The Effect of Smallholder Vegetable Production on Children's
Dietary Quality and Nutritional Outcomes: Evidence from Vietnam

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The thesis is submitted in fulfilment of the
requirements for the degree of
Doctor of Philosophy

The Centre for Global Food and Resources
Faculty of the Professions
The University of Adelaide

December 2019

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2015	Genova, C 2015, 'Does vegetable production lead to improved dietary quality? The case of Lao Cai, Vietnam', poster presented at the AGB-2012-059 Project Mid-Term Review, Sao Mai Bac Ha Hotel, 16-20 May.
2016	Genova, C 2016, 'A-WEAI and gender roles: lessons from the field', paper presented (virtual) at the CIAT-ACIAR gender workshop Strengthening the gender lens in agricultural production and value-chain research in Vietnam, Crowne Plaza West Hanoi, 6-7 October.
	Genova, C, Umberger, W, Newman, S & Peralta, A 2016, 'Food choices of the Mongs in the northwest uplands of Vietnam', paper presented at the Agri-food XXIII Research Network Conference, University of Adelaide, 7-10 December.
2017	Genova, C, Umberger, W, Newman, S & Peralta, A 2017, 'Linking smallholder vegetable production to children's diets: evidence from rural Vietnam', paper presented at the 61st AARES Annual Conference, Brisbane Convention and Exhibition Centre, 7-10 February.
	Genova, C, Umberger, W, Newman, S & Peralta, A 2017, 'To market, to market: does smallholder vegetable production lead to increased children's dietary diversity and improved dietary quality? Empirical evidence from northwest Vietnam', paper presented at the 2017 AAEA Annual Meeting, Chicago Marriott Downtown Magnificent Mile, 30 July- 1 August.
	Genova, C, Umberger, W, Newman, S & Peralta, A 2017, 'To market, to market: does smallholder vegetable production lead to increased children dietary diversity? Empirical evidence from North West Vietnam (Poster 26)', poster presented at the North-West Vietnam Research Symposium Mountains of Opportunity, Daewoo Hotel Hanoi, 22-24 November.
	Genova, C, Umberger, W, Newman, S, Peralta, A & Zeng, D 2017, 'Do farmers reap what they sow? Impact of smallholder vegetable production on child nutrition in rural Vietnam (Poster 37)', poster presented at the North-West Vietnam Research Symposium Mountains of Opportunity, Daewoo Hotel Hanoi, 22-24 November.
2018	Genova, C, Umberger, W, Newman, S, Peralta, A & Zeng, D 2018, 'Impact of smallholder vegetable production on child nutrition in rural Vietnam', paper presented at the 62nd AARES Annual Conference, Adelaide Convention Centre, 6-9 February.

Year	Citation
	Genova, C, Umberger, W, Newman, S & Peralta, A 2018, 'Dietary diversity of children and teenagers in northern Vietnam', paper accepted at the 30th International Conference of Agricultural Economists, The Westin Bayshore Vancouver, 28 July-2 August.
2019	Genova, C, Umberger, W, Newman, S & Peralta, A 2019, 'The impact of smallholder vegetable production on child nutrition in rural Vietnam', paper presented at the 63rd AARES Annual Conference, Melbourne Convention Exhibition Centre, 12-15 February.
	Genova, C, Umberger, W, Newman, S & Peralta, A 2019, 'Linking vegetable production and improved market access with improved dietary diversity for children and adolescents in northwest Vietnam', paper presented at the Seeds of Change: Gender Equality through Agricultural Research for Development, University of Canberra, 2-4 April.

Abstract

Children's undernutrition remains a major health concern in rural communities in northwest Vietnam. Recent studies propose leveraging agriculture to improve children's dietary quality and nutritional status. Increased vegetable production is a sustainable way to enhance their nutritional status and is a viable economic option to augment farm income, especially in rural communities where agriculture is the main source of livelihood. However, the overall impact of vegetable production in addressing children's undernutrition remains unexplored. This study presents empirical evidence on the role smallholder vegetable production plays in improving children's dietary quality and nutritional outcomes using three pathways that link agriculture and nutrition at the household level: 1) direct pathway via consumption of household's own food production due to lack of markets; and 2) indirect pathways via (a) consumption of diverse food due to market access and/or sales of agricultural produce, and (b) women's empowerment in agriculture. Data comes from a unique cross-sectional household survey that was collected in 2016, covering 510 households from four districts in northwest Vietnam.

Chapter 2 focuses on 653 children aged six months to 17 years old from 298 households. Nine models are estimated using a Poisson Generalised Linear Model and ordinary least squares (OLS) to explore the association of vegetable production diversity, market engagement, and women's empowerment with the Dietary Diversity Score (DDS) of children and adolescents. The results of this chapter suggest that market access and market participation can significantly improve DDS, especially of schoolchildren and adolescents. For young girls, market access is associated with a significantly higher DDS (by two food groups).

Chapter 3 focuses on nutritional outcome measures for children aged six months to five years from 188 households. Nine models are estimated using several estimation strategies for boys and girls: three-stage least squares, OLS, logistic regression, and seemingly unrelated regression to explain variations in several nutritional outcome measures, including height-for-age (HAZ), weight-for-height (WHZ), weight-for-age (WAZ) z-scores, and prevalence of stunting, wasting, and underweight. Results suggest that market participation is an important factor in improving young girls' HAZ and WHZ, and in reducing the probability of young boys being stunted and underweight.

Chapter 4 explores the parental food choice motivations of the 510 households using Exploratory Factor Analysis and two-step cluster analysis. Four distinct food choice factors exist: 'Natural and healthy', 'Familiarity', 'Balanced diet', and 'Convenience'. Two distinct consumer clusters are identified that are significantly different in household dietary quality, wealth, education, ethnicity, and geographic location: 'Health-conscious' households and 'Pragmatic' households. Results show the importance of incorporating food choice motivations in future dietary change interventions to ensure that they are tailored to different groups with distinctive motivational factors.

Overall, the study finds an indirect association between smallholder vegetable production on dietary quality and nutrition outcomes. The results imply that additional income from selling vegetables allows households to purchase diverse food, which could have a positive impact on the dietary quality and nutritional outcomes of these children. Understanding these associations and parental food choice motivations can help the Government of Vietnam to develop dietary change interventions that, by using a targeted approach, will be more resource-efficient.

Declaration

I certify that this work contains no material which has been accepted for the award of any other degree or diploma in my name, in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. In addition, I certify that no part of this work will, in the future, be used in a submission in my name for any other degree or diploma in any university or other tertiary institution without the prior approval of the University of Adelaide and where applicable, any partner institution responsible for the joint-award of this degree.

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7 May 2019

Acknowledgements

A large number of individuals and organisations have provided considerable contributions to this research. Therefore, I would like to express my appreciation to the following:

First and foremost, acknowledgement goes to the University of Adelaide for the Adelaide Scholarship International (ASI), and to the Australian Centre for International Agricultural Research (ACIAR) for the research funding.

The successful completion of my research project and candidature materialised because of the unwavering support of my three main supervisors at the Centre for Global Food and Resources (GFAR): Prof. Wendy Umberger, Dr. Suzie Newman, and Dr. Alexandra Peralta. The opportunities they have provided for my personal growth, and their overall supervision and guidance, made this journey intellectually stimulating and quite memorable. For that, I am forever grateful. Prof. Umberger and Dr. Newman (Plant and Food Research, formerly with GFAR) were especially instrumental during my application to the University, in the development of my research proposal, and in securing research funding for my PhD research as part of the AGB/2012/059 project funded by ACIAR. In addition, I am extremely grateful to Prof. Umberger for providing me the GFAR PhD Scholarship after the expiration of my university scholarship in 2017, ensuring the completion of my research work without having to worry about financial obligations to the University. Dr. Newman, who I have known since 2006, was not only an academic supervisor but also a strong pillar providing emotional support and advice especially during the lowest points of this journey. Grateful appreciation also to Dr. Peralta for her suggestions in the survey instrument, and for her valuable supervision in the sampling design and in my Chapter 2. In addition to my main supervisory committee, appreciation also goes to Dr. Di Zeng for his significant guidance and supervision in my Chapter 3; to Dr. Manuel Solis (Adelaide Law School), Prof. Sarah Wheeler (GFAR), Prof. John Williams and Anne Witt (Adelaide Graduate Centre) for the encouragement during the critical juncture of my candidature; to Dr. Natasha Caulfield and Julia Avdeeva from GFAR for their overall support, especially with the GFAR scholarship and travel-related matters, respectively; to Dr. Alec Zuo (GFAR) for his assistance with the

1 Introduction

1.1 The situation in Vietnam

Vietnam has demonstrated significant economic growth after the "*Doi Moi*" (or the renovation) initiated in 1986. The number of people living below the national poverty line had declined from 18 per cent in 2004 to 11 per cent in 2012 (GSO 2012). During this time, the extent of undernourishment in the Vietnamese population also fell from 14 per cent in 2004 to eight per cent in 2012 (von Grebmer et al. 2014). There were also significant reductions in the prevalence of stunting of children under five (from 43% in 2000 down to 25% in 2015) and in underweight among children under five (from 27% in 2000 to 14% in 2015) (Chaparro et al. 2014; NIN 2015; NIN & UNICEF 2011). Interestingly, Vietnam is the only developing country in Asia (including India) with a steady rise in vegetable availability per capita (Johnson et al. 2009).

Nevertheless, the positive impact of economic development differs between urban and rural areas, by regions, and across ethnic groups (Epprecht et al. 2009; GSO 2012; NIN 2015; NIN & UNICEF 2011). For instance, 14 per cent of households in the rural areas are poor while only four per cent of households in urban areas were impoverished in 2012 (GSO 2012). By region, poverty rates and the prevalence of undernutrition are highest in the Northern Midland and Mountainous areas, the North Central and Central Coastal areas, and the Central Highlands where ethnic minority communities are geographically concentrated, compared to the other regions that have major cities (e.g. Red River Delta and South East) (GSO 2012; NIN 2015).

Past nutritional programs focused on the implementation of nutrition-specific interventions. They significantly reduced undernutrition rates in the country but failed to meet targets due to declining financial support from the national and local governments

for these activities, and the poor nutritional knowledge of mothers and household members, among other reasons (Socialist Republic of Vietnam 2012).

One way to lessen the financial burden of nutrition programs is to promote agriculture, animal husbandry and other existing production systems in locations with high proportions of these vulnerable groups (poor, undernourished. and ethnic minorities) (Alderman et al. 2013). Bhutta et al. (2013) estimated that if populations can access and scale-up a set of ten evidence-based nutrition-specific approaches, with 90 per cent coverage of the population in need, stunting of children under five could be reduced by 20 per cent. The remaining 80 per cent could come from multi-sectoral, nutrition-sensitive programs and policies; for instance, putting in place agricultural interventions, social safety nets, and improving women's social status and empowerment in agriculture (Ruel et al. 2013). By doing so, the Government of Vietnam could save possibly one-half of the 100 billion VND[1] per year (Socialist Republic of Vietnam 2012) it spends on nutrition-specific interventions.

1.2   The role of agriculture in nutrition

Agriculture is linked with nutrition in several ways. For one, it provides households with diverse foods, either through market purchases or, in the case of some farming households, through their own food production. Agriculture is also the main income source for three-fourths of the world's poor in the rural areas where undernutrition[2] persists (Ravallion et al. 2007). Therefore, tapping and maximising the contribution of agriculture to nutrition is crucial. Investing in and improving the dietary quality of smallholder farmers in rural areas can improve their well-being, overall productivity,

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[1] Vietnamese Dong
[2] See definition in Sec 1.7.1

income and, possibly, their nutritional status. 'Nutrition-sensitive agriculture' is an approach that tries to tackle the underlying cause of undernutrition, in this case the lack of physical and/or economic access to food, and it attempts to enhance the coverage and effectiveness of nutrition-specific interventions (Alderman et al. 2013; Ruel et al. 2013).

Alderman et al. (2013) identified several pathways through which agriculture can improve nutrition: increasing nutrient-dense food production for households that produce their own food by diversifying crops and ensuring year-round food access; promoting market engagement; and empowering women through targeted agricultural interventions, which can improve diets and micronutrient status. Many studies have found some correlation between these factors. In Uganda, for instance, women who are engaged in small-scale fruit and vegetable production have a 12 per cent higher intake of fruit and vegetables and have higher haemoglobin levels of between 0.14 to 0.15 grams per decilitre than non-producer peers (Kabunga et al. 2014). Crop diversification through an integrated home garden (horticulture, aquaculture and animal husbandry) in Vietnam also positively increased the intake of energy, iron, vitamin A, and protein among children in intervention households (English & Badcock 1998). For low- and middle-income countries, the diversity of their agricultural production correlates with the diversity of food available for consumption (Fanzo et al. 2014). This means that countries like Vietnam should find a balance between allowing large-scale production of its top agricultural exports without compromising diverse domestic agricultural production for domestic consumers.

A systematic review of the effects of selected agricultural interventions (for instance, vegetable home gardens, small-scale fish production and aquaculture, animal husbandry, poultry development, dairy development, irrigation, mixed livestock/gardening, cash

cropping, among others) on young children and women in low-income countries has also shown improvements in household consumption levels, dietary diversity, and intakes of certain micronutrient-rich foods (particularly vitamin A) when nutrition education, gender and nutritional objectives are explicitly stated. Literature reviews by Berti et al. (2004), Girard et al. (2012), Kawarazuka and Bene (2010), Leroy and Frongillo (2007), and Masset et al. (2012), showed that home garden programs increased the consumption of fruits and vegetables, aquaculture and small fisheries interventions increased the consumption of fish, and dairy development increased the consumption of milk. Girard et al. (2012) also found that home gardens with animal production led to positive dietary improvements, for instance, improved dietary diversity scores and vitamin A intakes for both women and young children. However, the effect on stunting has been inconclusive because impact assessments were conducted shortly after interventions had taken place. Most interventions were aimed at reducing immediate, short-term undernutrition (underweight and wasting) rather than chronic undernutrition (stunting) (Masset et al. 2012). Similarly, it is also possible that certain projects, which only target increasing women's time spent in agricultural production without considering childcare for instance, improve food availability and dietary quality at the expense of child welfare, leading to poor growth, anaemia or morbidity (Berti et al. 2004). Hence, significant improvements in the methodological rigor and assessment of future food-based interventions, to strengthen causality and attribution, are suggested due to the poor methodological designs and lack of statistical power of existing studies (Girard et al. 2012; Leroy & Frongillo 2007; Masset et al. 2012; Ruel 2001; Webb 2013)[3].

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[3] Ruel et al. (2013) and Webb (2013) reviewed these systematic reviews, and concluded that while most of the homestead food production programs were not significantly effective in

1.3   Research gaps

Globally, ethnic minorities (also known as indigenous peoples' groups) have been shown to have a higher prevalence of noncommunicable diseases and poorer health outcomes, compared to the rest of the population (Damman 2005; Einsiedel et al. 2013; Montenegro & Stephens 2006; Murphy et al. 1997; Schulz & Chaudhari 2015; Teufel-Shone et al. 2015). Therefore, dietary assessment is the first step to effectively implement any type of health interventions among these populations.

Many dietary assessment studies have been conducted in Vietnam, either using primary or secondary data, or with an emphasis on certain groups or geographical locations. For instance, several studies have used representative samples from the Vietnam Household Living Standard Survey (VHLSS) to examine household calorie and macro- and micronutrient intakes during specific time periods (Dien et al. 2004; Hoang 2009; Hoang 2018; Mishra & Ray 2009; Thang & Popkin 2004). Other studies have conducted consumption studies that look at the consumption patterns in Hanoi's urban and peri-urban areas (e.g. Ali et al. 2006; Hoang 2018).

Several dietary quality studies have also measured the dietary diversity and/or micronutrient adequacy of certain groups, such as women of reproductive age, infants and/or young children (Nguyen, PH et al. 2013a; Nguyen et al. 2014; Nguyen, PH et al. 2013b), and the potential impact of food fortification vehicles (rice, fish/soy sauce, micronutrient- fortified instant flour, food complement containing amylases, and fortified biscuits) (Laillou et al. 2012a; Laillou et al. 2012b; Laillou et al. 2012c; Nga et al. 2009; Pham et al. 2012; Van Hoan et al. 2009).

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improving child and maternal nutritional status (stunting, micronutrient intakes) with the possible exception of vitamin A, this was largely due to poor study designs and lack of methodological rigor. The weak and mixed results do not indicate zero positive impacts, but weak attribution of results to interventions.

However, no previous study has investigated the dietary quality of ethnic minority communities in remote rural areas of Vietnam, including Lao Cai province. In addition, none has explored the relationship of dietary quality and diet-related nutritional outcomes[4] with household production of nutrient-rich vegetables as well as related factors like market access and market participation, socioeconomic status, education, women's empowerment, and food choice motives. These other factors may mediate the relationship between vegetable production and nutritional improvements as explicitly discussed in Sec 1.8.

Preschool children, schoolchildren, and adolescents are especially vulnerable to undernutrition, as their requirements for energy and nutrient-dense food are high to fully maximize their physical growth potential during these dynamic formative periods (DiMeglio 2000; Ochola & Masibo 2014; WHO 2002). Vegetable consumption is, therefore, a practical and sustainable way to tackle undernutrition because it is one of the nutrient-dense foods, and vegetables are readily available in the province (see Sec 1.9).

1.4   Aims/Objectives of the study

This study aims to add to the literature on dietary quality and nutritional outcomes of smallholder households producing vegetables. Specifically, we empirically examine the role that smallholder vegetable production plays in the dietary quality and nutritional outcomes of preschool, schoolchildren, and adolescents from ethnic minority communities in Lao Cai province, Vietnam.

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[4] Diet-related nutritional outcomes pertain to changes in the height and body composition of an individual. The effect of undernutrition on children under five years of age may either be low height in relation to age (stunting) or low weight in relation to height (wasting); for older children and adults, it may manifest through low body mass index. See Sec 1.7.1 for more details.

Three specific research questions are proposed, which are addressed by the three main analytical chapters (Chapters 2 to 4):

1. *What is the relationship between smallholder vegetable production and the dietary quality of preschool, schoolchildren, and adolescents? What other factors are also key determinants of improved dietary quality?*

2. *What is the relationship between smallholder vegetable production and nutritional outcomes of children under five years old? What other factors are also key determinants of better child nutritional outcomes?*

3. *What are the factors motivating food choices of the main food decision-makers in smallholder households? Can we find unique segments with similar factors motivating their food choices, and develop profiles of these segments to allow targeted nutrition programs to improve nutritional outcomes, particularly of young children?*

1.5   Significance/Contribution to the discipline

Overall, this research adds to the body of literature that assesses the link between production, consumption, and nutrition using rigorous and statistically sound methodologies. This body of work also validates the importance of smallholder vegetable production (regardless of farm scale) and engagement with markets in improving dietary intake, and as a means of reducing undernutrition in Lao Cai province in the long run. Lastly, from a policy perspective, this can inform the Government of Vietnam in combining approaches that focus not only on nutrition-specific interventions but also on ones that are more sustainable and resource-efficient. This means capitalizing on the

existing farm production systems and using them to address the province's nutritional problems.

1.6   Building the case for Lao Cai province

Lao Cai province, in the Northern Midlands and Mountainous region of Vietnam, is a temperate, vegetable-producing region. In 2016, its total vegetable output was 128,617 tons from 11,732 hectares (Lao Cai Statistics Office 2017) compared to the country's 14.9 million tons produced from 1.0 million hectares (FAOSTAT 2018). It is an ideal research location because: (1) it is among the poorest provinces in Vietnam, with 22 per cent of its population below the poverty line (Lao Cai Statistics Office 2017); (2) it has one of the country's highest rates of stunting and underweight among children under five; (3) it is home to various ethnic minority communities, many of whom are considered among the most vulnerable groups in the country; (4) it is one of the country's vegetable-producing areas, and farming is the main livelihood; (5) it has relatively low fruit and vegetable consumption per capita; and (6) government programs have already been implemented in the province, attempting to overcome nutrition issues, aimed mainly at iron, vitamin A, and iodine deficiency (Chaparro et al. 2014).

In the province, nearly one-third of children under five years experience stunting and one-fifth being underweight, due to insufficient household food security (caused by poverty) and inadequate maternal and child care (NIN 2015; NIN & UNICEF 2011). These measurements are considered effective approximations of the nutritional status of the population (FAO et al. 2013). Likewise, the prevalence of anaemia among children under five and pregnant women in the region are the highest in the country at 35 per cent and 46 per cent, respectively (NIN & UNICEF 2011). The prevalence of stunting and underweight decreased by 50 per cent between 2001 and 2011 due to the implementation

of several programs outlined in the National Nutrition Strategy 2001-2010 (Socialist Republic of Vietnam 2012). However, progress remains slow. It therefore requires a different approach; one that considers examining agricultural production and its role in meeting adequate dietary intake, and, consequently, addressing childhood undernutrition.

The main ethnic minority groups are the Mong (22%), the Tay (16%), the Dao (14%), the Giay (5%), and the Nung (4%) (Lao Cai People's Committee 2016). A study by Epprecht et al. (2009) looked into the relationship between ethnicity and poverty, and found that many ethnic minority groups are geographically concentrated in the northern uplands and they face a 'spatial poverty trap', which means that their location limits their access to various resources like health, education, infrastructure, and credit. These findings were also reported by the World Bank Country Analysis report (World Bank 2009 as cited by Dang 2012).

Returns to education are much lower for ethnic minority groups compared to ethnic majority group like the Kinh (Imai et al. 2011). In some cases, ethnic minority groups also resist state intervention in favour of their traditional cultural knowledge (Bonnin & Turner 2012). For instance, the Mong's dependence on shifting cultivation, livestock breeding and terrace field farming, and their lack of access to scientific and technological advances, are major factors in their poverty (Tinh 2002).

Farming constitutes 93 per cent of the economy in this region, especially in the rural areas (Linh & Glewwe 2011). The area is suitable for increased vegetable integration and intensification due to its climate and soil (Wijk & Everaarts 2007). In this region, many rural households are smallholder farmers, where the average vegetable area is 0.30 hectare and farm operations are primarily dependent on family manual and animal labour (Tran 2003; Wijk & Everaarts 2007; Ye & Pan 2016). Many smallholder farmers (72-

85%) mainly grow vegetables (e.g., cabbage, cauliflower, leafy greens, fresh legumes, herbs and spices) for their own consumption because their small landholdings limit their ability to reach commercial scale production (International Food Policy Research Institute 2002). In spite of this, fruit and vegetable consumption is only 88 grams/capita/day (GSO 2012, pp. 279-283), which is well below the recommended 400 grams/capita/day (WHO & FAO 2005). The diet is high in staples and low on fruits, vegetables and animal products, and micronutrient intakes are suboptimal, even among the wealthiest quintiles (Nguyen et al. 2014).

Several factors could explain the poor dietary quality in this region:

- Market engagement: Households have low dietary quality because of long distances between their houses and the nearest food markets, thereby limiting their access to diverse food (market access) and their ability to sell their produce (market participation).

- Low educational levels and/or poor nutritional knowledge: Households make poor dietary choices, regardless of physical and economic access to diverse and nutritious food, due to their lack of nutritional knowledge.

- Gender roles: Male decision-makers in households that are engaged in cash crop production sell most of their high quality produce in the market or to private traders, and buy micronutrient- and protein-poor staples and non-food items. When women are empowered in agriculture and participate in making household decisions on the type of food to grow, purchase, and cook for other household members, they tend to select food that are nutritionally beneficial.

- Low socioeconomic status: Rural farmers cannot afford to buy diverse foods.

- Farm scale: Many rural farmers are engaged in subsistence production and there is little diversity in the crops they produce.

- Ethnicity: Food consumption habits can differ by ethnicity. Certain ethnic minority groups in northern Vietnam have homogenous diets, largely based on staple grains, like rice, with minimal consumption of micronutrient-rich foods, like meat, fruits and vegetables.

The remainder of this chapter presents additional background information on child undernutrition and its economic implications to individuals and society; its causes and the short- and long-route interventions; women's empowerment in agriculture, market engagement, parental food choice motivations, and other factors that can improve a child's health. Information on several indicators of dietary quality and dietary diversity used in developing countries are also presented. The conceptual framework and methods underpinning the empirical work are then discussed, and an overview of each of the remaining chapters is presented.

1.7   Overview on child undernutrition

1.7.1   Malnutrition defined

Malnutrition is defined as "an abnormal physiological condition caused by inadequate (undernutrition), unbalanced or excessive consumption (overnutrition) of macronutrients and/or micronutrients (micronutrient deficiencies[5])" (FAO et al. 2018, p. 160). "Undernutrition is the outcome of poor nutritional intake in terms of quantity and/or quality, and/or poor absorption and/or poor biological use of nutrients consumed as a result of repeated instances of disease" (FAO et al. 2018, p. 161). It is a global problem

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[5] This is referred to as hidden hunger in other literatures (for instance, Alderman et al. 2013).

with significant implications for an individual's survival, disease incidence, full physical growth and development, and economic productivity (Black et al. 2013).

1.7.2   The problem of undernutrition

In 2014, an estimated 784 million people were undernourished globally; and 523 million of these were from Asia (FAO et al. 2018). The number of undernourished people has declined by more than 100 million since 2005. In developing countries, it has declined from 14 per cent in 2005 to 11 per cent in 2014. Despite this overall success, more work is required as the decreasing trend is now reversing (FAO et al. 2018).

Children are the segment of the population most vulnerable to undernutrition. Globally, in 2013, undernutrition caused approximately 45 per cent of all deaths among children under five (Thompson & Amoroso 2014; UNICEF 2014). It weakens the immune system and compounds the effects of preventable infectious diseases such as pneumonia, diarrhea and malaria (Black et al. 2013; Brogan & Jen 2010; Caulfield et al. 2004; Kennedy et al. 2006; Muller & Krawinkel 2005; Neumann et al. 2002; UNICEF 2014). It also leads to physical disabilities and compromised intellects (Alderman et al. 2013; Black et al. 2013; Nisbett et al. 2014; Péter et al. 2014; Ruel et al. 2013; von Grebmer et al. 2014; World Bank 2006).

For children under five years, undernutrition manifests in low weight in relation to height (wasting) and age (underweight), and low height in relation to age (stunting). In the case of adolescents and adults, undernutrition manifests in low body mass index (BMI)[6] (Alderman et al. 2013; FAO et al. 2014). Wasting, or acute undernutrition, is a

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[6] The WHO (2010) recommends the cut-off below -2 standard deviations (SD) and -3 SD (-2/-3 standard deviations below the median person in that age group) as moderate to severe stunting (height-for-age measure), wasting (weight-for-height), and underweight (weight-for-age), respectively; for adolescents and adults, body mass index below 18.5 kg/m^2 is considered chronically energy-deficient.

result of a recent significant weight loss due to insufficient food intake or infectious disease. Long-term undernutrition leads to stunting or chronic undernutrition. Underweight can imply either stunting or wasting (Alderman et al. 2013; Levinson & Bassett 2007). de Onis et al. (2012) proposed using stunting as an overall indicator of children's (under five years old) health and nutritional status due to the nutrition transition[7] occurring in many developing countries – that is, the continued prevalence of stunting, and the increasing rate of overweight and obesity (and declining underweight rates).

In 2017, an estimated 155 million children under five were stunted and 52 million were wasted. The number of children affected is concentrated in Asia and Africa (UNICEF et al. 2017), where it is projected to remain a problem until 2020 (de Onis et al. 2012). Within countries, the prevalence of stunting, wasting, and underweight, and mortality rate are generally higher in poorer families in rural communities (Black et al. 2013; Levinson & Bassett 2007; Paciorek et al. 2013; Pinstrup-Andersen 2007), and among certain ethnic minority groups, compared to the rest of the population (Damman 2005; Einsiedel et al. 2013; Montenegro & Stephens 2006; Murphy et al. 1997; Schulz & Chaudhari 2015; Teufel-Shone et al. 2015). When children from these groups grow up, their undernutrition (stunting) may be passed on to the succeeding generation (an intergenerational cycle of undernutrition) because maternal health and nutrition and that of their future offspring are intimately linked (Branca et al. 2015; Walker et al. 2015).

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[7] Kimenju (2014) found that the nutrition transition led to reduction in the prevalence of underweight and child stunting. Fat consumption, the increasing share of modern retail in grocery sales, and the prevalence of overweight women were used as indicators of the nutrition transition from various cross-country data.

1.7.3   Economic consequences of undernutrition to individuals and to society

Undernutrition due to micronutrient deficiencies can have debilitating effects on the cognitive development, physical functioning and, eventually, on an individual's productivity. It implies higher budget outlays for health services and, because of reduced productivity, gross domestic product (GDP) and/or gross national product (GNP) loss. In many developing countries, where a large share of the population suffering from poor health and/or nutritional status is directly involved in agriculture, not directly addressing micronutrient deficiency can lead to GNP loss (WB 1994 as cited by Stein & Qaim 2007). In China and India, preventing micronutrient deficiencies is estimated to be worth around US$2.5 billion (or up to US$5 billion in China) in increased GDP annually, which represents 0.20 and 0.40 per cent[8], respectively, of its annual GDP (Stein & Qaim 2007; World Bank 2006)[9]. In Indonesia, micronutrient deficiencies come at a cost of US$0.75 billion (Alderman et al. 2003 as cited by Thompson & Amoroso 2014). Considering only iron deficiency, it is estimated that low- and middle-income countries lose an average of 0.60 per cent of their GDP to iron deficiency in adults. Including iron-deficiency induced damage to children's cognitive and motor development brings the economic loss to four per cent of GDP (Horton & Rose 2013 as cited by Levinson & Bassett 2007).

Previous studies have assessed the economic losses of several indicators of undernutrition (underweight, stunting, low birth weight, anaemia, suboptimal breastfeeding practices, and folic acid-related birth defects, among others) in Albania, Lao PDR, and Cambodia. These losses have been assessed using four discrete pathways: mortality and disability of children with consequent loss of value to the future workforce;

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[8] Stein and Qaim (2007) estimated around one to two per cent of India's GDP.
[9] Figures from World Bank (2006) and Thompson and Amoroso (2014) may need further validation.

childhood cognitive development deficits resulting in inferior school performance and adult productivity; the current value of depressed productivity in working adults; the current value of excessive and preventable healthcare and welfare utilization (Bagriansky 2010; Bagriansky et al. 2014; Bagriansky & Voladet 2013). Using an algorithm to calculate the net present value (NPV) of losses with a three per cent discount rate, these studies found a loss of one per cent of GDP, worth US$107 million annually in Albania; a loss of two per cent of GDP, worth US$200 million annually in Lao PDR; and a loss of one to two per cent of GDP, worth US$419 million in Cambodia. The majority of these future losses arise from workforce losses due to child mortality, and from lower earnings due to childhood cognitive and educational deficits.

Behrman et al. (2004) identified three types of losses arising from undernutrition: higher resource costs from spending more on health care; direct losses due to reductions in physical productivity; and indirect losses due to poor cognitive development or delay and/or absenteeism from school and reduced future earnings. In the United States, for instance, the excessive medical cost due to low birth weight, attributed to maternal smoking, was US$263 million in 1995 (Lightwood et al. 1999 as cited by Behrman et al. 2004). In Brazil, a one per cent increase in height leads to a two per cent increase in wages or earnings, regardless of a person's gender, in the labour market (Thomas & Strauss 1997 as cited by Behrman et al. 2004). Alderman et al. (2001) and Alderman et al. (2003) as cited by Behrman et al. (2004) also found that undernutrition decreases the probability of ever attending school in Pakistan and Zimbabwe. A one year delay in entry to primary school in Ghana entails a three per cent loss of a child's lifetime wealth (Glewwe & Jacoby 1995 as cited by Behrman et al. 2004). These findings confirm those of other studies. McCarron and Heaney 2004 as cited by Gyles et al. (2012), also found that poor

intake of dairy products in the United States costs in excess of US$200 billion, over a five-year period, in health care expenditure on obesity, hypertension, Type 2 diabetes, osteoporosis, kidney stones, certain pregnancy outcomes, and some cancers. In terms of reduction in physical productivity, the efficiency wage hypothesis posits that poor nutrition leads to poor productivity because poor workers are unable to generate sufficient income to obtain sufficient calories to be productive (Behrman et al. 2004; Hoang 2009). Horton and Rose 2003 as cited by Thompson and Amoroso (2011), found that iron deficiency anaemia in ten developing countries leads to per capita physical productivity losses of US$2.30, or one per cent of present GDP, reaching US$16.80 per capita, or four per cent of present GDP, after factoring in cognitive losses. In South Asia alone (Bangladesh, India and Pakistan), the absolute value of physical productivity losses amounts to US$4.2 billion annually.

The more undernourished children in a country, the higher the strain on its development prospects. It is therefore important to understand the determinants of undernutrition to improve intervention programs and policies.

1.8   Causes of undernutrition, and short- and long-route interventions

The UNICEF's conceptual model is commonly used to explain the causes of child undernutrition and mortality (Alderman et al. 2013; Black et al. 2008; Ruel 2008; Smith & Haddad 2000; UNICEF 1990, 2013). In this framework, inadequate dietary intake and diseases are the immediate determinants of children's undernutrition. These factors, which often occur together, are caused by several underlying factors, such as the lack of physical or economic access to food, poor maternal and childcare practices, and an unhealthy environment due largely to low incomes. Dietary inadequacy can be addressed by implementing several short-route, nutrition-specific interventions that immediately

improve nutrition. Save the Children (2012) proposed six life-saving low-cost solutions: iron folate supplements; breastfeeding; complementary feeding; vitamin A supplements; zinc for diarrhea; and improved water, sanitation and hygiene. Alternatively, longer route, multi-sectoral programs and policies with a nutritional outcome component can also be adopted; for instance, agricultural interventions, poverty reduction, income generation, and educational reforms (Alderman et al. 2013; Carter 2014; Ecker & Nene 2012; Ruel 2008; Webb 2013).

Poverty limits a household's ability to access adequate food, education, health services and care, and a clean environment (Black et al. 2008 as cited by Alderman et al. 2013). Once populations have stable access to food and move beyond their concerns about food scarcity, they can begin to address dietary quality (Temple 2013). However, the prevalence of stunting is also high in the richer, urban areas in Vietnam (Khan et al. 2007; Ministry of Health et al. 2010; Nguyen, HT et al. 2013; van Lierop et al. 2008). Therefore, this may not reflect a lack of access to an adequate diet but unequal intrahousehold food allocation or poor dietary choices, among others, despite the availability of diverse and nutritious foods.

1.8.1 Women's empowerment in agriculture and maternal education

Understanding the direct effect of agricultural interventions in improving the nutritional status of women and children requires a further look at intrahousehold dynamics to ensure food-based interventions are effective, since the relationship between production and consumption is not straightforward. Women tend to be more concerned than men with the health and well-being of children and men (Quisumbing et al. 1995). Hence, women's status and empowerment, their ability to select and spend on diverse and nutritious food for their families, their educational level, and their nutritional knowledge have been found

to be strong determinants of reducing childhood undernutrition, as well as ensuring the effectiveness of food-based interventions (Berti et al. 2004; Girard et al. 2012; Kawarazuka & Bene 2010; Leroy & Frongillo 2007; Smith & Haddad 2000).

One of the most recent multidimensional survey tools that measures women's empowerment in agriculture is the Women's Empowerment in Agriculture Index (WEAI). It was developed in 2012 by the International Food Policy Research Institute (IFPRI), the Oxford Poverty and Human Development Initiative (OPHI), and the U.S. Agency for International Development (USAID) (Alkire et al. 2013). The WEAI assesses the degree to which men and women decision-makers are empowered using 10 indicators from five domains: (1) decisions about agricultural production; (2) access to and decision-making power about productive resources; (3) control of the use of income; (4) leadership in the community; and (5) time allocation to primary productive and domestic tasks. However, certain operational issues (for instance, the excessively long completion time of the survey leading to respondent fatigue) and complexities in how some modules are designed and phrased led to the creation of the Abbreviated-Women's Empowerment in Agriculture Index (A-WEAI). It is a shorter version of WEAI, using only six indicators from five domains (Malapit et al. 2017). Since its launch, the associations between women's empowerment on health outcomes have been mixed. In Ethiopia, when women are empowered in relation to group membership, access to credit, autonomy in production, and workload, it positively affects young children's and women's dietary diversity (Yimer & Tadesse 2015). In Bangladesh, when women are involved in decision-making about the spending of household income, household purchases and healthcare, it increases the odds of young children (6-24 months) in meeting the minimum dietary diversity requirements (Bhagowalia et al. 2012). Malapit and Quisumbing (2015) and

Malapit et al. (2015a) find weak (or no) associations between indicators of women's empowerment and the diets of young children under two years in Ghana and under five years in Nepal, respectively. Further investigation, to test the validity of the WEAI in more cross-cultural settings, is suggested.

Maternal education is also an important factor in mitigating child mortality (Caldwell 1979). Various pathways have been suggested for the way maternal education can improve dietary quality and children's health outcomes, although causal associations remain debatable (Hobcraft 1993). Overall, maternal education can increase health knowledge, improve socioeconomic status via higher wages or higher productivity, increase female's autonomy in familial decision-making, and improve reproductive outcomes (Schultz 1984 as cited by Babu et al. 2014; Frost et al. 2005; Glewwe 1999). Each (or a combination of these) pathway can translate to better quality childcare and feeding practices, higher demand for diversified food (Moon et al. 2002) and healthier food choices (Variyam et al. 1998), and therefore improve children's health (Mishra & Retherford 2000; Semba et al. 2008). One study in Vietnam (Nguyen, PH et al. 2013a) found that children whose mothers had reached high school were 1.7 times more likely to achieve the minimum dietary diversity requirement than those mothers who did not go to school. Using data from several developing countries, Cleland and Van Ginneken (1988) found that one to three years of maternal education translates to a 20 per cent decline in the risk of childhood death. This strong association exists in many developing countries, regardless of geographical region and access to better health services.

1.8.2   Market engagement

Market engagement also plays a crucial role in improving food security and nutritional outcomes. It can affect nutrition either directly (through consumption of one's own food

production rather than selling their produce), indirectly (income earned from semi-commercial production, and diversified food purchases due to market proximity), or through both consumption and indirect measures (Aberman et al. 2015; Darrouzet-Nardi & Masters 2015; Minot et al. 2006). There is evidence in the literature that the effect of market engagement on nutrition measures is larger than agricultural diversity per se (for instance, Hirvonen & Hoddinott 2017; Koppmair et al. 2017; Sibhatu et al. 2015; Stifel & Minten 2017). Proximity to food markets (market access) allows households to gain immediate access to diverse foods, and this may explain the better health status of children who are located closer to food markets than those who reside in remote areas (Abay & Hirvonen 2016; Koppmair et al. 2017).

1.8.3 Food choice motives

Children's undernutrition may also occur due to poor dietary choices. The motives behind parents' selection of foods to purchase and to prepare for the household can directly influence children's diet, their dietary behaviours and, ultimately, their nutritional outcomes (Hursti 1999; Oellingrath et al. 2013; Russell et al. 2015; Søndergaard & Edelenbos 2007). Food choice and diet-related behaviours are quite complex, because they are influenced by a myriad of factors from biology and personal experience with food to people's physical, social, and cultural environment (Contento 2011). Dietary changes due to market globalisation, economic development, supermarket evolution, and altered work patterns (Cunha et al. 2018; Damman et al. 2008), have resulted in increased cases of noncommunicable diseases (WHO 2002). Hence, recent studies on food choice have not only focused on market research (for instance, Baudry et al. 2017; Chen 2007; Forestell et al. 2012; Hoek et al. 2011; House 2016; Lockie et al. 2004; Prescott et al. 2002; Prescott et al. 2004; Stolz et al. 2011), but also on the promotion of eating healthy

food (Locher et al. 2009; Mardon et al. 2015; Miedema et al. 2016; Mitterer-Daltoe et al. 2013; Pollard et al. 2002; Steptoe et al. 2016).

1.8.4 Other factors that affect children's health

Community characteristics, such as access to health facilities, clean water sources and sanitation, also affect children's health (UNICEF 1990, 2013). Glewwe et al. (2003) studied the effect of household income growth and access to health services on children's health in Vietnam during the 1990s, and found that access to a pharmacy had a larger impact than household income growth. Furthermore, the provision of sanitary toilets and adequate supply of oral rehydration tablets are also likely to lead to substantial improvements in childhood nutrition. Water, sanitation, and hygiene (WASH) also affect children's health outcomes by altering the environment to prevent infectious diseases, like diarrhea, affecting household members. In Nepal, WASH can mediate the association between women's empowerment and the HAZ of children aged 6-24 months (Cunningham et al. 2018). When disentangling these effects, improved sanitaton may have greater impacts on children's health than access to clean water supplies. The Young Lives cohort study in Ethiopia, India, Peru, and Vietnam (Dearden et al. 2017), and the study of Cyriac et al. (2017) suggest that this may be the case. Further investigation is suggested using longitudinal data to validate the association.

Other factors, such as geographic heterogeneity, unequal intrahousehold food allocation due to certain biases and the seasonality of vegetable production, can also affect children's health. Geographical location can impose disadvantages and lead to poorer quality diets and nutritional outcomes. These geographical differences may arise from a location's (dis)advantage in vegetable production due to elevation or other factors (Tran 2003). Intrahousehold food allocation can also be affected by age and gender biases, and

seasonal food shortages. Young children and/or women in certain villages in Bangladesh and the Philippines receive proportionately lower energy and protein intakes than their adult male counterparts (Abdullah & Wheeler 1985; Senauer et al. 1988), while in Indonesia, women consumed more carbohydrates than other family members (Wibowo et al. 2015). Therefore, incorporating various age groups from preschool children to schoolchildren and adolescents into studies and programs is recommended (Finaret et al. 2018). It is not only preschool children or children under five years, who require energy and nutrient-dense food to maximise their full physical growth potential. Schoolchildren and adolescents undergo a dynamic transitional period. It is during this period that nutritional requirements are highest (DiMeglio 2000; Ochola & Masibo 2014; WHO 2002).

1.9 Dietary quality and dietary diversity measurements

One method of assessing diet-related health is dietary quality. It is measured by scoring food patterns based on how they align with national dietary guidelines, and how diverse food variety is within the identified food groups (Wirt & Collins 2009).

Dietary diversity is a key component of a good quality diet (Hawkes & Ruel 2012; Oldewage-Theron et al. 2013; Ruel 2003). It is characterized by a combination of nutrient-dense foods, like fruits and vegetables, fish, meat and whole grains (Maillot et al. 2007; Vadiveloo et al. 2014). Lack of diversity, or variety, in a diet can lead to micronutrient deficiencies in "…iron (causing anaemia, lassitude, and learning difficulties), iodine (causing goitre and cretinism), and vitamin A (causing xerophthalmia, impaired night vision, and eventually blindness)" (World Cancer Research Fund/American Institute for Cancer Research 2007, p. 350). Poor dietary diversity also leads to high stunting rates (FAO et al. 2013). Recommendations to combat specific

deficiencies not only include micronutrient supplementation and food fortification, but also increasing the consumption of meat and other foods of animal origin (for iron), fish, and fruits and vegetables (for vitamins) (World Cancer Research Fund/American Institute for Cancer Research 2007).

Consuming more fruits and vegetables appears to reduce specifically the risk of some cancers, stroke, and heart disease (Boffetta et al. 2010; He et al. 2006). This could be attributable to the phytochemicals (for instance, flavonoids, carotenoids, phenols, vitamins and minerals) found in fruits and vegetables, that could be responsible for the protective effect against certain cancers, cardiovascular diseases, stroke and cataracts in adults, and asthma and bronchitis which are common forms of chronic obstructive pulmonary disease (COPD) in children (Van Duyn & Pivonka 2000). For instance, bitter gourd (*Momordica charantia*) is known for its anti-diabetic properties among certain indigenous populations, although further scientific testing is advised to test its validity (Leung et al. 2009). It is high in carbohydrates and proteins (Bakare et al. 2010), calcium and magnesium, and vitamin C, beta-carotene and lutein (Zhang et al. 2009).

There are several methods to measure dietary quality at the individual level. In developing countries, where the main concern is inadequate dietary intake, nutrient adequacy is often used. However, since quantifying nutrient intake is time-consuming and prone to methodological challenges in developing countries, dietary diversity is used because of its relative simplicity (Torheim et al. 2004). It is a simple count of food items or food groups consumed over a specified period by an individual or household, and is a useful tool to predict dietary quality for both adults and children (Arimond & Ruel 2004; Headey & Ecker 2013; Moursi et al. 2008; Ruel 2013; Wiesmann et al. 2009). A systematic review done by Ruel (2013) showed that dietary diversity indicators predict

micronutrient adequacy and anthropometry of women and children in developing countries (see Tables 18.1 to 18.4 for selected studies in a developing country context).

The most common dietary diversity indicators are the food variety score (FVS), which counts the number of individual food items; the dietary diversity score (DDS), which counts the number of different food groups; the food frequency score (FFS), which reveals how often a food group was consumed over a specified time period; and the food consumption score (FCS), which attaches greater weight to more nutritious food groups like meat, fish and milk, and less weight to oil and sugar (Headey & Ecker 2013). However, count measures have several disadvantages: they do not differentiate between healthy and unhealthy food, and they do not consider the distribution of the foods in the diet (Drescher et al. 2007). They also require consumption of a minimum quantity of foods to be included in the score (Ruel 2013).

A better measure, reflecting diversity and dietary quality, is the Healthy Food Diversity Index (HFD-Index)[10] developed by Drescher et al. (2007). It is a validated measure of nutritional adequacy (Leschewski et al. 2017), and has been implemented in Germany (Drescher et al. 2009), Canada (Drescher & Goddard 2008), and the United States (Vadiveloo et al. 2014). The index takes a value between 0 and almost 1, with higher values reflecting greater consumption of healthier foods in a household. Unlike other count measures of dietary diversity, such as the DDS, the HFD-Index is multidimensional and measures dietary variety, dietary quality, and proportionality (consuming larger or fewer amounts of certain food groups based on the dietary guidelines) (Drescher et al.

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[10] We attempted to use both DDS and HFD-Index in this study for comparison; however, due to the absence of any correlation between our variables of interest and HFD-Index, its use was eventually dropped.

2007). This index encourages proportionality and penalizes the consumption of a single high-quality commodity or equal consumption of all food groups (Vadiveloo et al. 2014).

1.10 Conceptual framework and methods

1.10.1 Conceptual framework

This study uses the UNICEF's conceptual framework to identify the determinants of childhood undernutrition (UNICEF 1990, 2013). It identifies three causes of children's undernutrition in developing countries: immediate, underlying, and basic. The immediate causes are inadequate dietary intake and/or diseases (health). Both affect each other and are due to lack of access to: food, either physically and/or economically; quality maternal and childcare practices; clean water and sanitation facilities; and adequate health services at the household/family level, driven primarily by income poverty. The basic factors are institutional, political, environmental and economic in nature, and their solution require concerted efforts from many institutions (Alderman et al. 2013; Black et al. 2008; Ruel 2008; Smith & Haddad 2000; UNICEF 1990, 2013).

1.10.2 Three pathways of agriculture-diet-nutrition linkages

A number of pathways have been identified linking agriculture and food systems with nutritional outcomes (Alderman et al. 2013; Carletto et al. 2015; Dangour et al. 2012; Gillespie et al. 2012; Herforth & Harris 2014; Kadiyala et al. 2014; Kanter et al. 2015; Pinstrup-Andersen 2014; Turner et al. 2013; Webb 2013). At the household level, the link between agriculture and nutrition could be a result of one or a combination of three factors: (a) consumption of own food production due to lack of market access, (b) consumption of more nutritious food from sales of agricultural produce and/or proximity to markets, and (c) gender-related factors which could be linked to women's social status

and empowerment in agriculture, education, health and nutritional status. These three pathways are used to assess the associations between smallholder vegetable production and dietary quality and children's nutritional outcomes in Chapters 2 and 3, respectively. Essentially, we hypothesize positive associations leading to improved dietary quality and nutritional outcomes as previously discussed in Section 1.2. These associations are further influenced by other confounding factors, such as seasonality of produce, geographic heterogeneity, ethnicity, education, age group, and an individual's gender (Sec 1.8), among others, which are also considered in the survey design and subsequent analyses.

1.10.3 Methods

Previous assessments of agricultural interventions found that they had many methodological issues (Girard et al. 2012; Leroy & Frongillo 2007; Masset et al. 2012; Ruel 2001; Webb 2013). Several suggestions by Masset et al. (2012), i.e. use of proper metrics (for instance, household income and consumption and indices of dietary diversity), and collection of anthropometric measurements to detect the effect, were therefore considered in this study.

To fully understand the consumption patterns of the ethnic minority communities in the province, two layers of primary data collection were conducted: Participant Observation Study and the Vietnam Rural Household Survey[11].

The Participant Observation Study was undertaken in July-August 2015. The aim was to observe and document the consumption and shopping behaviours of six households in selected areas in the districts of Bac Ha and Sa Pa, and in Lao Cai city for six weeks. To do this, the PhD student, accompanied by a locally-based researcher from the Vietnam

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[11] Ethics approval no. H-2015-059 (Appendix A-1)

National University of Agriculture (VNUA), stayed in each household for a week to record the types and portion sizes of food prepared and consumed in each meal, food source, main decision-maker in food preparation/selection, and the market days in the target sites. This was to get a better understanding of what the commonly used dishes, cups, bowls and glasses are, including their various sizes, and share this information with the enumerators for them to accurately estimate the portion sizes during the actual survey implementation. Identifying the main food decision-maker and preparer to target as our main respondent in the actual survey was also critical to ensure that we collected quality and complete information on intrahousehold food consumption. We also enquired about the market days in each target district to: (a) assess how market day affects household consumption patterns compared to ordinary days, and (b) determine how to properly administer the 24-hour food recall in several non-consecutive days during the week of the actual survey.

Results of the Participant Observation Study showed that in low-income households, the male and female decision-makers share responsibility in the food preparation, purchase of ingredients, and feeding the younger children in the household. In relatively wealthier households, female decision-makers are mainly responsible for these activities. It was also observed that weekday versus weekend consumption (market day) was different. These results were then incorporated into the design of the Vietnam Rural Household Survey, especially in selecting which non-consecutive day to conduct the food consumption module.

The Vietnam Rural Household Survey entailed face-to-face interviews with the target respondents in July-August 2016 (round 1) and November 2016 (round 2). The food

consumption data was collected in these two time periods in order to capture seasonal fluctuations in household's food consumption.

In total, 510 households out of 3,035[12] households from four districts in the province were interviewed in the Vietnam Rural Household Survey. The target respondents were: (a) the main food preparers[13] in households, responsible for making meal decisions and/or meal preparations; and (b) the male household heads, responsible for making agricultural production decisions. A multistage stratified random sampling process was used to select the household respondents. To capture the geographic heterogeneity of the target areas, the following strata were used: elevation and vegetable production density per capita. Details are explained in Chapter 2, Section 2.2.

The list of households in each commune was gathered in June 2016 by visiting all of the communes selected through the multistage stratified random sampling process (Appendix A-2). Commune/Village information was also collected by interviewing the commune/village leaders using a Commune-Village questionnaire (Department of Agriculture, Forestry and Fishery Statistics – Ministry of Planning and Investment 2006, see Appendix A-4).

The paper-based semi-structured survey questionnaire is composed of 13 modules (Sections A to M), excluding the Screener and Cover pages (Appendix A-6). It covers modules on: sociodemographic information including anthropometrics; food consumption using 24-hour recall; Household Food Insecurity Access Scale (HFIAS); food choice motives and dietary beliefs; A-WEAI for male and female decision-makers; maternal care and micronutrient supplementation; health status, access to clean water and

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[12] This does not include the number of households from four villages (11B 12 in Sa Pa Town; Pao Pao Chải in Pha Long, Muong Khuong; and Dì Thàng 2 in Na Hối, Bac Ha.

[13] Each household identified the main food decision-maker and food preparer.

sanitation, and exercise and smoking status; household characteristics and assets; household income and expenditure; farm characteristics, crop and livestock output; vegetable input expenditure; and economic shocks.

In designing the questionnaire, information was obtained from the public domain or from other researchers known to the PhD student. For instance, the overall questionnaire design was adapted from a previous project "Markets for high-value commodities in Indonesia: Promoting Competitiveness and Inclusiveness (ADP/2005/006)" that was commissioned to the Centre for Global Food and Resources (formerly Global Food Studies), University of Adelaide, by ACIAR (Minot et al. 2010; Minot et al. 2011). Other modules were adapted from published literature; for instance, food choice motivations was adapted from Steptoe et al. (1995) and Lindeman and Vaananen (2000) since relevant questions had been cross-culturally validated. These sources are indicated in Table 1.1. Copyright permissions have been obtained, as applicable (for instance, Appendix A-8).

The paper-based survey questionnaire was pre-tested in Hanoi and in the study areas in March, June, and July 2016. It was transferred to the mobile data platform CommCare v.2.28.0 (Dimagi, Cambridge, MA) from April-June 2016 by Smart Decision, a company based in Tanzania, with final modifications completed before the Training of Enumerators in July 2016. A detailed Training Manual (Appendix A-5) was provided to a team of 22 enumerators and five field supervisors from the Mekong Development Research Institute (MDRI), who facilitated the survey implementation. The training of enumerators was divided into two parts: conceptual, where enumerators learned about each module in the whole questionnaire and the rationale or objectives for collecting the data; and practical, where enumerators learned how to navigate CommCare, how to collect anthropometric measurements, and how to measure portion sizes in the

intrahousehold food consumption module. Each enumerator was provided with a tablet device; infantometer, digital weight scale, and tape measure for collecting anthropometric measurements; and digital kitchen scale, graduated plastic cylinders, modelling clay, and shredded paper for measuring portion sizes.

Based on the results of the Participant Observation Study, the household (and intrahousehold) food consumption patterns (Appendix A-6, Sec B) were collected using the 24-hour food recall on several occasions. The 24-hour food recall is a method for estimating total food intake by assessing dietary patterns during the 24 hours prior to the interview (Himmelgreen & Crooks 2005). It is commonly used due to low respondent burden, high compliance rates, low costs, use of standardized interviews, and ease of administration. However, it also relies heavily on memory, overestimates low intakes and underestimates high intakes, and may provide inaccurate estimates of portion size (Baranowski 2012; Himmelgreen & Crooks 2005).

Considering these limitations, it is recommended to collect information multiple times, for instance, three non-consecutive days, to mitigate the effects of these drawbacks. The three-day recall period is the recommended minimum number of days for dietary recall studies and includes two weekdays and a weekend day (Baranowski 2012; Kral et al. 2009; Nelson et al. 1989). In this study, the 24-hour food recall was administered in three reference periods or data days: two non-consecutive days (one weekday and one weekend day that was a market day) during round 1, and one (any day of the week) in round 2. Due to budgetary restrictions, we were only able to collect data for one 24-hour recall period in round 2.

Food access is generally determined by income and food price, but consumers also select food based on taste, nutritional value, variety, social norms, and convenience.

However, for the marginally poor, food cost makes all the difference (Antin & Hunt 2012; Brinkman et al. 2010; Darmon et al. 2004; Maillot et al. 2007). Therefore, the consumption module (using 24-hour food recall) also include information on food source (if home grown, purchased, sourced from neighbours/friends, etc.) to examine households' ability to physically access food, purchase price, and quantity consumed (portion sizes). Ruel (2003) raised two issues in the use of dietary diversity indicator: selection of food groups to use and the use of portion sizes. This study used the National Institute of Nutrition's (NIN) 14-scale food consumption groups (Ministry of Health & NIN 2007). Portion sizes were measured using actual weights (enumerators were trained on how to use portable measuring scales) (Gibson & Ferguson 2008).

1.10.4 Three analytical chapters

The three analytical chapters in this thesis each address the specific research questions identified in Section 1.4. The chapters share some similarities in the background information and/or the use of certain variables in the regression models. This is because each paper attempts to present the overall problem being addressed in this study (i.e. childhood undernutrition) and uses the same background information of the province. Similarly, Chapters 2 and 3 use the same pathways to examine the associations of smallholder vegetable production on the selected outcome variables. However, each paper has a different objective, and uses different measures of association. Below is an overview of the subsequent chapters. The tables and figures are at the end of each chapter.

Chapter 2 analyses how smallholder vegetable production is associated with improved dietary diversity. The data set includes 653 preschool, schoolchildren, and adolescents,

aged six-months to 17 years old from 298 households[14], with complete information in both survey rounds. In this paper, the main variables of interest are vegetable production diversity; travel time to the nearest market as indicator of market access, and the value of the vegetables sold as a share of total vegetable production in the last production cycle as an indicator of market participation; and the four weighted indicators of women's empowerment from the modified A-WEAI (women's access to and decisions on credit; control over income; group membership; and workaway[15]).

Nine models are estimated using the Poisson Generalised Linear Model and ordinary least squares (OLS) to see associations between the indicators of vegetable production diversity, market access and participation, and women's empowerment on the Dietary Diversity Score of children and adolescents (DDS). The analyses are done separately for the pooled, and age- and gender-disaggregated samples. All regression models control for other confounding variables, such as household, child, and food preparer characteristics. The results present associations, not causal relationships, between our main variables of interest and the DDS because it did not address endogeneity due to the absence of sufficiently strong instruments.

Chapter 3 analyses how smallholder vegetable production is associated with improved child nutrition outcomes. The data set includes young children, aged six-months to five years, from 188 households in the first round. In this paper, the main variables of interest are the vegetable production indicators: vegetable production diversity, travel time to the nearest market as an indicator of market access, and two dummy variables to indicate

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[14] Out of the 510 households, 298 households have children and adolescents aged six months to 17 years old with complete information on consumption in both survey rounds.
[15] *WorkAway* is a weighted women's disempowerment or inadequacy score. An individual is assigned a value of 1 (inadequacy) if she worked for more than 10.50 hours in the past 24 hours, and 0 if otherwise (Malapit et al. 2015b). This value is then multiplied by the assigned weight to arrive at the weighted inadequacy score.

market participation (household has sold to traditional channels, and to modern channels in the last production cycle). Traditional channels are those that exist locally, such as the local market in the village/commune/district, selling to fellow farmers, and selling to collectors who visit the farm. Modern market channels include supermarkets, wholesale markets, cooperatives, and other retailers in Hanoi and other provinces.

Nine models are estimated for young boys and girls: three-stage least squares (3SLS), OLS, logistic regression, and seemingly unrelated regression (SUR) to explain variations in several nutritional outcome measures, including: height-for-age (HAZ), weight-for-height (WHZ), weight-for-age (WAZ) z-scores, as well as three other measures (stunting, wasting, and underweight). All regression models control for other confounding variables: women's empowerment (two dummy variables for women's control over income and workload[16]); household characteristics including improved sanitation; children's characteristics; and maternal characteristics, including height and body mass index. We use several instruments to account for the potential endogeneity of vegetable production diversity and the two dummy variables for market participation. The main results of the 3SLS estimates are therefore used for inference and are compared with OLS, logistic regression, and SUR estimates to determine the possible direction of the bias.

Chapter 4 investigates the factors motivating food choices of the main food decision-makers of the 510 rural households, and identifies consumer clusters with similar motivational factors. A modified Food Choice Questionnaire (FCQ) is used to assess 47 items from 11 factors: 'convenience', 'natural content', 'ethical concern', 'weight control', 'sensory appeal', 'price', 'religion', 'familiarity', 'health', 'mood', and

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[16] *Workload* is a binary measure of women's empowerment or adequacy. It is equal to 1 if a woman's workload is less than the time poverty line of 10.50 hours, and 0 if otherwise (Malapit et al. 2015b).

'balanced'. Descriptive statistics, Exploratory Factor Analysis, Two-step Cluster Analysis, Independent Samples t-test, and Pearson chi-square statistics are used in the analyses. Clusters are profiled according to household dietary diversity, food security, and other selected characteristics of the food preparer, household, and community.

Chapter 5 presents the overview of the study and summarises the major findings of the three analytical chapters (Chapters 2 to 4). It also presents the overall contributions and the limitations of the study, and outlines potential areas for future research.

Table 1.1 Different modules of the survey questionnaire and its sources

Module	Description	Source(s)
Sec A	Household characteristics	
	Grade conversion table for general education systems	GSO et al. (2011)
Sec B	Consumption	
	24-hour food recall	Gibson and Ferguson (2008); Raneri et al. (2014)
	Food consumption tables	Ministry of Health & NIN 2007; NIN (1995); NIN and Wageningen University (2013)
	Household Food Insecurity Access Scale	Coates et al. (2007)
Sec C	Food choice and dietary beliefs	
	Modified Food Choice Questionnaire	Lindeman and Vaananen (2000); Steptoe et al. (1995)
Sec D	Gender	
	Modified Abbreviated-Women's Empowerment in Agriculture Index	Malapit et al. (2015b)
	Gender dimensions of household decision-making processes	Climate Change, Agriculture and Food Security (CCAFS) et al. (2013); Yamano et al. (2016)
Sec E	Micronutrient supplementation, breastfeeding practices and maternal knowledge about nutrition information	NIN (2013)
Sec F	Health indicators, access to clean water and sanitation, handwashing practices, and lifestyle	
	Access to clean water and sanitation	WHO and UNICEF (2006)
Sec G	Other household characteristics and assets	
Sec H	Non-farm expenditure sources in the last 12 months	
Sec I	Household income sources in the last 12 months	
Sec J	Farm characteristics	
Sec K	Crop and animal output and disposal in the last cropping cycle	
Sec L	Vegetable input expenditures in the last cropping cycle	
Sec M	Economic events/shocks	Ahmed (2013)

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Statement of Authorship

Title of Paper	Linking vegetable production and market access with improved dietary diversity for children and adolescents in northwest Vietnam
Publication Status	☐ Published ☐ Accepted for Publication ☐ Submitted for Publication ☒ Unpublished and Unsubmitted work written in manuscript style
Publication Details	This chapter is being prepared for submission to the Food Security journal[17].

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i. the candidate's stated contribution to the publication is accurate (as detailed above);

ii. permission is granted for the candidate in include the publication in the thesis; and

iii. the sum of all co-author contributions is equal to 100% less the candidate's stated contribution.

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[17] This version is formatted to meet the University thesis requirement. It includes references to other chapters, which are removed in the submitted version.

Name of Co-Author	Wendy J. Umberger		
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2 Linking vegetable production and market access with improved dietary diversity for children and adolescents in northwest Vietnam

Abstract: Many households in Southeast Asia suffer from low dietary diversity, which is a leading cause of persistent undernutrition. Children and adolescents are especially vulnerable to undernutrition, since they require energy and nutrient-dense food to maximise their full physical and cognitive potential. This paper investigates the determinants of dietary diversity for children aged six months to 17 years from smallholder farming households in Lao Cai Province, Vietnam. Three pathways that link agriculture with household diets and dietary diversity scores: vegetable production diversity, market engagement, and women's empowerment, are considered. Regressions are estimated for the pooled, age- and gender-disaggregated samples using a Poisson Generalised Linear Model to explore associations between individual Dietary Diversity Score (DDS) and variables representing the three pathways, and other covariates. Both measures of market engagement, market access and market participation, are associated with significant improvements in DDS. For preschool girls, increased market access is significantly associated with an increase in DDS by up to two food groups. Household income and the educational attainment of the food preparer are statistically significant covariates associated with improved DDS of children. Improving nutritional knowledge of the main food preparer, promoting market engagement, and implementing interventions targeted at the low-lying and low vegetable density per capita areas may lead to improvements in dietary diversity.

Keywords: children; dietary diversity; gender; market access; vegetable production; Vietnam

2.1   Introduction

Dietary diversity is a key component of a high quality diet (Hawkes & Ruel 2012; Oldewage-Theron et al. 2013). It is characterized by a combination of nutrient-dense food like fruits and vegetables, fish, meat and whole grains (Maillot et al. 2007; Vadiveloo et al. 2014). Dietary diversity has been shown to be positively associated with nutritional adequacy in both children and adults (Arimond et al. 2010; Kennedy 2009; Mirmiran et al. 2004; Moursi et al. 2008; Nithya & Bhavani 2018; Ogle et al. 2001; Steyn et al. 2014; Steyn et al. 2006; Torheim et al. 2004). It is essential to physical growth, cognitive development, physical functioning, and, eventually, adult productivity (Black et al. 2013; World Cancer Research Fund/American Institute for Cancer Research 2007).

In Southeast Asia, many households suffer from low dietary diversity due to homogenous diets (Dorado et al. 2018; Food and Nutrition Research Institute-Department of Science and Technology (FNRI-DOST) 2012; McDonald et al. 2015; Nguyen et al. 2013; Wangpakapattanawong et al. 2016), which is a leading cause of persistent undernutrition (Thompson & Amoroso 2014). Homogenous diets are generally based on staples such as grains, like rice, or starchy vegetables, roots and tubers, with minimal consumption of nutrient-rich foods, like meat, and fruits and vegetables (Arimond & Ruel 2004; Ruel 2003).

Preschool children[18], schoolchildren, and adolescents are especially vulnerable to diet-related health issues[19]. In particular, children aged six months to five years require energy

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[18] Preschool children refer to children who are five years old and below, while schoolchildren and adolescents refer to those who are over five years of age. In this chapter, 'young children', 'young boys', and 'young girls' will be used interchangeably to refer to preschool children; while 'older children', 'older boys', and 'older girls' refer to schoolchildren and adolescents. The general terms 'boys' and 'girls' are independent of age.

[19] In this thesis and in this analysis, we did not include infants under six months old since they normally derive most of their nutritional intake from breastfeeding. However, children aged six

and nutrient-dense food to maximize their full physical growth potential and reduce the probability of them being stunted. Greater dietary diversity has been shown to be positively associated with better nutritional status among young children in developing countries (Arimond & Ruel 2004; Sawadogo et al. 2006). Furthermore, school-aged children and adolescents undergo a dynamic transitional period between childhood and adulthood. While better nutrition is required from infancy to adolescence, it is during the latter period that nutritional requirements are highest (DiMeglio 2000; Ochola & Masibo 2014; WHO 2002).

The measurement of dietary diversity, or the number and type of food groups consumed, differs between countries, since the main food groups commonly eaten across countries varies. Caution is advised when making cross-country comparisons. Nevertheless, a number of studies that look at the individual diets of preschool children (Arimond & Ruel 2004; Ey Chua et al. 2012; Marriott et al. 2012; Rah et al. 2010; Steyn et al. 2014), schoolchildren, and adolescents (Dorado et al. 2018; Getaneh et al. 2017; Herrador et al. 2015; Steyn et al. 2014) in developing countries find low dietary diversity.

Agriculture is the main source of food and livelihoods for many rural households in developing countries (Ali et al. 2013), and thus, contributes both directly and indirectly to individual and household dietary quality and nutrition. Agriculture and individual dietary quality and nutrition have been linked in the literature via the following three pathways: (1) household production of agricultural products which may subsequently be consumed by the household members; (2) market engagement where at least a share of the agricultural products produced by the household are sold at markets generating

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months to 17 years old are vulnerable to age and gender biases in intrahousehold food allocation (see Sec 1.8.4).

agricultural income used to purchase diverse food products, or access to a wide variety of food due to market proximity; and (3) gender-related factors influencing women's empowerment with respect to household decisions (Dangour et al. 2012; Gillespie et al. 2012; Herforth & Harris 2014; Kadiyala et al. 2014; Kanter et al. 2015; Pinstrup-Andersen 2014; Turner et al. 2013).

In pathway 1, the diversity and specific mix of agricultural crops cultivated by a household can influence household members' dietary quality. This is especially true for subsistence households that only consume what they produce (Muller 2009).

Pathway 2 relates to how poor market access and low household incomes can be interrelated, and its effect on dietary diversity as previous research has shown (Abay & Hirvonen 2016; Koppmair et al. 2017; Sibhatu et al. 2015). However, when households have increased market access and opportunities for market participation, they are faced with complex decisions about which agricultural crops to produce, consume and sell, and how to use any additional income generated from the sale of agricultural crops.

In pathway 3, the role women play in resource-poor households affects the diets of household members (Alderman et al. 2013). As women tend to be more concerned with the health and well-being of children and other household members, their ability to control resources at home, to have access to credit, and to spend time selecting and preparing diverse and nutritious food for the family can have a strong, positive effect on household dietary quality, especially on children's diets (Quisumbing et al. 1995). Furthermore, the literature on women's empowerment show that when mothers are empowered, the dietary diversity of both mothers and children improves. For instance, in Ethiopia, Yimer and Tadesse (2015) found positive associations between four indicators of women's empowerment (group membership, access to credit, autonomy in production,

and workload) and young children's (under 72 months), as well as women's dietary diversity. Bhagowalia et al. (2012) found that in Bangladesh, women's involvement in decision-making related to control over financial resources, decisions regarding daily and large household purchases, decisions regarding their own healthcare, and decisions regarding visits to relatives, increased the odds of meeting the minimum dietary diversity for young children aged 6-24 months.

In addition to the three pathways, other factors can also affect dietary diversity. For example, intrahousehold food allocation may be unequally distributed due to age and gender biases, and seasonal food shortages (Abdullah & Wheeler 1985; Gittelsohn 1991; Luo et al 2001). Girls and women of reproductive age in certain countries in East and South Asia are often discriminated against when it comes to intrahousehold food allocation (Gittelsohn 1991; Luo et al. 2001; Madjdian & Bras 2016; Murphy et al. 2011; Rahman 2018). In some rural villages in Bangladesh and the Philippines, children under five years old receive proportionately lower energy and protein intakes compared to the household's adult males (Abdullah & Wheeler 1985; Senauer et al. 1988). Hence, Finaret et al. (2018) suggested examining different age groups, including schoolchildren and adolescents, since most nutrition intervention programs only focus on children under five years of age. These associations are further influenced by other confounding factors like geography, ethnicity, religion, and education, among others.

This paper helps bridge a gap in the literature by considering all three pathways to estimate the empirical link between vegetable production diversity, market engagement, women's empowerment, and the dietary diversity of children aged six months to 17 years. We use a unique cross-sectional data set collected in 2016 in Lao Cai province, northwest Vietnam. The province is a temperate vegetable-producing region in the Northern

Midlands and Mountainous region of Vietnam. It is an ideal research location for several reasons. Firstly, the province is among the poorest in Vietnam, with 22 per cent of its population living below the poverty line (Lao Cai Statistics Office 2017). Secondly, the region is home to many ethnic minority groups, which are considered to be among the most vulnerable groups in the country (Kozel 2014). Generally, they show preference for sons, due to their patriarchal and patrilocal clan system (Jones et al. 2014). Boys play significant cultural and economic roles, especially in religious rituals, in continuing the family heritage and in providing support to parents during old age (Jones et al. 2014). Thirdly, while many rural households are dependent on farming as the main source of their livelihoods, with many growing vegetables for their own consumption due to small landholdings (International Food Policy Research Institute 2002), vegetable consumption per capita remains low[20] (GSO 2012).

Fourthly, the region has the highest rates of child marriage (19%), where women marry before their eighteenth birthday (UNICEF & UNFPA 2018). Evidence shows that early marriages and premature childbearing can have a negative effect on maternal health (Goli et al. 2015), which can be transferred to her offspring (Parsons et al. 2015).

Lastly, many households are poor due to a "spatial trap"; i.e. their remoteness limits their access to resources like health, education, infrastructure and credit, and they may be isolated from both input and output markets (Dang 2012; Epprecht et al. 2009; Kozel 2014). Furthermore, their strong adherence to cultural traditions versus acceptance of new

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[20] Vegetable intake of 24 kg/cap/year (67g/capita/day) from GSO (2012, p. 283). These should be taken with caution as the national average values differ by source– FAOSTAT has 148 kg/capita/year for 2013 (FAOSTAT 2018) while the National Institute of Nutrition (NIN) has 72 kg/capita/year for 2009 (or about 195g/capita/day) (NIN & UNICEF 2011, p. 28) which are both higher than Vietnam Household Living Standards Survey (VHLSS) estimates.

agronomic technological innovations that offer opportunities to improve productivity and efficiency is also a major factor to their poverty (Bonnin & Turner 2012).

The remainder of this paper is divided into four sections. The Data section includes information on the selection of the target sites and rural households, dietary assessment using the 24-hour recall methodology, the derivation of the Dietary Diversity Score, the econometric estimation strategy, and the list of vegetables consumed and produced. The Results section discusses the relationships between children's and adolescents' dietary diversity and subsistence production (pathway 1); market engagement (pathway 2); and women's empowerment in agriculture (pathway 3), while also controlling for a number of other important covariates in the regression models. Regressions are estimated using pooled, age- and gender-disaggregated samples. The Summary, Discussion, and Limitations section summarises the findings and the limitations of this work, and provide recommendations for further research.

2.2 Data

The authors gathered the data set analysed in this study as part of an extensive rural household survey conducted in July-August 2016 and November 2016 in Lao Cai province, Vietnam. Data was collected in two time periods to capture possible seasonal variations in both household consumption and household vegetable production. The survey sample included households from four districts (Bac Ha, Sa Pa, Muong Khuong and Si Ma Cai). The selection of districts was based on having a minimum elevation of 600 meters or more above sea level (masl), as temperate vegetable cultivation is best achieved at higher altitudes. Figure 2.1 shows the administrative map of the province that is colour-coded to indicate geographic heterogeneity.

Smallholder households were selected using a stratified multistage sampling strategy. Households had to be engaged in agricultural production (of any product, not just vegetables) during the past three years to qualify for the study. Communes in the four selected districts were grouped using the median elevation and median vegetable density per capita data. From the elevation and vegetable density per capita data, each commune was coded as either low elevation (<=1335 meters) or high elevation (>1335 meters), and low vegetable density per capita (<=98) or high vegetable density per capita (>98). Then, communes were categorised into four strata: low vegetable density per capita-low elevation (LV-LA); low vegetable density per capita-high elevation (LV-HA); high vegetable density per capita-low evaluation (HV-LA); and high vegetable density per capita-high elevation (HV-HA). Finally, three communes in each stratum, and four villages per commune were randomly selected[21]. In each village, ten households were randomly selected from a list of households provided by the rural commune (*xã*)/commune-level town (*thị trấn*) administrative officers, yielding 510 households from 51 villages in 13 communes.

Detailed information was collected on household and individual food consumption patterns, women's empowerment, farm production and crop disposals, market engagement, and sociodemographic. Data for each member of the household were collected to measure intrahousehold differences in consumption behaviour. In each household, the main food preparer was interviewed, along with the household head (or the spouse, if the main food preparer was the household head).

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[21] We purposely included one commune and three villages in Sa Pa district to be of some benefit to the project (AGB/2012/059) which funded this research.

Our analyses focused on households with children aged six months to 17 years. After excluding households in the sample with incomplete information for the variables, the final sample consisted of 653 children from 298 households who have complete information in the two survey periods.

2.2.1 Dietary assessment using the 24-hour food recall

Data on food variety and the patterns of consumption were collected using the 24-hour food recall methodology, which is a common method of acquiring individual consumption data (Baranowski 2012; Thompson & Subar 2013). The 24-hour recall is based on an individual's recall of the quantities of food consumed during the previous 24 hours. One of its advantage over other methods is that it minimizes potential recall bias due to the shorter recall period. However, it also suffers from within-person random error since it only captures a snapshot of individual consumption patterns that could vary day-to-day.

One solution to address the within-person random error from only one 24-hour recall period is repeated administration of the 24-hour recall, with the number of reference periods varying, depending on the observed day-to-day variability of individual food consumption (Baranowski 2012; Gibson & Ferguson 2008). In this study, we used three reference periods or data collection days: two 24-hour periods in July-August 2016 (round 1), and one 24-hour period in November 2016 (round 2). In the first survey round, we selected non-consecutive reference periods: one weekday and one weekend day.

The decision to collect on both a weekday and a non-consecutive weekend day was based on an intensive ethnographic study conducted with selected households in the study area in July and August 2015 (Sec 1.10.3). The ethnographic study was conducted to understand household consumption and shopping behaviours, and to assess the variability

in consumption, if any, between ordinary days (weekdays) and the weekend, which was when local markets were generally held. We observed that the relevant households had relatively homogenous diets daily, and thus, within-person random error would not likely pose a serious problem. This means that the type of food normally consumed by the household and its individuals does not vary significantly day-to-day, and therefore will not likely be a source of measurement error when estimating an individual's usual intake. However, we observed that food consumption differed on weekend days compared to weekdays for households that participated in local weekend markets. Also, because consumption of leftover food the following day was quite common, dietary intake was collected in two non-consecutive days, one weekday and one weekend day. In the second survey round, we were only able to collect food consumption data on one day of the week due to budgetary restrictions.

The food consumption module was composed of two sections. In the first section, the respondent was asked to list and provide the quantity of all dishes and individual food items served to all household members in each reference period. The list included both food prepared at home and those sourced elsewhere, including food eaten away from home. Then, we asked about the intrahousehold food consumption, or the amount consumed by each household member. If other household members were in the house during the time of the interview, they were asked to participate to confirm and verify their consumption. The second part contained the list of ingredients used in all home-cooked dishes mentioned in the first section.

2.2.2 Development of the Dietary Diversity Score (DDS)

The intrahousehold food consumption data allowed us to calculate the individual Dietary Diversity Score (DDS), defined as a simple unweighted count of the number of unique

food groups consumed by an individual household member in each reference period. In this study, the DDS ranges from 1 to 14, and is based on the 14 food groups in the Vietnamese Food Composition Table 2007 edition[22]: cereal and products; starchy roots and tubers; nuts and beans; vegetables; fruits and berries; oils, fats and butters; meat, poultry game and its products; fish, shellfish, and products; eggs and products; milk and milk products; canned products; sugars, preserves and confectionery; soft drinks and other beverages including alcoholic drinks; and spices and sauces[23].

The derivation of the DDS considers all food items consumed by an individual in each reference period. These food items are classified three ways: (a) home-cooked meals; and food sourced elsewhere, either purchased or provided by relatives and/or neighbours, composed of (b) cooked meals, and (c) specific food items (uncooked) that were directly consumed by children, e.g. bread, branded milk, fresh fruits and raw vegetables, candies, chips, and juices. The individual DDS is the mean DDS of the two survey periods.

2.2.3 Empirical approach

Our empirical analyses consider the three pathways discussed previously that can link vegetable production to dietary diversity, while controlling for child, food preparer, and other household characteristics. Specifically, we estimated the *DDS* or the number of unique food groups of child *i* taken care of by food preparer *j* in household *h*, using the following equation (1):

$$DDS_{ijh} = \alpha i + \beta V_h + \lambda M_h + \psi G_h + \varphi' \boldsymbol{HH}_h + \delta \boldsymbol{CH}_i + \gamma' \boldsymbol{FP}_j + \varepsilon_{ijh} \qquad (1)$$

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[22] The food groups in the 1994 and the 2007 versions of the Vietnamese Food Composition Tables are similar, except that the ordering of food group "softdrink, beverages, alcoholic beverages (13)" and "condiments and traditional sauces (14)" are interchanged.
[23] A diverse diet which contains all the 14 food groups does not automatically translate to "good" diversity.

V_h is the unweighted count of the number of unique vegetables grown by household h where individual i resides; and V_h provides insight on pathway 1. Vegetable production diversity (V_h or *VegDiversity*) was assessed by asking the respondent about the types of vegetables cultivated and harvested (crop output and disposal) by the household in the previous 12 months prior to July/August 2016 (Keding et al. 2012). We expect the effect of *VegDiversity* on *DDS* to be positive and significant.

M_h is a vector of household market engagement variables that address pathway 2 and includes market access and market participation. Market engagement is an essential factor in the study of food security and nutritional outcomes as the impact of agriculture on nutrition can either be direct (consumption of own production), indirect (the income effect from semi-commercial production, and market proximity), or both (Aberman et al. 2015; Darrouzet-Nardi & Masters 2015; Minot et al. 2006).

Market access is often measured using distance to market or travel time (Koppmair et al. 2017; Meerman et al 2015; Sibhatu et al. 2015). In this study, we use the variable *TimeMarket_h* as proxy for market access, which is the travel time (one-way) from the residence to the nearest food market, because it takes into account road quality, terrain, transport networks, and the best available means of transportation (in most cases, the use of self-owned or rented motorbikes) (Epprecht et al. 2009). Furthermore, many households had difficulty estimating distance, which is likely due to the serpentine nature of the roads in these mountainous areas. Households with improved physical market access may have more diverse diets through: (1) improved access to a wider variety of food for purchase, and (2) improved access to a place to sell their food products and generate cash income that can be used for purchasing diverse food products. Therefore,

longer travel times to the nearest food market are expected to have a negative relationship with children's dietary diversity since certain food groups can only be purchased at the market.

We use the variable *VegValueSold* as a proxy for market participation (Meerman et al. 2015). *VegValueSold* is the value of the vegetables sold (to any market outlet) as a share of total vegetable production in the previous 12 months prior to July/August 2016. Households who actively participate in markets by selling their agricultural produce are able to use the additional income to purchase either a wide variety of food products or other goods.

G_h are the weighted individual women's empowerment scores based on the modified Abbreviated-Women's Empowerment in Agriculture Index (A-WEAI) (Malapit et al. 2015b), and is used to address pathway 3. There are six indicators included in the modified A-WEAI: input in productive decisions (*AgDecision*); ownership of assets (*Asset*); access to and decisions on credit (*Credit*); control over income (*Income*); group membership (*Group*); and workload (*WorkAway*). In our analyses, we used *Credit*, *Income*, *Group*, and *WorkAway*. *AgDecision* was correlated with *Income* (r=0.30), and all women decision-makers own at least two assets (*Asset*) indicating adequacy. *Credit*, *Income*, and *Group* are weighted women's empowerment or adequacy scores. Each indicator is assigned a value of 1 if the woman's (secondary decision-maker in the household) achievement is adequate, and 0 if otherwise (Malapit et al. 2015b). These dummy variables are multiplied by their assigned weights to derive the weighted women's empowerment or adequacy scores. *Credit* has a weight of 0.07, while *Income* and *Group* each has a weight of 0.20 (Malapit et al. 2015b).

WorkAway is a weighted women's disempowerment or inadequacy score. An individual is assigned a value of 1 (inadequacy) if she worked away from home for more than 10.50 hours in the past 24 hours, and 0 if otherwise. The weighted inadequacy score for *WorkAway* is derived by multiplying the inadequacy dummy variable by 0.20. Except for *WorkAway,* we expect the marginal effects of *Credit*, *Income,* and *Group* to be positive and significant. Women's ability to have access to credit, to control the resources at home, to select and spend on diverse and nutritious food for the family will have a strong positive effect on children's dietary diversity. Conversely, we expect a negative correlation between *WorkAway* and *DDS* since working longer hours in the field means less time to plan and prepare diverse and nutritious food for the family.

We also control for other confounding variables: household characteristics (**HH_h**), child characteristics (**CH_i**), and food preparer characteristics (**FP_j**). **HH_h** is a vector of household characteristics including the geographic stratum to which the commune belongs, according to elevation and vegetable density per capita (*LV-LA, LV-HA, HV-LA,* and *HV-HA*), monthly food expenditure per capita (*FoodExp_pc*), monthly non-food expenditure per capita (*NonFoodExp_pc*), total cultivated area (*Area*), and the number of years the household has engaged in vegetable cultivation (*Experience*).

CH_i is a vector of child-related controls that include age (*AgeChild*) and a dummy for male children (*MaleChild*). The variables in vector **FP_j** are controls for food preparer characteristics that include age (*AgeFoodPrep*), education (*EducFoodPrep*), and dummies for women as food preparers (*FemaleFoodPrep*) and belonging to the Mong ethnic minority (*MongFoodPrep*). ε_{ijh} is an error term.

We use a Poisson model due to the count nature of the dependent variable *DDS* (Cameron & Trivedi 1998). The Poisson estimator assumes equidispersion; i.e, the

conditional mean of the dependent variable should equal the conditional variance. This is commonly violated in practice (Wooldridge 2010). Since we suspect problems of underdispersion in our data, we estimated the association using Poisson Generalised Linear Model (Poisson GLM) (Wooldridge 2010), using robust standard errors, clustered at the household level, to correct for intrahousehold correlation of standard errors (Cameron & Trivedi 2010). For ease of interpretation, the marginal effects are reported for all explanatory variables for the Poisson GLM estimates. The marginal effects describe how an individual's dietary diversity score (*DDS*) changes when a regressor changes by one unit. Results using ordinary least squares (OLS) are shown in Appendix Table A2.8.

Except for *TimeMarket*, six main variables of interest (*VegDiversity*, *VegValueSold*, *Credit*, *Income*, *Group*, and *WorkAway*) are potentially endogenous. While we have instruments to address the endogeneity of *VegDiversity* and *VegValueSold*, our existing data does not have instruments for the four women's empowerment indicators. Therefore, the subsequent analyses only present associations and not causal relationships between our main variables of interests and *DDS*.

We use Stata v15.1 (StataCorp, College Station, TX) for the descriptive and statistical analyses. The succeeding analyses focus on children with complete information in both survey periods. In addition to the pooled sample, we estimated eight other regressions to examine the relationship by age group (children six months to five years, and greater than five to 17 years old), and gender (boys and girls), to identify any differential effects.

2.2.4   Characteristics of the sample

Table 2.1 provides the descriptive statistics of the variables included in our analysis for the pooled sample. The complete descriptive statistics by age group and gender are in

Appendix Table A2.4. Our sample is composed of 298 households with children and adolescents six months to 17 years. The total number of observations is 653, composed of 334 boys (51%) and 319 girls (49%). The average age of children in our sample is 8.33 years.

In our sample, a typical rural household cultivated three vegetables on average during the last 12 months. The nearest food market is 0.39 hours away, for a one-way trip, regardless of the transport type. For those who sell at least some of their vegetable crop, the share of vegetables sold is, on average, 20 per cent of the total value of vegetable production.

The women decision-makers in our sample households are relatively empowered in terms of group membership (68%) and having the ability to make decisions about the household income (80%), while those who have accessed and made decisions about credit constitute only 29 per cent. More than half in the sample have women decision-makers working more than 10.50 hours per day (63%).

A typical rural household spends a monthly average per capita of 0.55 million VND (US$24.59) on food and 0.76 million VND (US$33.97) on non-food, totalling 1.31 million VND (US$58.56) monthly expenditure per capita. This is relatively small compared to the 2.20 million VND (US$98.35) which is the national average monthly expenditure per capita (CEIC 2018). In rural areas across Vietnam, the average monthly income per capita is 2.42 million VND (US$108.31) (CEIC 2017).

A typical farmer has a cultivated area of 1.07 ha, and has, on average, 15.50 years of experience in vegetable cultivation.

The majority of the main food preparers are women (82%)[24], are of Mong ethnicity (74%), and are, on average, 35 years of age. Many have not attended school (58%) and only 34 per cent reached primary and/or lower secondary level.

2.2.5 Dietary diversity score (DDS) of children and adolescents

The average DDS of children in the sample is 4.31 (Table 2.1). Table 2.2 provides information on the main food groups commonly consumed, and the share of children and adolescents consuming each food group consumption by age group and gender. In general (Panel 1), the five main food groups commonly consumed by children and adolescents are: cereals and related products (99%); vegetables, including fresh and dried (97%); spices and sauces (95%); oils, fats and butter (72%); and meat, poultry game, and its products (51%). The consumption of fruits, and starchy roots and tubers, are the lowest of the 14 food groups. These results are evident for both boys and girls in all age groups. Figure 2.2 shows the mean dietary diversity scores of children and adolescents in the province by gender. For both boys and girls, we observe an increase in the number of food groups consumed between six months to five years of age, and DDS levels off from five years old onwards (red line).

2.2.6 Description of vegetables consumed

Table A2.6a and Table A2.6b show the detailed list of vegetables from the 24-hour food recall data that have been consumed during the two survey rounds, respectively. They are the vegetables that are categorized under the food group "Vegetables" (see Sec 2.2.2). In general, the vegetables that are commonly consumed in both rounds are pumpkin fruit,

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[24] For the 18% male food decision-makers/preparers, the females/wives are likely either working (as either self-employed or as farm labourer), working outside the district/province and thus, not included in the household roster, or they are divorced or deceased.

chili pepper, mustard greens, bamboo shoot, chayote fruit, tomato, cabbage, onion, and garlic.

Other crops such as pumpkin leaves, kangkong, winter melon, *Sauropus*, cucumber, and sponge gourd are also commonly consumed in July/August 2016 (Table A2.6a). Chinese cabbage, green peas, and young pea leaves are available for consumption in November 2016 (Table A2.6b). With the exception of garlic, these vegetables are mainly sourced from their own home garden or farm (>50%) (Figure A2.3a and Figure A2.3b). Cabbage is both sourced from own farm and purchased from the market during July/August 2016, which is considered the early cabbage season. During the main harvesting period (November-February), cabbage is mostly sourced from own production.

2.2.7   Description of vegetables produced

Table A2.7 show the variety of vegetables cultivated by the sampled households in the previous 12 months prior to the survey. These vegetables are used to compute the vegetable production diversity of each household (see Sec 2.2.3). In general, the sampled households cultivate coriander, pumpkin, kale, cabbage, *rau*, chayote, cucumber, Mong mustard, mustard greens, chili pepper, *bí*, turnip, kohlrabi, kangkong, onion, bamboo shoot, ginger root, tomato, *Sauropus*, *cải ngồng*, garlic, sponge gourd, and sweet potato leaves. Almost all sampled households grow coriander, while about a third grow pumpkin and kale. Less than 20% of the sampled households cultivate the other crops.

The vegetables that generate cash income for the sampled households are: chayote fruit and leaves, ginger root, tomato, bamboo shoot, mustard greens, Mong mustard, kohlrabi, and *cải ngồng* (Figure A2.4). Vegetables that are mainly cultivated for home consumption are: sweet potato leaves, *bí*, *Sauropus*, onion, pumpkin fruit and leaves, garlic, kangkong,

kale, chili pepper, cucumber, *rau*, coriander, turnip, and sponge gourd. Cabbage is commonly sold and consumed at home depending on the season, while sponge gourd is commonly given as gift or used for seed storage.

2.3   Results

Table 2.3 shows the effects of vegetable production diversity (*VegDiversity),* market access (*TimeMarket*), market participation (*VegValueSold*), and women's empowerment (*Credit, Income, Group, WorkAway*) on the dietary diversity score (*DDS*) for the pooled (Panel 1) sample of children and subsamples (Panels 2-9), while controlling for other covariates. Overall, we did not find any significant association between *DDS* and *VegDiversity* or any of the women's empowerment indicators. As initially hypothesised, we find positive associations between *DDS* and both market engagement variables: proximity to market (*TimeMarket*) and income from vegetable production (*VegValueSold*). The positive association between *TimeMarket* and *DDS* is consistent across all age groups and gender. For *VegValueSold*, the positive association with *DDS* varies by age group and gender. In the subsequent subsections, we will discuss the significant coefficients for the pathway variables, and for all covariates in more detail.

2.3.1   Market access and dietary diversity

Dietary diversity (*DDS*) decreases for every additional hour in travel time (one-way) to the nearest market (*TimeMarket*). Therefore, closer proximity to market is positively associated with *DDS*, and these positive associations are consistent across age groups and gender. Closer proximity to market improves the dietary diversity of both boys and girls significantly (Panels 4-5, $p<0.01$), especially among schoolchildren and adolescents (Panels 3, 8 and 9, $p<0.01$). The effect size is larger for girls (Panels 7 and 9) compared

to boys. For instance, having access to markets can increase a young girl's *DDS* by 1.71 food groups (Panel 7, $p<0.05$).

2.3.2 Market participation and dietary diversity

Dietary diversity increases for every additional unit in income from vegetable production (*VegValueSold*). The positive association is observed especially among schoolchildren and adolescents (Panel 3), boys in general (Panel 4), and older boys in particular (Panel 8) ($p<0.01$). However, the effect size is negligible.

2.3.3 Household characteristics and dietary diversity

Dietary diversity increases with monthly food expenditure per capita (*FoodExp_pc*) and non-food expenditure per capita (*NonFoodExp_pc*), which are both measures of wealth. However, the significance and magnitude of the association varies by age group and gender. For instance, the marginal effect of *FoodExp_pc* on *DDS* in the pooled sample (Panel 1) is small and only significant at the $p<0.10$ level, whereas it is relatively larger (marginal effect of 0.56) and significant at the $p<0.05$ level for older boys (Panel 8), but it is not significant for younger boys or girls of any age.

For *NonFoodExp_pc*, a one-unit increase leads to positive and significant increase in the *DDS,* especially for young children (0.16-unit increase, Panel 2, $p<0.01$), and for young boys in particular (0.26-unit increase, Panel 6, $p<0.01$). We also find significant increases in the *DDS* of schoolchildren and adolescents (Panel 3), boys and girls in general (Panels 4-5), and older boys (Panel 8), but the effect sizes are smaller.

Another measure of household wealth, *Area*, was also significant, but only in the case of older girls, where a one-unit increase in total cultivated area is associated with an increase in older girls' *DDS* by 0.14 units (Panel 9, $p<0.01$).

The *DDS* of young boys in high vegetable-producing areas, *HV-LA* and *HV-HA,* is significantly higher than the reference stratum (*LV-LA*) by 0.74 units ($p<0.05$) and 0.86 units ($p<0.01$), respectively.

2.3.4 Child characteristics and dietary diversity

A young child's age (*AgeChild*) and being a male child (*MaleChild*) are significantly and positively associated with *DDS*. For children five years of age or younger, a one-year increase in *AgeChild* is associated with a 0.27-unit increase ($p<0.01$) in their dietary diversity score (Panel 2). This positive association is true for both young boys and girls (Panels 6-7), and is largest for young girls (0.30, $p<0.01$). The effect of being a male child (*MaleChild)* on *DDS* is associated with a higher *DDS* of 0.38 units (Panel 2, $p<0.05$) for young children. This is also illustrated in Figure 2.2.

2.3.5 Food preparer characteristics and dietary diversity

The gender (*FemaleFoodPrep*) education (*EducFoodPrep*), and ethnicity (*MongFoodPrep*) of the food preparer show significant associations with *DDS*. Being a female food preparer (*FemaleFoodPrep*) marginally increases the *DDS*. A significant association is only observed for boys (Panel 4), particularly for older boys (Panel 8), increasing their dietary diversity score by 0.30 unit ($p<0.05$).

With the exception of younger girls (Panel 7), the educational level of the food preparer is positively associated with *DDS* for children of all age groups and gender. A one-year increase in *EducFoodPrep* is associated with a 0.10-unit to 0.20-unit increase in the *DDS* of these children and adolescents. The effect size is relatively bigger for younger boys (0.16, Panel 6, $p<0.05$) and older girls (0.16, Panel 9, $p<0.01$).

Belonging to the Mong ethnic group (*MongFoodPrep*) is negatively associated with the *DDS* of both boys and girls, but the association is age-specific. It only significantly affects schoolchildren and adolescents (Panels 3-5, 8 and 9); their *DDS* are lowered by 0.47 to 0.53 (*p*<0.01) if the food preparer is of Mong ethnicity compared to food preparers in other ethnic minority groups (Kinh, Nung, Dao, Tay, Bo Y, Phu La-Xa Pho, and other groups).

2.4 Summary, Discussion, and Limitations

This study was carried out to investigate if and how vegetable production diversity, market engagement (both market access and market participation), and women's empowerment were associated with children's and adolescents' dietary diversity. Our sample considered smallholder households from a remote and relatively low socioeconomic region of Lao Cai province, Vietnam. As discussed in the Introduction, previous literature suggests that household production of agricultural products such as vegetables can lead to improvements in the diets of household members through three main pathways.

We find strong evidence that children from vegetable-producing households, which are able to engage more in markets, through both improved market access and market participation, have more diverse diets. This association is especially strong for schoolchildren and adolescents for both measures of market engagement that were considered. The positive association we hypothesised between dietary diversity and the two other pathways: vegetable production diversity (pathway 1) and women's empowerment (pathway 2), were not found.

With respect to having physical access to markets (*TimeMarket*), the size of the marginal effect is notably larger for girls, with a one-unit increase in the travel time to the

nearest market decreasing their dietary diversity scores by at least one and up to two (for girls aged five years and below) food groups. This strong gender result is quite interesting, yet it is unclear why the effect of proximity to markets is so strong for girls versus boys.

Conversely, market participation (*VegValueSold*), the other measure of market engagement, was only significant in the analyses of two subsamples: boys in general and boys over the age of five. However, the marginal effects were relatively modest. This could be because the vegetables sold as a share of total vegetable production was minimal (roughly 20% on average) for about 44 per cent of our households with children.

These results suggest that the ability of farmers to engage in markets, both through physical access (proximity to markets) and as a market participant selling vegetables, is crucial to improving the dietary diversity of both boys and girls in all age groups from vegetable-farming households. These findings are consistent with other studies that have identified diversified agricultural production as less important compared to market engagement in improving children's dietary diversity in developing countries (e.g. Sibhatu et al. (2015)); and support other studies showing a link between food markets and dietary diversity (Abay & Hirvonen 2016; Koppmair et al. 2017).

In general, it is difficult to compare the results of women's empowerment with other studies in Southeast Asia due to inter-country differences related to culture, religion, family systems or socio-political values (Akter et al. 2017). The few studies that have used WEAI have shown mixed results in finding associations between women's empowerment and young children's diets. For instance, Yimer and Tadesse (2015) found women's empowerment is positively associated with young children's and women's dietary diversity in Ethiopia. In Ghana and Nepal, Malapit and Quisumbing (2015) and Malapit et al. (2015a) find weak or no associations between indicators of women's

empowerment and the diets of young children under five years. These mixed findings merit further investigation to test the validity of women's empowerment measures on children's diets in cross-cultural settings.

In addition to the three pathways, we also considered other household and individual characteristics as covariates. The results show that household income, as proxied by household expenditure, is a significant determinant of dietary diversity (Jones et al. 2014; Rashid et al. 2011; Ruel et al. 2005). Poverty limits a household's ability to access adequate and nutritious food, education, health services and care, and a clean environment (Alderman et al. 2013). Svedberg (2004) found an inverse association between real income per capita and child stunting and wasting from 1998-2002 for aggregated data from more than 48 countries. However, increasing income does not automatically translate to improved diets. It also depends on how households choose to invest in health-promoting non-food items like deworming (short-term), education or housing (long-term), or in their food choice motivations (Behrman et al. 2004; Kennedy 1994). Hence, in some cases, it might be a case of poor dietary choices instead of a lack of economic and physical access to food that contributes to low dietary diversity.

Other covariates, for instance, the child's age and gender, and the food preparer's gender, education and ethnicity, were also significantly associated with the dietary diversity of children in this study.

What do these results imply for smallholder producers in northwest Vietnam? Our results point at issues that required further study to determine whether there is a causal relationship between these variables, and not just a correlation. If that is the case, there is a need to either create and/or improve existing linkages between smallholder vegetable producers and markets. The type of linkage needed will depend on the specific conditions

in each locality: farmer-to-trader linkage, farmer-to-retailer linkage, or creation of farmer groups or cooperatives. There are about 733 collaborative farmer groups and 45 cooperatives in the province (ILRI 2014). While markets present great opportunities for rural farmers to increase their livelihoods, it can also lead to high transaction costs if they are not suitably adapted to the locality, thus inducing some households to opt out of market participation (Fackler & Goodwin 2001; Renkow et al. 2004).

Our results further suggest that in addition to providing income-generating opportunities for these households, future interventions could also incorporate the following factors that are strongly associated with children's and adolescents' diets. The first is to promote education among the Mong ethnic minority group, who has had the lowest literacy rates among the other major ethnic groups (GSO 2011), because higher educational attainment among food preparers increases the allocative efficiency of health production. Education provides access to more information on balanced diets and nutrition, which translates to better nutritional knowledge and better feeding practices (Makate & Makate 2017), and therefore higher demand for diverse foods (Moon et al. 2002) and healthy food choices (Variyam et al. 1998). One study in Vietnam (Nguyen et al. 2013) found that children whose mothers had reached high school education were 1.7 times more likely to achieve the minimum dietary diversity than those mothers who did not go to school. Among Mong food preparers, improving their nutritional knowledge, by providing them information about healthy eating, could be included in the design of any future health-promoting intervention. Young children from ethnic minority groups (Thai-Muong, Tay-Nung, E De-Mnong) suffer lower dietary diversity compared to the children of Kinh mothers since ethnic minority mothers give their young children fewer legumes and nuts, dairy products, flesh foods, and vitamin-A rich fruits and vegetables

(Nguyen et al. 2016). While the aim is not to impose change on their ethnic heritage, nutritional education could highlight the benefits of diversified diets, which can translate to better child nutritional outcomes. Nutritional education can increase children's dietary diversity, as shown by previous studies in Cambodia, Malawi, and Western Kenya (Kuchenbecker et al. 2017; Reinbott et al. 2016; Waswa et al. 2015). When dietary diversity is promoted through nutritional education, it can be easily integrated into the local knowledge (Powell et al. 2017).

Furthermore, our results indicate a preference for boys[25] among the ethnic minority groups, and boys' dietary diversity is accordingly significantly higher than girls'. Having a female food preparer significantly increases the dietary diversity of older boys compared to having a male food preparer. Therefore, nutrition education can also be used to highlight how the preference for sons, culturally entrenched among the Mong (Jones, N et al. 2014), may have important adverse consequences for girls' health and development. These effects can then be passed on to the succeeding generation (an intergenerational cycle of malnutrition) since the health and nutrition status of women, children, and adolescents are intimately linked (Branca et al. 2015; Walker et al. 2015). This vicious cycle can be remedied by improving girls' dietary diversity at an early age, as well as by ensuring the health and nutritional status of women throughout all life-stages.

Lastly, intervention can be targeted towards young children in the low-lying and low vegetable density per capita areas to improve their dietary quality. Young children in the high vegetable production diversity and high-altitude areas have higher dietary diversity

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[25] Son preference stems from the patriarchal and patrilocal clan system among these ethnic minority communities (details are in Sec 2.1).

than those in the low-lying and low vegetable density per capita areas. This could indicate that the demand for diverse food also depends on geographic location due to differences in the types of food that are available, food consumption patterns, and cultural factors (Moon et al. 2002).

This study has limitations that should be considered. The first concerns the measurement of the dietary diversity score. Caution is recommended when comparing the mean dietary diversity scores of children and adolescents derived in this study with results of previous studies in Vietnam. Other studies that have looked at the relationship between young children and maternal dietary diversity used seven and nine food groups, respectively, following the FAO and the WHO Infant and Young Child Feeding (IYCF) modules (Ali et al. 2013; Humphries et al. 2017; Nguyen et al. 2013). There is no international consensus on the way food groupings are constructed (Koppmair et al. 2017).

Secondly, we did not address the potential endogeneity problems of our main variables of interest (vegetable production diversity, market participation, and the four women's empowerment indicators) due to the absence of strong instruments; therefore, we can only discuss associations, not causality. Future research should consider ways to address the potential endogeneity between the main variables of interest.

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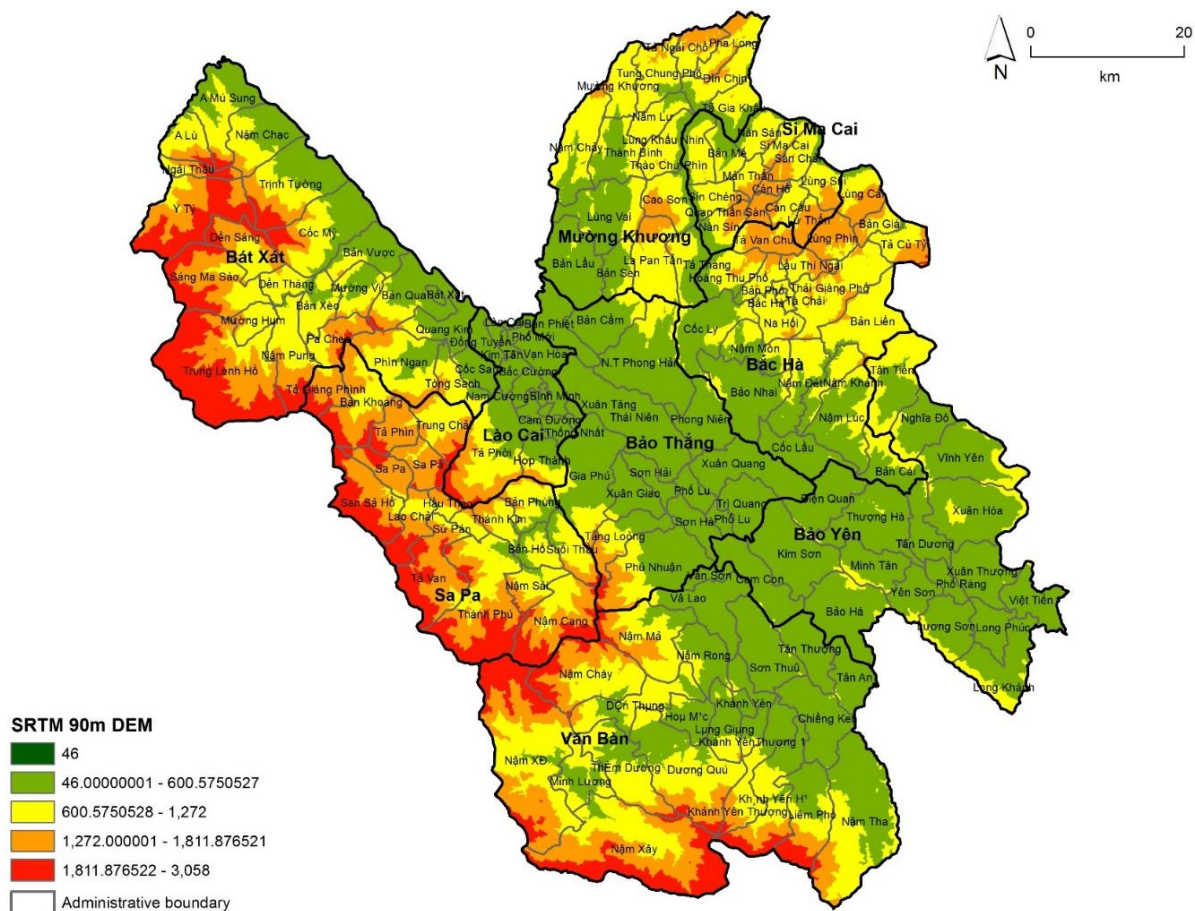
Source: SRTM downloaded from http://srtm.csi.cgiar.org/SELECTION/inputCoord.asp
Data: SRTM 90m digital Elevation Model (DEM) using ArcGIS10
http://srtm.csi.cgiar.org/SELECTION/listImages.asp

Figure 2.1 Administrative map of Lao Cai province, Vietnam
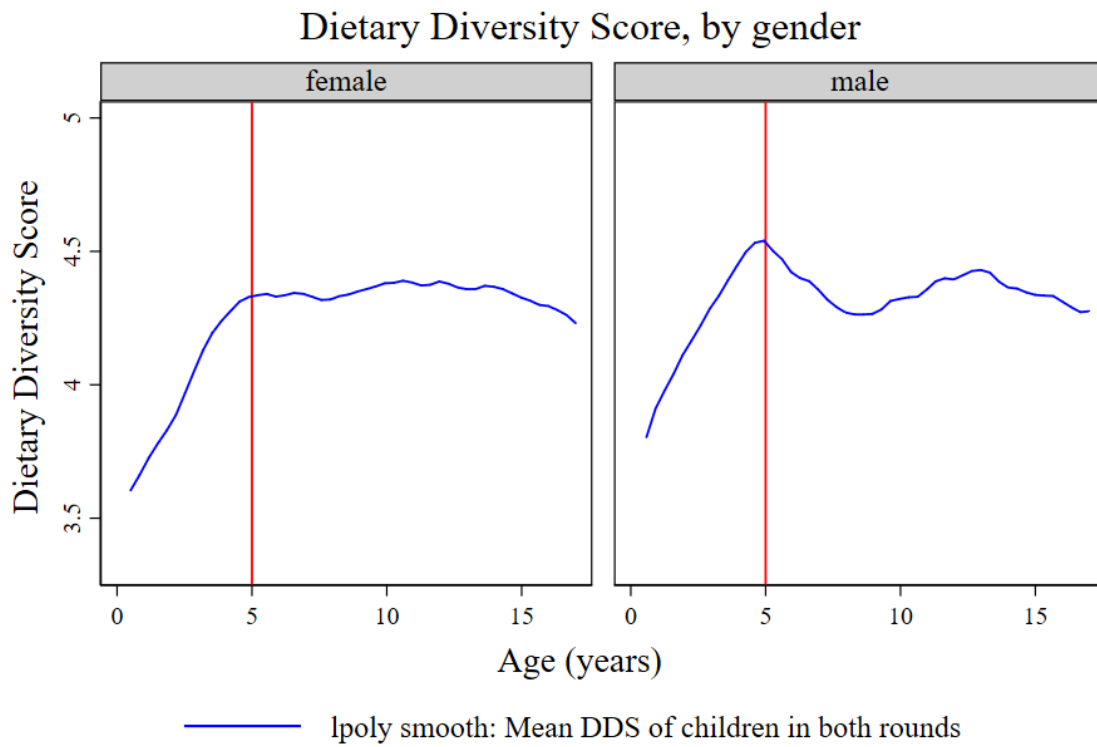
Figure 2.2 Dietary Diversity Score (DDS) of children aged six months (0.5 years) to 17 years in Lao Cai province, Vietnam

Table 2.1 Descriptive statistics of key variables in the pooled sample

Variable	Description	Mean	SD	Min	Max
Outcome variable					
DDS	Dietary Diversity Score of children aged six months to 17 years	4.31	1.01	1	8.25
Vegetable production and market engagement					
VegDiversity	Number of different types of vegetables produced by the household during the last 12 months	2.77	1.57	0	11
TimeMarket	Travel time from residence to nearest food market (hour)	0.39	0.24	0.07	1.50
VegValueSold	Share (%) of the total value of vegetables produced by household that was sold	20.25	27.94	0	100
Women's empowerment (weighted scores)					
Credit	Woman has access to and can make decisions on credit	0.02	0.03	0	0.07
Income	Woman has control over use of household income	0.16	0.08	0	0.20
Group	Woman is an active member of a group	0.14	0.09	0	0.20
WorkAway	Woman's workload is more than the time poverty line of 10.50 hours[†]	0.13	0.10	0	0.20
Household characteristics					
LV-LA	Commune is classified as low vegetable density per capita-low altitude area (1=yes, 0=otherwise)	0.23	0.42	0	1
LV-HA	Commune is classified as low vegetable density per capita-high altitude area (1=yes, 0=otherwise)	0.25	0.43	0	1
HV-LA	Commune is classified as high vegetable density per capita-low altitude area (1=yes, 0=otherwise)	0.21	0.41	0	1
HV-HA	Commune is classified as high vegetable density per capita-high altitude area (1=yes, 0=otherwise)	0.32	0.47	0	1
FoodExp_pc	Monthly food expenditure per capita (million VND)	0.55	7.74	0	197.80
NonFoodExp_pc	Monthly non-food expenditure per capita (million VND)	0.76	1.79	0.04	25.57
Area	Total cultivated area (hectare)	1.07	1.71	0	19.60

Table 2.1 Continued

Variable	Description	Mean	SD	Min	Max
Experience	Number of years household has been engaged in vegetable production	15.48	10.34	0	53
Child characteristics					
AgeChild	Age of child (years)	8.33	4.23	0.50	17
MaleChild	Young child is male (1=yes, 0=female)	0.51	0.50	0	1
Food preparer characteristics					
AgeFoodPrep	Age of food preparer (years)	35.42	9.46	16	69
FemaleFoodPrep	Food preparer is female (1=yes, 0=male)	0.82	0.39	0	1
EducFoodPrep	Highest level of education completed by food preparer: 0=no education; 1=nursery; 2=primary (incomplete); 3=primary; 4=lower secondary; 5=upper secondary; 6=vocational; 7=university; 8=postgraduate	1.54	2.04	0	8
MongFoodPrep	Food preparer is Mong (1=yes, 0=otherwise)	0.74	0.44	0	1
Households (number of households in the sample)		298			
Observations (number of children in the sample)		653			

Notes: SD, 'standard deviation'; Min, 'Minimum'; Max, 'Maximum'; VND, 'Vietnamese Dong'. Table A2.4 shows the full table by age group and gender.
[†]Based on derivation of the weighted adequacy in the five domains of empowerment in the modified A-WEAI (Malapit et al. 2015).
Source: Vietnam Rural Household Survey (July-August and November 2016).

Table 2.2 Food group consumption by age group and gender (%)

Food group	(1) Pooled	(2) 0.5-5yr	(3) >5-17yr	(4) boys	(5) girls	(6) 0.5-5yr boys	(7) 0.5-5yr girls	(8) >5-17yr boys	(9) >5-17yr girls
1. Cereals and products	99.69	99.39	99.80	100.00	99.37	100.00	98.63	100.00	99.59
2. Starchy roots and tubers	1.23	0.61	1.43	0.60	1.88	0.00	1.37	0.83	2.03
3. Nuts and beans	25.73	20.61	27.46	22.75	28.84	23.91	16.44	22.31	32.52
4. Vegetables, including fresh and dried	97.24	92.73	98.77	96.41	98.12	90.22	95.89	98.76	98.78
5. Fruits and berries	3.52	2.42	3.89	3.89	3.13	3.26	1.37	4.13	3.66
6. Oils, fats, and butters	72.43	66.06	74.59	73.65	71.16	68.48	63.01	75.62	73.58
7. Meat, poultry game, and its products	50.84	44.24	53.07	50.00	51.72	48.91	38.36	50.41	55.69
8. Fish, shellfish, and products	13.94	15.76	13.32	12.57	15.36	14.13	17.81	11.98	14.63
9. Eggs and products	14.40	16.97	13.52	15.57	13.17	16.30	17.81	15.29	11.79
10. Milk and milk products	5.82	14.55	2.87	6.59	5.02	16.30	12.33	2.89	2.85
11. Canned products	-	-	-	-	-	-	-	-	-
12. Sugars, preserves, and confectionery	7.35	10.30	6.35	7.49	7.21	16.30	2.74	4.13	8.54
13. Soft drinks and other beverages, including alcoholic drinks	9.19	9.70	9.02	9.58	8.78	10.87	8.22	9.09	8.94
14. Spices and sauces	94.64	92.12	95.49	95.21	94.04	91.30	93.15	96.69	94.31
N	**653**	**165**	**488**	**334**	**319**	**92**	**73**	**242**	**246**

Notes: yr, 'age in years'; -, 'no consumption'; %, 'percentage of individuals within the sample consuming food belonging to a specific food group, based on total valid N'.

Source: Vietnam Rural Household Survey (July-August and November 2016).

Table 2.3 Association between vegetable production diversity, market engagement, women's empowerment, and dietary diversity score (DDS) using Poisson GLM, for pooled, age- and gender-disaggregated samples

	Dependent variable: *DDS*								
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
Variables	**Pooled**	**0.5-5yr**	**>5-17yr**	**boys**	**girls**	**0.5-5yr boys**	**0.5-5yr girls**	**>5-17yr boys**	**>5-17yr girls**
Vegetable production and market engagement									
VegDiversity	0.020	0.029	0.011	0.022	0.017	-0.044	0.096	0.038	-0.034
	(0.032)	(0.055)	(0.032)	(0.033)	(0.044)	(0.068)	(0.096)	(0.033)	(0.042)
TimeMarket	-0.804***	-0.914**	-0.818***	-0.656***	-1.015***	-0.791*	-1.711**	-0.615***	-1.003***
	(0.221)	(0.370)	(0.224)	(0.236)	(0.309)	(0.426)	(0.700)	(0.233)	(0.288)
VegValueSold	0.005***	0.002	0.006***	0.007***	0.002	0.005*	-0.005	0.007***	0.004
	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)	(0.007)	(0.002)	(0.003)
Women's empowerment									
Credit	-2.304	-0.601	-2.535	-1.815	-2.180	3.034	-3.028	-2.804	-2.021
	(1.738)	(2.787)	(1.950)	(1.817)	(2.313)	(3.513)	(4.671)	(1.877)	(2.539)
Income	0.087	-0.005	-0.021	0.389	-0.483	-0.109	-0.398	0.160	-0.167
	(0.653)	(1.070)	(0.674)	(0.673)	(0.835)	(1.297)	(1.400)	(0.689)	(0.905)
Group	0.520	0.673	0.525	0.108	1.086	-1.145	1.229	0.145	0.829
	(0.616)	(1.111)	(0.615)	(0.611)	(0.814)	(1.152)	(1.942)	(0.638)	(0.756)
WorkAway	-0.592	0.395	-0.688	-0.887	-0.134	-1.235	0.872	-0.600	-0.852
	(0.541)	(0.992)	(0.539)	(0.544)	(0.707)	(1.117)	(1.484)	(0.565)	(0.705)
Household characteristics									
LV-HA (ref: LV-LA)	-0.027	-0.059	-0.024	-0.034	-0.050	-0.026	0.171	-0.041	0.033
	(0.167)	(0.257)	(0.183)	(0.179)	(0.209)	(0.321)	(0.423)	(0.195)	(0.227)
HV-LA	0.093	0.059	0.066	0.065	0.116	0.737**	-0.134	-0.123	0.265
	(0.167)	(0.247)	(0.184)	(0.164)	(0.222)	(0.286)	(0.459)	(0.188)	(0.234)
HV-HA	0.093	0.161	0.075	0.111	0.078	0.860***	-0.099	-0.038	0.288
	(0.165)	(0.256)	(0.175)	(0.171)	(0.206)	(0.322)	(0.460)	(0.182)	(0.216)

Table 2.3 Continued

Variables	(1) Pooled	(2) 0.5-5yr	(3) >5-17yr	(4) boys	(5) girls	(6) 0.5-5yr boys	(7) 0.5-5yr girls	(8) >5-17yr boys	(9) >5-17yr girls
				Dependent variable: *DDS*					
FoodExp_pc	0.003*	0.004**	0.330*	0.002	0.294	0.002	0.693	0.565**	0.028
	(0.001)	(0.002)	(0.190)	(0.001)	(0.271)	(0.002)	(0.686)	(0.227)	(0.228)
NonFoodExp_pc	0.056***	0.159***	0.033**	0.050***	0.071**	0.257***	0.083	0.036***	0.022
	(0.018)	(0.039)	(0.015)	(0.017)	(0.032)	(0.084)	(0.067)	(0.014)	(0.028)
Area	-0.014	-0.050	0.036	-0.006	-0.018	0.087	-0.097	-0.007	0.143***
	(0.051)	(0.039)	(0.055)	(0.049)	(0.053)	(0.072)	(0.063)	(0.046)	(0.046)
Experience	-0.003	-0.008	0.002	-0.001	-0.008	0.002	-0.014	0.004	0.001
	(0.007)	(0.010)	(0.007)	(0.007)	(0.010)	(0.009)	(0.021)	(0.008)	(0.008)
Child characteristics									
AgeChild	0.027***	0.266***	0.004	0.012	0.047***	0.171**	0.298***	-0.004	0.0125
	(0.008)	(0.065)	(0.010)	(0.011)	(0.013)	(0.075)	(0.093)	(0.015)	(0.014)
MaleChild	0.119*	0.382**	0.043						
	(0.066)	(0.166)	(0.072)						
Food preparer characteristics									
AgeFoodPrep	0.008	0.016	0.001	0.007	0.007	0.006	0.002	0.003	-0.001
	(0.007)	(0.011)	(0.007)	(0.007)	(0.010)	(0.012)	(0.017)	(0.008)	(0.008)
FemaleFoodPrep	0.252*	0.329	0.239*	0.318**	0.099	0.215	0.134	0.324**	0.054
	(0.130)	(0.225)	(0.126)	(0.125)	(0.201)	(0.230)	(0.488)	(0.136)	(0.169)
EducFoodPrep	0.107***	0.119**	0.097***	0.088***	0.112***	0.160**	0.073	0.054*	0.155***
	(0.029)	(0.056)	(0.027)	(0.033)	(0.036)	(0.064)	(0.119)	(0.033)	(0.033)
MongFoodPrep	-0.484***	-0.362*	-0.474***	-0.480***	-0.467***	-0.396	-0.205	-0.468***	-0.533***
	(0.134)	(0.201)	(0.147)	(0.154)	(0.171)	(0.268)	(0.335)	(0.153)	(0.182)
Constant	1.360***	1.006***	1.455***	1.389***	1.376***	1.204***	1.186***	1.429***	1.499***
	(0.091)	(0.173)	(0.093)	(0.092)	(0.128)	(0.175)	(0.348)	(0.101)	(0.115)

Table 2.3 Continued

Variables	(1) Pooled	(2) 0.5-5yr	(3) >5-17yr	(4) boys	(5) girls	(6) 0.5-5yr boys	(7) 0.5-5yr girls	(8) >5-17yr boys	(9) >5-17yr girls
				Dependent variable: *DDS*					
Observations	653	165	488	334	319	92	73	242	246
Log likelihood	-1136	-287.5	-844.7	-578.8	-556	-158.8	-126.2	-417.4	-425.4
χ^2	202	143.5	210.1	201.6	114.9	171.5	126.6	249.4	138.5
AIC	3.544	3.739	3.548	3.586	3.612	3.886	4.006	3.615	3.622
BIC	-3985	-700.4	-2823	-1776	-1664	-312.1	-211	-1188	-1210

Notes: yr, 'age in years'. Robust standard errors, in parentheses, are clustered at the household level. *** $p<0.01$, ** $p<0.05$, * $p<0.10$.
Source: Vietnam Rural Household Survey (July-August and November 2016).

Appendix. Descriptive statistics by age group and gender, food group consumption by round, list and graphs of vegetables consumed/produced and their main sources, and full model estimates using OLS

Table A2.4 shows the complete descriptive statistics of key variables by age group and gender. Table A2.5a and Table A2.5b show the consumption of food groups by age group and gender for survey rounds 1 (July-August 2016) and 2 (November 2016), respectively. Table A2.6a and Table A2.6b list the vegetables consumed by households in survey rounds 1 and 2, respectively. Figure A2.3a and Figure A2.3b map out the main sources of vegetables consumed in rounds 1 and 2, respectively. Table A2.7 shows the variety of vegetables that were cultivated in the previous 12 months. Table A2.8 shows the full model estimates of the association of vegetable production diversity, market engagement, women's empowerment, and dietary diversity score (DDS) using OLS.

Table A2.4 Descriptive statistics of key variables by age group and gender

Variable	Description	0.5-5yr	>5-17yr	boys	girls	0.5-5yr boys	0.5-5yr girls	>5-17yr boys	>5-17yr girls
		Mean (SD)							
Outcome variable									
DDS	Dietary Diversity Score of children aged six months to 17 years	4.19 (1.16)	4.34 (0.96)	4.34 (0.98)	4.27 (1.05)	4.30 (1.10)	4.06 (1.23)	4.35 (0.93)	4.34 (0.98)
Vegetable production and market engagement									
VegDiversity	Number of different types of vegetables produced by the household during the last 12 months	2.70 (1.51)	2.79 (1.59)	2.70 (1.61)	2.83 (1.52)	2.73 (1.63)	2.66 (1.35)	2.69 (1.60)	2.89 (1.57)
TimeMarket	Travel time from residence to nearest food market (hour)	0.40 (0.24)	0.39 (0.24)	0.41 (0.25)	0.38 (0.23)	0.43 (0.26)	0.37 (0.22)	0.40 (0.25)	0.38 (0.24)
VegValueSold	Share (per cent) of the total value of vegetables produced by household that was sold	20.19 (27.66)	20.28 (28.06)	20.91 (29.27)	19.57 (26.50)	21.32 (29.83)	18.76 (24.79)	20.76 (29.11)	19.80 (27.03)
Women's empowerment (weighted scores)									
Credit	Woman has access to and can make decisions on credit	0.02 (0.03)	0.02 (0.03)	0.02 (0.03)	0.02 (0.03)	0.02 (0.03)	0.02 (0.03)	0.02 (0.03)	0.02 (0.03)
Income	Woman has control over use of household income	0.16 (0.08)	0.16 (0.08)	0.16 (0.08)	0.16 (0.08)	0.16 (0.08)	0.16 (0.08)	0.16 (0.08)	0.16 (0.08)
Group	Woman is an active member of a group	0.15 (0.09)	0.13 (0.09)	0.14 (0.09)	0.13 (0.09)	0.14 (0.09)	0.15 (0.09)	0.14 (0.09)	0.13 (0.10)
WorkAway	Woman's workload is more than the time poverty line of 10.50 hours[†]	0.13 (0.09)	0.12 (0.10)	0.13 (0.10)	0.12 (0.10)	0.14 (0.09)	0.12 (0.10)	0.13 (0.10)	0.12 (0.10)
Household characteristics									
LV-LA	Commune is classified as low vegetable density per capita-low altitude area (1=yes, 0=otherwise)	0.24 (0.43)	0.22 (0.41)	0.25 (0.43)	0.20 (0.40)	0.24 (0.43)	0.25 (0.43)	0.25 (0.43)	0.19 (0.39)
LV-HA	Commune is classified as low vegetable density per capita-high altitude area (1=yes, 0=otherwise)	0.21 (0.41)	0.26 (0.44)	0.22 (0.41)	0.28 (0.45)	0.20 (0.40)	0.23 (0.43)	0.22 (0.42)	0.29 (0.45)
HV-LA	Commune is classified as high vegetable density per capita-low altitude area (1=yes, 0=otherwise)	0.21 (0.41)	0.21 (0.41)	0.20 (0.40)	0.22 (0.42)	0.24 (0.43)	0.18 (0.39)	0.19 (0.39)	0.24 (0.43)
HV-HA	Commune is classified as high vegetable density per capita-high altitude area (1=yes, 0=otherwise)	0.33 (0.47)	0.31 (0.46)	0.34 (0.47)	0.30 (0.46)	0.33 (0.47)	0.34 (0.48)	0.34 (0.47)	0.28 (0.45)
FoodExp_pc	Monthly food expenditure per capita (million VND)	1.45 (15.38)	0.25 (0.26)	0.84 (10.81)	0.25 (0.25)	2.39 (20.60)	0.26 (0.26)	0.25 (0.27)	0.25 (0.25)
NonFoodExp_pc	Monthly non-food expenditure per capita (million VND)	0.69 (1.19)	0.78 (1.95)	0.78 (2.02)	0.73 (1.52)	0.65 (0.78)	0.74 (1.56)	0.83 (2.32)	0.72 (1.51)
Area	Total cultivated area (hectare)	1.13 (2.33)	1.04 (1.44)	1.05 (1.57)	1.08 (1.84)	0.94 (1.27)	1.38 (3.19)	1.09 (1.67)	0.99 (1.18)
Experience	Number of years household has been engaged in vegetable production	13.36 (12.71)	16.20 (9.32)	15.39 (10.88)	15.58 (9.77)	14.74 (14.00)	11.62 (10.72)	15.64 (9.45)	16.75 (9.17)

Table A2.4 Continued

Variable	Description	0.5-5yr	>5-17yr	boys	girls	0.5-5yr boys	0.5-5yr girls	>5-17yr boys	>5-17yr girls
					Mean (SD)				
Child characteristics									
AgeChild	Age of child (years)	3.13 (1.23)	10.09 (3.34)	7.97 (4.14)	8.71 (4.30)	3.02 (1.18)	3.27 (1.30)	9.85 (3.20)	10.33 (3.47)
MaleChild	Young child is male (1=yes, 0=female)	0.56 (0.50)	0.50 (0.50)						
Food preparer characteristics									
AgeFoodPrep	Age of food preparer (years)	32.76 (11.34)	36.31 (8.56)	35.53 (9.85)	35.30 (9.04)	33.70 (12.66)	31.59 (9.37)	36.23 (8.47)	36.40 (8.66)
FemaleFoodPrep	Food preparer is female (1=yes, 0=male)	0.80 (0.40)	0.83 (0.38)	0.79 (0.41)	0.85 (0.36)	0.80 (0.40)	0.79 (0.41)	0.79 (0.41)	0.86 (0.35)
EducFoodPrep	Highest level of education completed by food preparer: 0=no education; 1=nursery; 2=primary (incomplete); 3=primary; 4=lower secondary; 5=upper secondary; 6=vocational; 7=university; 8=postgraduate	2.25 (2.12)	1.30 (1.96)	1.50 (2.02)	1.59 (2.06)	2.08 (2.03)	2.47 (2.21)	1.28 (1.98)	1.33 (1.94)
MongFoodPrep	Food preparer is Mong (1=yes, 0=otherwise)	0.70 (0.46)	0.76 (0.43)	0.75 (0.44)	0.74 (0.44)	0.72 (0.45)	0.68 (0.47)	0.76 (0.43)	0.76 (0.43)
Observations (number of children in the sample)		165	488	334	319	92	73	242	246

Notes: SD, 'standard deviation'; Min, 'Minimum'; Max, 'Maximum'; VND, 'Vietnamese Dong'.

[†]Based on derivation of the weighted adequacy in the five domains of empowerment in the modified A-WEAI (Malapit et al. 2015).

Source: Vietnam Rural Household Survey (July-August and November 2016).

Table A2.5a Food group consumption by age group and gender in survey round 1 (%)

Food group	(1) Pooled	(2) 0.5-5yr	(3) >5-17yr	(4) boys	(5) girls	(6) 0.5-5yr boys	(7) 0.5-5yr girls	(8) >5-17yr boys	(9) >5-17yr girls
1. Cereals and products	99.74	99.44	99.83	100.00	99.48	100.00	98.80	100.00	99.67
2. Starchy roots and tubers	1.03	0.56	1.17	0.51	1.56	0.00	1.20	0.67	1.66
3. Nuts and beans	25.55	21.67	26.71	22.78	28.39	23.71	19.28	22.48	30.90
4. Vegetables, including fresh and dried	97.30	91.67	99.00	96.96	97.66	90.72	92.77	98.99	99.00
5. Fruits and berries	3.72	2.78	4.01	4.05	3.39	3.09	2.41	4.36	3.65
6. Oils, fats, and butters	71.37	65.00	73.29	72.66	70.05	68.04	61.45	74.16	72.43
7. Meat, poultry game, and its products	50.19	43.89	52.09	48.10	52.34	46.39	40.96	48.66	55.48
8. Fish, shellfish, and products	13.48	14.44	13.19	12.15	14.84	13.40	15.66	11.74	14.62
9. Eggs and products	14.12	16.67	13.36	14.68	13.54	15.46	18.07	14.43	12.29
10. Milk and milk products	5.39	13.89	2.84	6.08	4.69	15.46	12.05	3.02	2.66
11. Canned products	-	-	-	-	-	-	-	-	-
12. Sugars, preserves, and confectionery	7.32	10.56	6.34	7.09	7.55	16.49	3.61	4.03	8.64
13. Soft drinks and other beverages, including alcoholic drinks	9.11	8.89	9.18	9.62	8.59	10.31	7.23	9.40	8.97
14. Spices and sauces	94.48	91.11	95.49	94.94	94.01	90.72	91.57	96.31	94.68
N	**779**	**180**	**599**	**395**	**384**	**97**	**83**	**298**	**301**

Notes: yr, 'age in years'; -, 'no consumption'; %, 'percentage of individuals within the sample consuming food belonging to a specific food group, based on total valid N'.
Source: Vietnam Rural Household Survey (July-August 2016).

Table A2.5b Food group consumption by age group and gender in survey round 2 (%)

Food group	(1) Pooled	(2) 0.5-5yr	(3) >5-17yr	(4) boys	(5) girls	(6) 0.5-5yr boys	(7) 0.5-5yr girls	(8) >5-17yr boys	(9) >5-17yr girls
1. Cereals and products	99.71	98.92	100.00	99.42	100.00	98.08	100.00	100.00	100.00
2. Starchy roots and tubers	2.94	3.24	2.83	3.17	2.70	2.88	3.70	3.29	2.38
3. Nuts and beans	12.21	11.89	12.32	11.53	12.91	10.58	13.58	11.93	12.70
4. Vegetables, including fresh and dried	87.79	73.51	93.13	87.03	88.59	75.00	71.60	92.18	94.05
5. Fruits and berries	2.65	3.24	2.42	2.59	2.70	2.88	3.70	2.47	2.38
6. Oils, fats, and butters	61.32	55.14	63.64	64.27	58.26	61.54	46.91	65.43	61.90
7. Meat, poultry game, and its products	29.71	28.65	30.10	31.70	27.63	30.77	25.93	32.10	28.17
8. Fish, shellfish, and products	10.15	8.11	10.91	9.80	10.51	8.65	7.41	10.29	11.51
9. Eggs and products	6.03	7.03	5.66	5.19	6.91	4.81	9.88	5.35	5.95
10. Milk and milk products	2.79	6.49	1.41	4.03	1.50	7.69	4.94	2.47	0.40
11. Canned products	0.29	1.08	0.00	0.58	0.00	1.92	0.00	0.00	0.00
12. Sugars, preserves, and confectionery	2.79	3.24	2.63	3.17	2.40	2.88	3.70	3.29	1.98
13. Soft drinks and other beverages, including alcoholic drinks	0.29	0.00	0.40	0.58	0.00	0.00	0.00	0.82	0.00
14. Spices and sauces	87.35	74.05	92.32	86.74	87.99	75.96	71.60	91.36	93.25
N	**680**	**185**	**495**	**347**	**333**	**104**	**81**	**243**	**252**

Notes: yr, 'age in years'; -, 'no consumption'; %, 'percentage of individuals within the sample consuming food belonging to a specific food group, based on total valid N'.

Source: Vietnam Rural Household Survey (November 2016).

Table A2.6a List of vegetables consumed by households in survey round 1

Code	Vegetable name	Freq
S4066	Pumpkin leaves, raw	833
S4003	Pumpkin squash, raw	576
N4056	Chili pepper, yellow	311
S4016	Mustard greens, India, leaves and stems, raw	255
N4050	Bamboo shoot, spring variety	193
N4047	Bamboo shoot, unspecified	189
N4086	Chayote, fruit raw	185
VEG_99	Chili pepper, small, spicy	108
S4005	Tomato, raw	73
N4057	Chili pepper, green	72
S4083	Kangkong, swamp cabbage, water spinach, water convolvulus, raw	62
S4002	Ashgourd waxgourd, winter melon, raw	46
S4010	Cabbage, common, raw	42
S4086	*Sauropus*, sp. Leaves, raw	38
N4039	Onion, Welsh, raw	30
N4028	Cucumber	27
N4051	Gourd, sponge gourd	27
S4103	Garlic bulbs, raw	26
S4030	Cowpeas, yard long, Chinese long bean, raw	25
N4001	Calabash/ bottlegourd	21
S4009	Aubergine, raw	20
S4076	Sweet potato leaves, raw	20
VEG_99	Chayote leaves	19
N4017	Chinese cabbage, unspecified	16
VEG_99	Mong mustard	15
N4037	Soybean sprouts	13
S4080	Malabar nightshade, Vines spinach; Ceylon spinach, raw	12
VEG_99	Choy sum	12
N4057	Peppers, green	11
N4032	Green peas; field pea; peas garden	9
N4097	Mustard green, pickled	9
VEG_99	Pickled pepper	9
S4055	Bitter gourd, balsam pear, balsam-apple, bitter melon, raw	7
N4022	Radish garden white, raw	6
N4040	Onion, common, garden	6
N4048	Asparagus, white	6
N4049	Bamboo shoots, dried	6
N4082	Mint leaves	6
S4007	Carrot, raw	6
S4036	Mungbean sprouts, green gram, tiensin green bean, raw	7
VEG_99	*Coong*	6
VEG_99	*Diplazium esculentum*	6
VEG_99	Lemon leaves	5
VEG_99	Lemongrass	5
VEG_99	Sweet potato buds	5
VEG_99	*Xi*	5
N4034	Papaya, unripe, raw	4

Table A2.6a Continued

Code	Vegetable name	Freq
N4044	Banana, buds and flowers	4
N4090	Chinese leek, onion fragrant	4
S4029	Kidney beans, in pod, French bean; Navy bean, raw	4
S4070	Jute potherb, raw	4
VEG_99	Wild vegetable roots	4
N4027	*Colocasia indica*	3
N4038	Onion, Welsh	3
N4107	Mushroom, straw	3
N4115	Wild plant	3
S4102	Balm-mint, garden-balm, raw	3
S4121	Jew' ear, Judas' ear, dried, wood ear, tender variety, raw	3
N4004	Pumpkin, dried	2
N4058	Tamarind	2
N4101	Onion, pickled	2
N4108	Mushroom, common	2
S4073	Amaranth, sp. red, raw	2
S4082	Parsley, curly, raw	2
VEG_99	Hill mushroom	2
VEG_99	*Lactuca indica*	2
VEG_99	Sponge gourd, leaves	2
N4016	Cress, sp.	1
N4053	Sponge gourd, rag (young flower)	1
N4055	Corn, small variety immature, baby corn	1
N4071	Coriander	1
N4074	Kangkong, dried	1
N4078	*Polygonum odoratum*	1
N4092	Chinese olive	1
N4094	Tomato, pickled	1
N4095	Eggplant, garden; brinjan; aubergine salted	1
N4104	Mushroom, Chinese raw	1
N4118	*La lot*	1
S4016	Mustard greens, India, leaves and stems, raw	1
S4019	Banana, dwarf, young fruit, raw	1
S4042	Onion, fragrant, Chinese leek, raw	1
S4074	Amaranth, sp white, raw	1
VEG_99	Apricot leaves	1
VEG_99	*Brassica integrifolia*	1
VEG_99	*Canarium spp.*	1
VEG_99	Dracontomelon	1
VEG_99	Fresh lemongrass	1
VEG_99	Fried pickled bamboo shoots	1
VEG_99	Ginger leaves	1
VEG_99	*Lốc tâu* - a local dish	1
VEG_99	Mixed raw vegetables	1
VEG_99	Mugwort, common sagebrush	1
VEG_99	Napa cabbage	1
VEG_99	Pea leaves	1
VEG_99	Pickled bamboo shoots	1

Table A2.6a Continued

Code	Vegetable name	Freq
VEG_99	*Quất hồng bì*	1
VEG_99	*Rau giap ca, diep ca*	1
VEG_99	Raw vegetables	1
VEG_99	Salted *coong*	1
VEG_99	Sour leaves	1
VEG_99	Taro tuber leaves	1
VEG_99	Unknown name	1
VEG_99	Wild eggplant	1
VEG_99	Winter melon leaves (ashgourd waxgourd)	1
Total		3483

Notes: Freq, 'frequency of responses'. This list only pertains to vegetables classified under food group 4 ("Vegetables, fruit types, fresh and dried"). The codes and vegetable descriptions are based on the Vietnamese Food Composition Tables (FCT) 1994/2000 and 2013 versions; prefix "N" refers to codes from FCT 1994/2000 and "S" from SMILING FCT D3.5-a (http://www.fao.org/fileadmin/templates/food_composition/documents/pdf/VTN_FCT_2007.pdf).
Source: Vietnam Rural Household Survey (n=510 households, July-August 2016).

Table A2.6b List of vegetables consumed by households in survey round 2

Code	Vegetable name	Freq
S4016	Mustard greens, India, leaves and stems, raw	921
N4056	Chili pepper, yellow	337
VEG_99	Chili pepper, small, fresh	238
S4010	Cabbage, common, raw	68
N4086	Chayote, fruit raw	61
N4047	Bamboo shoot, unspecified	16
S4003	Pumpkin squash, raw	16
N4017	Chinese cabbage, unspecified	15
N4032	Green peas; field pea; peas garden	15
VEG_99	Young pea leaves	15
N4039	Onion, Welsh, raw	11
S4005	Tomato, raw	10
N4034	Papaya, unripe, raw	9
S4103	Garlic bulbs, raw	9
N4057	Chili pepper, green	8
VEG_99	Napa cabbage	7
S4096	Kohlrabi, raw	6
N4022	Radish garden white, raw	5
N4050	Bamboo shoot, spring variety	5
S4002	Ashgourd waxgourd, winter melon, raw	5
S4066	Pumpkin leaves, raw	5
VEG_99	Pea leaves	5
N4027	*Colocasia indica*	4
N4037	Soybean sprouts	4
S4036	Mungbean sprouts, green gram, tiensin green bean, raw	4
S4085	Rice paddy herb, raw (*Limnophilia aromatica*)	4
VEG_99	Chayote leaves	4
VEG_99	Mong mustard	4
VEG_99	Chili pepper, small, pickled	4
S4082	Parsley, curly, raw	3
S4121	Jew' ear, Judas' ear, dried, wood ear, tender variety, raw	3
VEG_99	*Brassica integrifolia*	3
VEG_99	Chili pepper, unspecified	3
VEG_99	Green banana	3
VEG_99	Lemongrass	3
VEG_99	Mong mustard, pickled	3
VEG_99	Chili pepper, small, pickled with bamboo shoots	3
N4016	Cress, sp.	2
N4067	Basil sweet leaves, raw	2
N4082	Mint leaves	2
S4076	Sweet potato leaves, raw	2
VEG_99	Chili pickled with bamboo shoots	2
VEG_99	*Diplazium esculentum*	2
VEG_99	Lemon leaves	2
VEG_99	Mong mustard, pickled	2
N4049	Bamboo shoots, dried	1
N4068	Sweet marjoram	1

Table A2.6b Continued

Code	Vegetable name	Freq
N4071	Coriander	1
N4080	Lettuce, garden asparagus	1
N4096	Cabbage, Chinese, salted	1
N4107	Mushroom, straw	1
S4018	Celery, Chinese, raw	1
S4019	Banana, dwarf, young fruit, raw	1
S4029	Kidney beans, in pod, French bean; Navy bean, raw	1
S4042	Onion, fragrant, Chinese leek, raw	1
S4086	*Sauropus*, sp. Leaves, raw	1
S4099	Cauliflower, raw	1
VEG_99	Choy sum	1
VEG_99	Mushroom	1
VEG_99	Papaya flower	1
Total		1875

Notes: Freq, 'frequency of responses'. This list only pertains to vegetables classified under food group 4 ("Vegetables, fruit types, fresh and dried"). The codes and vegetable descriptions are based on the Vietnamese Food Composition Tables (FCT) 1994/2000 and 2013 versions; prefix "N" refers to codes from FCT 1994/2000 and "S" from SMILING FCT D3.5-a (http://www.fao.org/fileadmin/templates/food_composition/documents/pdf/VTN_FCT_2007.pdf).
Source: Vietnam Rural Household Survey (n=510 households, November 2016).

Note: Per cent refers to percentage of the number of responses divided by total responses. Graph only includes main vegetables whose responses are >10.

Source: Vietnam Rural Household Survey (n=510 households, July-August 2016).

Figure A2.3a Main source of vegetables consumed in survey round 1

Note: Per cent refers to percentage of the number of responses divided by total responses. Graph only includes main vegetables whose responses are >=5.

Source: Vietnam Rural Household Survey (n=510 households, November 2016).

Figure A2.3b Main source of vegetables consumed in survey round 2

Table A2.7 List of vegetable crops that were cultivated in the last 12 months

Vegetable name	Freq
Coriander	456
Pumpkin squash, raw	157
Kale	135
Pumpkin leaves, raw	115
Cabbage, common, raw	91
Rau	74
Chayote, fruit raw	56
Cucumber	55
Mong mustard	46
Mustard greens, India, leaves and stems, raw	23
Chili pepper, unspecified	22
Bí	21
Turnip	18
Kohlrabi	13
Kangkong, swamp cabbage, water spinach, water convolvulus, raw	11
Onion, Welsh, raw	9
Bamboo shoot, spring variety	8
Chayote leaves	7
Ginger root	7
Tomato, raw	7
Sauropus sp. Leaves	6
Cải ngồng	5
Garlic bulbs, raw	5
Gourd, sponge gourd	5
Sweet potato leaves	5
Cải	4
Cauliflower, raw	4
Malabar nightshade, Vine spinach; Ceylon spinach, raw	4
Radish garden white, raw	4
Rau cải xanh	4
Calabash/ bottlegourd	3
Chinese cabbage, white	3
Jute potherb, raw	3
Ashgourd waxgourd, winter melon, raw	2
Aubergine, raw	2
Balm-mint, garden-balm, raw	2
Bitter gourd, balsam pear, balsam-apple, bitter melon, raw	2
Dracontomelon fruit, unripe	2
Scallion	2
Basil sweet leaves, raw	1
Các loại	1
Cải chip	1
Cải địa phương	1
Cải ngọt	1
Chili pepper, red, spicy	1
Eggplant, small	1
Lemon	1

Table A2.7 Continued

Vegetable name	Freq
Lemongrass	1
Lettuce, garden asparagus	1
Mungbean sprouts, green gram, tiensin green bean, raw	1
Parsley, curly, raw	1
Rau cải chíp	1
Rau cải ngồng	1
Rau cải trắng	1
Rau rền	1
Rau thơm các loại	1
Sweet marjoram	1
Vegetable mustard	1
Y di (native plant)	1
Total	1419

Note: Freq, 'frequency of responses'.
Source: Vietnam Rural Household Survey (n=494, July-August 2016).
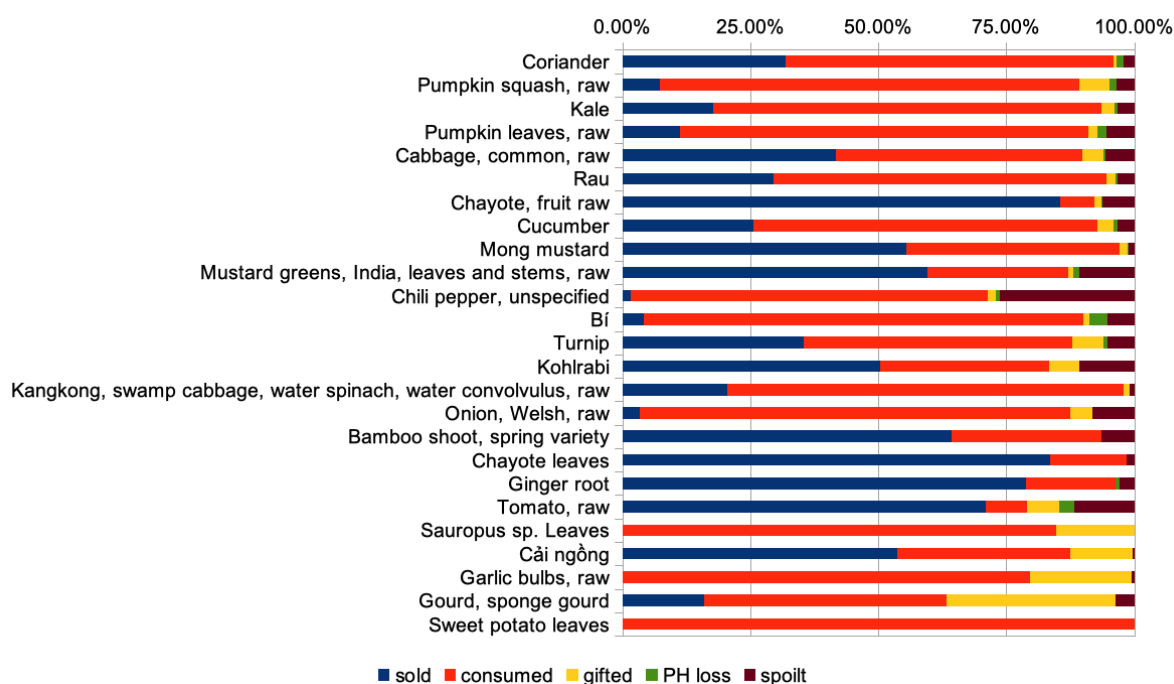
Note: Per cent refers to the quantity of sold/consumed/gifted/PH loss/spoilt divided by total production. Graph only includes main vegetables whose responses are >=5.
Source: Vietnam Rural Household Survey (n=494, July-August 2016).

Figure A2.4 Vegetable output and disposal in the previous 12 months

Table A2.8 Association between vegetable production diversity, market engagement, women's empowerment, and dietary diversity score (DDS) using OLS, for pooled, age- and gender-disaggregated samples

Variables	(1) Pooled	(2) 0.5-5yr	(3) >5-17yr	(4) boys	(5) girls	(6) 0.5-5yr boys	(7) 0.5-5yr girls	(8) >5-17yr boys	(9) >5-17yr girls
Vegetable production and market engagement									
VegDiversity	0.016	0.018	0.006	0.017	0.016	-0.051	0.086	0.034	-0.037
	(0.033)	(0.060)	(0.033)	(0.034)	(0.047)	(0.075)	(0.127)	(0.035)	(0.044)
TimeMarket	-0.756***	-0.873**	-0.765***	-0.614***	-0.953***	-0.751*	-1.631**	-0.565**	-0.940***
	(0.207)	(0.362)	(0.212)	(0.226)	(0.287)	(0.433)	(0.720)	(0.227)	(0.270)
VegValueSold	0.005***	0.003	0.006***	0.007***	0.002	0.005	-0.006	0.007***	0.004
	(0.002)	(0.004)	(0.002)	(0.002)	(0.003)	(0.004)	(0.009)	(0.002)	(0.003)
Women's empowerment									
Credit	-2.303	-0.340	-2.616	-1.674	-2.314	3.279	-2.432	-2.696	-2.109
	(1.787)	(3.069)	(1.991)	(1.899)	(2.408)	(3.991)	(5.295)	(1.944)	(2.650)
Income	0.143	0.041	0.024	0.388	-0.378	-0.151	-0.340	0.158	-0.090
	(0.649)	(1.077)	(0.673)	(0.672)	(0.857)	(1.390)	(1.604)	(0.704)	(0.923)
Group	0.526	0.589	0.550	0.122	1.051	-1.348	1.213	0.194	0.835
	(0.606)	(1.163)	(0.603)	(0.610)	(0.808)	(1.230)	(2.070)	(0.643)	(0.751)
WorkAway	-0.545	0.468	-0.672	-0.840	-0.170	-1.152	0.742	-0.567	-0.864
	(0.552)	(1.064)	(0.548)	(0.566)	(0.716)	(1.286)	(1.672)	(0.590)	(0.718)
Household characteristics									
LV-HA (ref: LV-LA)	-0.033	-0.045	-0.024	-0.034	-0.048	-0.009	0.144	-0.040	0.023
	(0.169)	(0.274)	(0.187)	(0.185)	(0.214)	(0.355)	(0.483)	(0.204)	(0.232)
HV-LA	0.096	0.067	0.072	0.082	0.106	0.784**	-0.165	-0.105	0.254
	(0.169)	(0.263)	(0.186)	(0.169)	(0.226)	(0.322)	(0.501)	(0.195)	(0.238)
HV-HA	0.132	0.218	0.119	0.152	0.119	0.940**	-0.075	0.005	0.314
	(0.168)	(0.273)	(0.181)	(0.177)	(0.212)	(0.360)	(0.535)	(0.189)	(0.222)
FoodExp_pc	0.002	0.004*	0.358*	0.001	0.346	0.001	0.861	0.592**	0.054
	(0.001)	(0.002)	(0.210)	(0.002)	(0.312)	(0.003)	(0.905)	(0.259)	(0.254)

The dependent variable is *CDDS*.

Table A2.8 Continued

Variables	(1) Pooled	(2) 0.5-5yr	(3) >5-17yr	(4) boys	(5) girls	(6) 0.5-5yr boys	(7) 0.5-5yr girls	(8) >5-17yr boys	(9) >5-17yr girls
					Dependent variable: *CDDS*				
NonFoodExp_pc	0.075***	0.182***	0.045**	0.072***	0.072**	0.322***	0.091	0.051***	0.024
	(0.021)	(0.056)	(0.018)	(0.021)	(0.035)	(0.098)	(0.081)	(0.017)	(0.030)
Area	-0.015	-0.044	0.040	-0.007	-0.019	0.092	-0.088	-0.007	0.156***
	(0.051)	(0.037)	(0.063)	(0.052)	(0.054)	(0.093)	(0.069)	(0.049)	(0.051)
Experience	-0.004	-0.009	0.001	-0.001	-0.008	0.002	-0.013	0.003	0.000
	(0.007)	(0.010)	(0.007)	(0.007)	(0.010)	(0.010)	(0.023)	(0.008)	(0.009)
Child characteristics									
AgeChild	0.028***	0.263***	0.004	0.012	0.047***	0.170*	0.293***	-0.005	0.014
	(0.008)	(0.068)	(0.010)	(0.012)	(0.013)	(0.086)	(0.105)	(0.015)	(0.014)
MaleChild	0.126*	0.384**	0.045						
	(0.066)	(0.178)	(0.073)						
Food preparer characteristics									
AgeFoodPrep	0.009	0.017	0.002	0.008	0.009	0.008	0.005	0.004	0.002
	(0.008)	(0.012)	(0.008)	(0.008)	(0.010)	(0.013)	(0.021)	(0.009)	(0.009)
FemaleFoodPrep	0.276**	0.353	0.264**	0.328***	0.120	0.232	0.163	0.336**	0.085
	(0.128)	(0.235)	(0.125)	(0.125)	(0.205)	(0.245)	(0.555)	(0.137)	(0.174)
EducFoodPrep	0.116***	0.130**	0.107***	0.094***	0.122***	0.178**	0.080	0.061*	0.169***
	(0.032)	(0.065)	(0.030)	(0.036)	(0.041)	(0.073)	(0.144)	(0.036)	(0.037)
MongFoodPrep	-0.510***	-0.384*	-0.503***	-0.501***	-0.490***	-0.424	-0.191	-0.488***	-0.559***
	(0.142)	(0.224)	(0.155)	(0.167)	(0.183)	(0.313)	(0.391)	(0.166)	(0.195)
Constant	3.797***	2.351***	4.205***	3.949***	3.855***	3.105***	3.069*	4.137***	4.340***
	(0.404)	(0.779)	(0.412)	(0.408)	(0.574)	(0.837)	(1.632)	(0.456)	(0.533)
Observations	653	165	488	334	319	92	73	242	246
R^2	0.309	0.362	0.357	0.351	0.303	0.497	0.416	0.390	0.394
Log likelihood	-814.8	-221.2	-563.7	-395	-409.9	-107.3	-98.36	-266.6	-282.9

Table A2.8 Continued

Variables	(1) Pooled	(2) 0.5-5yr	(3) >5-17yr	(4) boys	(5) girls	(6) 0.5-5yr boys	(7) 0.5-5yr girls	(8) >5-17yr boys	(9) >5-17yr girls
					Dependent variable: *CDDS*				
F-statistic	10.26	7.078	10.11	10.25	5.826	8.701	4.901	11.70	6.984
Degrees of freedom	20	20	20	19	19	19	19	19	19
Adjusted R^2	0.287	0.274	0.329	0.312	0.259	0.364	0.207	0.337	0.344

Notes: yr, 'age in years'. Robust standard errors, in parentheses, are clustered at the household level. *** $p<0.01$, ** $p<0.05$, * $p<0.10$.
Source: Vietnam Rural Household Survey (July-August and November 2016).

Statement of Authorship

Title of Paper	The impact of smallholder vegetable production on rural Vietnamese children's nutrition outcomes
Publication Status	☐ Published ☐ Accepted for Publication ☐ Submitted for Publication ☒ Unpublished and Unsubmitted work written in manuscript style
Publication Details	This chapter is being prepared for submission to the Journal of Development Studies[26].

Principal Author

Name of Principal Author (Candidate)	Christian Genova II
Contribution to the Paper	Involved in study design; performed primary data collection, data cleaning, data analysis, data interpretation; and wrote and revised the manuscript.
Overall percentage (%)	75
Certification:	This paper reports on original research I conducted during the period of my Higher Degree by Research candidature and is not subject to any obligations or contractual agreements with a third party that would constrain its inclusion in this thesis. I am the primary author of this paper.
Signature	Date MAY 7, 2019

Co-Author Contributions

By signing the Statement of Authorship, each author certifies that:

i. the candidate's stated contribution to the publication is accurate (as detailed above);

ii. permission is granted for the candidate in include the publication in the thesis; and

iii. the sum of all co-author contributions is equal to 100% less the candidate's stated contribution.

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[26] This version is formatted to meet the University thesis requirement. It includes references to other chapters, which are removed in the preprint version.

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3 The impact of smallholder vegetable production on rural Vietnamese children's nutrition outcomes

Abstract: Childhood undernutrition, particularly stunting, wasting, and micronutrient deficiencies, remains a major health concern in rural communities in Vietnam. While literature suggests leveraging agriculture to improve child nutrition via agricultural diversification, market engagement, and women's empowerment, very few studies have empirically explored how smallholder vegetable production can influence household nutrition. This paper examines the association of household-level vegetable diversity, market access, and market participation with nutrition outcome measures of children in the smallholder households. We use a cross-sectional household data set, collected in 2016 in northwest Vietnam, covering 234 children aged six to 60 months. We estimate and compare the results of regression models using three-stage least squares (3SLS), ordinary least squares (OLS), logistic regression, and seemingly unrelated regression (SUR), to explore variations in six nutrition outcome measures: height-for-age z-score (HAZ), weight-for-height z-score (WHZ), weight-for-age z-score (WAZ), stunting, wasting, and underweight. Our results suggest that smallholder vegetable production has a significant indirect association with children's nutrition status via market participation. Market participation is an important factor in improving girls' HAZ and WHZ, and in reducing the probability of boys being stunted and underweight. It is likely that additional income from selling vegetables allows households to purchase nutritious food, which is likely to have a positive impact on children's nutrition outcomes.

Keywords: child nutrition; gender; market access; market participation; vegetable production; Vietnam

3.1 Introduction

Vietnam has shown significant progress in reducing children's undernutrition in Southeast Asia (ASEAN et al. 2016), but this has decelerated in recent years. The prevalence of stunting and underweight went down by 50 per cent between 2001 and 2011 (Chaparro et al. 2014). However, between 2011 and 2015 there has been a relative increase in childhood stunting (from 23% to 25%) and wasting (from 4% to 6%) (WHO et al. 2016). Current interventions focus on the provision of key micronutrients, such as vitamin A, zinc, and iodine (Chaparro et al. 2014), because children's undernutrition is due to micronutrient deficiencies arising from poor dietary intake and from infectious diseases like diarrhea (UNICEF 1990). However, declining financial support from the national and local governments for these activities, and the poor nutritional knowledge of mothers and other household members (International Food Policy Research Institute 2016; Socialist Republic of Vietnam 2012), have impeded progress. The positive impacts of these changes also differ between urban and rural areas, by region, and between the Kinh majority and ethnic minorities. Women, children, and ethnic minorities are the most vulnerable groups (Epprecht et al. 2009; GSO 2012; NIN & UNICEF 2011). Children's undernutrition was found to be higher in the Northern Midland and Mountainous area, the North Central area, and Central Coastal areas compared to the regions where major cities are located (e.g. Red River Delta and South East) (Epprecht et al. 2009; NIN 2015; NIN & UNICEF 2011).

One way to lessen the financial burden of rural households is to promote agriculture, animal husbandry, and other existing production systems in locations with high populations of vulnerable groups (the poor, the malnourished, children and women, and ethnic minorities) (Alderman et al. 2013). Many of Vietnam's undernourished children

are found in resource-poor households in rural areas dependent on agriculture for the main source of their livelihood and nutrition (GSO 2012; Linh & Glewwe 2011; NIN 2015). At the household level, the pathway between agriculture and children's nutrition can be direct (the consumption of a healthy and diverse diet from their own food production) or indirect (the consumption of more nutritious and diverse food due to higher income from selling produce to food markets or market proximity) (Alderman et al. 2013; Carletto et al. 2015; Dangour et al. 2012; Gillespie et al. 2012; Herforth & Harris 2014; Kadiyala et al. 2014; Kanter et al. 2015; Pinstrup-Andersen 2014; Turner et al. 2013; Webb 2013). Vegetable consumption is a particularly sustainable way to combat some types of child undernutrition because of its micronutrient richness. However, its overall impact on child undernutrition remains largely unexplored. Most studies that have evaluated the impact of vegetables on nutritional outcomes were part of horticultural intervention programs (see a review by Taren & Alaofe 2013), which produced mixed findings (Carletto et al. 2015; Masset et al. 2012; Ruel et al. 2013). Recent studies have highlighted the importance of market engagement because its effect on household nutrition has been found to be larger than agricultural diversity per se (e.g. Hirvonen & Hoddinott 2017; Koppmair et al. 2017; Sibhatu et al. 2015; Stifel & Minten 2017), though much remains unknown about the impacts of market engagement and household vegetable production more broadly.

With these factors in mind, this study aims to fill this gap by examining the possible contribution of smallholder vegetable production on children's nutrition, as well as identifying other significant factors. We investigate these relationships using pooled and gender-disaggregated samples. We incorporate four indicators of smallholder vegetable production (vegetable production diversity and three indicators on market engagement)

in the standard empirical approach of examining child nutrition, controlling for the underlying child, maternal (including women's empowerment), and household characteristics (UNICEF 1990, 2013).

We use cross-sectional data to study 234 children, aged six to 60 months, from 188 rural households in northwest Vietnam. We hypothesise that smallholder vegetable production has a positive effect on children's nutrition, which may occur either through a direct or indirect pathway. In the direct pathway, we specifically investigate whether diverse vegetable production is associated with childhood nutrition. The premise is that when households diversify their production, children also diversity their food intake accordingly, and therefore improve their diet, ultimately leading to improved nutrition. In the indirect pathway, we assess whether market engagement, via market access and market participation, positively correlate with nutritional outcomes. Households close to markets enjoy a wider array of diverse and nutritious foods that are not accessible to those in more remote rural areas. Similarly, the consumption of more diverse foods, leading to improved nutritional status, becomes possible because of income gains due to semi-commercialisation (market participation). Understanding these direct and indirect pathways can help the Government develop long-term, sustainable solutions that are resource-efficient, and allow households to more effectively participate in.

3.2   Research Methods

3.2.1   Study area

The study was conducted in Lao Cai Province, a temperate vegetable-producing region in Vietnam's Northern Midlands and Mountainous region. Farming constitutes 93 per cent of the economy in this region, especially in its rural areas (Linh & Glewwe 2011). Many rural households grow vegetables only for their own consumption due to small

landholdings (International Food Policy Research Institute 2002). Nevertheless, the province is suited to increasing vegetable intensification due to its climate and soil suitability (Wijk & Everaarts 2007). In 2017, the province's total vegetable output was 11.40 tons per hectare (Lao Cai General Statistics Office (GSO) 2018) compared to the country average of 14.90 tons per hectare (FAOSTAT 2018).

In spite of this, fruit and vegetable consumption comprise only 88 grams/capita/day (GSO 2012), which is below the daily recommendation of 400 grams/capita/day (WHO & FAO 2005). The diet has a high intake of starchy staples and low intake of fruits, vegetables, and animal products. Micronutrient intakes are suboptimal even among the wealthiest quintiles (Nguyen et al. 2013). Government nutrition programs have already been implemented in the province to overcome nutritional issues (Chaparro et al. 2014). However, among children under five, it still has one of the highest rates of stunting (35%) and underweight (20%) due to inadequate household food security (caused by poverty) and inadequate maternal and childcare (NIN 2015; NIN & UNICEF 2011).

Ethnic minorities comprise 64 per cent of the province's population: Mong (22%), Tay (16%), Dao (14%), Giay (5%), and Nung (4%) (Lao Cai People's Committee 2016). Epprecht et al. (2009) found that most of these ethnic minorities are poor due to a spatial poverty trap. The rugged, mountainous terrain and their remoteness limit their access to various resources like health, education, infrastructure, credit, and markets (World Bank 2009 as cited by Dang 2012). However, they also resist state intervention in favour of their traditional cultural knowledge (Bonnin & Turner 2012). For instance, the Mong's dependence on shifting cultivation, livestock breeding and terrace field farming, and their lack of access to scientific knowledge and technological advances, are major factors contributing to their poverty (Tinh 2002).

3.2.2   Data

Our analyses focused on households with children aged six to 60 months from a unique cross-sectional data set that we collected during July and August 2016. Rural farming households were randomly selected using a stratified multistage random sampling strategy. Chapter 2 (Sec 2.2) further explains the sampling design.

Detailed information on household and individual characteristics— including anthropometric measurements, women's empowerment (using the modified Abbreviated-Women's Empowerment in Agriculture Index or A-WEAI (Malapit et al. 2015b)), farm production and marketing activities in the last production cycle, and child health— were collected. Except for the women's empowerment module, the person primarily responsible for food preparation in the household was the target respondent, which in most cases is the child's mother. The modified A-WEAI module was administered to both the principal and secondary decision-makers in the household (normally, the parents of the child).

The semi-structured questionnaire was translated into Vietnamese by two native Vietnamese speakers and was validated by the Mekong Development Research Institute (MDRI)[27]. Pre-testing was done in the study areas in March, June, and July 2016. The paper-based questionnaire was transferred to a mobile application. A detailed Training Manual was provided to a team of 22 enumerators and five field supervisors from MDRI who facilitated the survey implementation. The team included one local enumerator fluent in the local Mong dialect. Enumerator training was conducted over a week and modifications were made to the survey instrument.

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[27] MDRI is a research institute in Hanoi, Vietnam that was contracted to assist our team in gathering data in the northwest.

We used Stata v15.1 (StataCorp, College Station, TX) for the descriptive and statistical analyses. Analyses were done for the pooled sample and were gender-disaggregated to identify any differential effects for boys and girls.

3.2.3   Characteristics of the sample

Table 3.1 shows the descriptive and summary statistics of the key variables used in the analyses. Our sample consists of 266 children aged six to 60 months from 210 households. After cleaning the data, the final number of observations with complete information is 234 children from 188 households.

The main variables of interest comprise variables that measure vegetable production diversity, market access, and market participation. The mean *VegDiversity* is 3, and ranges between 0 and 13 vegetables. *TimeMarket* is 0.39 hours on average, with the most remote household traveling for 1.50 hours to access the market. Most of the households are involved in vegetable production, with 60 per cent having sold to some type of market (44% to traditional channels, 20% to modern channels, and about 5% to both traditional and modern channels).

More than 60 per cent of woman decision-makers make decisions on household income (*Income*) and nearly 30 per cent have a workload that is less than the time poverty line of 10.50 hours[28] per day (*Workload*).

The average age of young children in our sample is 37.40 months, and they consume food belonging to four food groups[29] (*DDS*), on average. Seventeen per cent of the 188

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[28] Malapit et al. (2015b) considers an individual as time poor when s/he works more than the time poverty line of 10.50 hours per day.
[29] Refer to Table A2.5a and Table A2.5b.

households indicate that some or all of their children have experienced diarrhea two weeks prior to the survey.

Most mothers belong to the Mong ethnic group, and their average age is 41 years. The oldest is 87 years old, because the respondent is the child's grandmother; the biological mother is working elsewhere or has passed away, and the grandmother took over the mother's role. Mothers who are working and residing elsewhere are excluded since we only include household members staying in the house four days of the week or six months of the year. About 40 per cent are illiterate, 22 per cent have primary-level education, and 33 per cent have reached secondary-level[30]. The average maternal height is 149.77 centimetres (cm), which is considered stunted following the definition of Addo et al. (2013) on maternal stunting as being below 150.10 cm. The mean BMI is 22.40 kilograms per square meter (kg/m^2), which is considered "normal" weight (WHO Expert Consultation 2004).

The average number of children under five years old is two. We find high variability in the total cultivated land area (*Area*); the average is 1.08 hectares, and the largest land area is 19.60 hectares. Wide variation is also observed for *NonFoodExp_pc,* with the lowest monthly non-food expenditure per capita equal to 0.04 million VND[31] (US$1.79) and the highest is 13.88 million VND (US$620.50). The majority of households do not have access to a safe water source and drinking water, and only about 37 per cent have access to improved[32] toilet facilities.

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[30] In the regression model, education is treated as a continuous variable rather than a categorical variable to determine the effect of higher education on the child nutritional outcomes.

[31] 1 US Dollar (US$) = 22,370.09 Vietnamese Dong (VND) (2017 average). Source: UNCTAD, 'Currency exchange rates, annual, 1970-2017', http://unctadstat.unctad.org/wds/TableViewer/tableView.aspx?ReportId=117

[32] Categories under improved toilet facilities include septic tank, biogas, double pit dry, ventilated pit dry, and single pit dry; unimproved toilets are no toilet, pour flush, fishpond, and ashes/bridge/bucket (WHO & UNICEF 2006).

3.2.4 Anthropometric measurements

Children were measured using the anthropometric protocol from the National Health and Nutrition Examination Survey (NHANES) Anthropometry Procedures Manual (Centres for Disease Control and Prevention 2007). The Seca infantometer 210 was used to record the recumbent length of infants and children up to three years who cannot stand on their own. The height of older children was measured using a tape measure. The Laica digital weight scale was used to record children's weight. The weight of infants and young children unable to stand independently was recorded with the aid of the mother. The mother and the child were weighed together, then the mother's weight was deducted to derive the child's weight. Mothers were requested to remove their, and their children's, shoes, hats, and heavy clothing, prior to the recording of height and weight.

Using the 2006 WHO Child Growth Standards and the Stata user-written program *zscore06* (Leroy 2011), children's height and weight were converted into z-scores: height-for-age z-score (HAZ), weight-for-height z-score (WHZ), and weight-for-age z-score (WAZ). Three additional variables were created to measure the prevalence of stunting, wasting, and underweight, using the HAZ, WHZ, and WAZ, respectively. Specifically, these binary indicators take the value of 1 if the z-score is below -2 standard deviations (SD), or 0 if otherwise. For instance, a child is defined as stunted or with impaired linear growth when HAZ is less than -2 SD from the WHO Child Growth Standards median. Stunting reflects chronic or long-term undernutrition typically resulting from sustained episodes of nutritional deprivation and/or recurrent infection (WHO 2010a). A child is wasted, or exhibits extreme thinness, when WHZ is less than -2 SD from the median of the reference population. Wasting reflects acute undernutrition and is an indicator of a child's current nutritional status due to a recent period of starvation or a severe infection,

like diarrhea (WHO 2010a). A child is underweight when WAZ is less than -2 SD from the median of the reference population. WAZ is a composite measure of HAZ and WHZ, and is difficult to interpret. However, it is commonly used to monitor growth and changes in malnutrition over time (O'Donnell et al. 2008). Underweight is therefore used as a summary indicator, reflecting a child being stunted or wasted (Kimenju & Qaim 2016). Children with missing data on height, weight, age, and gender were excluded from our analyses. The observed standard deviations of the z-scores can also identify inaccurate data due to measurement or coding errors. Therefore, we followed the WHO cut-off points for each of the child nutrition outcomes in the final analyses to identify these errors and exclude children whose values are in these ranges: HAZ, below or equal to -6 or equal to or above 6 SD; WHZ, below or equal to -5 SD or above or equal to 5 SD; and WAZ, below or equal to -6 or above or equal to 5 SD (WHO 2010b).

3.2.5   Nutritional status of sampled children

The mean HAZ, WHZ, and WAZ are -2.20, -0.25, and -1.44 SD below the medians in the reference population, respectively (Table 3.1). The prevalence of child undernutrition in Lao Cai province by age group and gender is shown in Table 3.2. We have a nearly balanced sample of boys (n=123) and girls (n=111) aged six to 60 months. In the pooled sample, 62 per cent are stunted, 9 per cent are wasted, and 24 per cent are underweight. These estimates are higher than the 2015 provincial and regional averages (NIN 2015) and are consistent in each of the four districts. By gender, there are slightly more boys who are stunted (65%) and underweight (24%), and more girls who suffer from wasting (13%). The higher prevalence of stunting among boys was also observed in several countries in Sub-Saharan Africa, which suggests that boys are more vulnerable to health inequalities than girls (Wamani et al. 2007).

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Disaggregating them by age group, we find a higher incidence of stunting in the 24 to 60-month group, and a higher incidence of wasting in the six to 23-month group. The results for the children in the six to 23-month group represent growth faltering, while those for the 24 to 60-month group reflect the full impact of various postnatal issues (Alderman & Headey 2018). We find more girls who are stunted (64%) and more boys who are wasted and underweight (20% and 28%, respectively) in the six to 23-month old age group. In the 24 to 60-month old age group, stunting (67%) and underweight (28%) are more prevalent among boys, and wasting is more prevalent among girls (27%). By geographic strata, stunting and underweight are highest in HV-LA (70% and 30%, respectively). In contrast, the lowest incidence of stunting and underweight are in HV-HA (49%) and in LV-LA (18%), respectively. Figure 3.1 shows the overall distribution of children for HAZ, WHZ, and WAZ, while Figure 3.2 and Figure 3.3 show the distribution for boys and girls, respectively. These figures further show the extent of stunting, where the majority of children have HAZ below the WHO child growth standards depicted as standard normal densities. In the subsequent analyses, results are presented for the pooled sample and disaggregated by gender, instead of by age group, due to small sample size.

3.2.6 Econometric model specification

We adopt the UNICEF conceptual framework commonly used to explain the causes of child malnutrition and mortality (UNICEF 1990, 2013). In this framework, poor diets and diseases are the immediate determinants of child undernutrition. These factors, which often occur together, are caused by several underlying factors, like lack of access to food, either physically or economically, poor maternal and child-care practices, and an unhealthy environment, due largely to income poverty.

The empirical model estimated is shown in equation (1):

$$H_{ijh} = constant + \beta VegDiversity_h + \gamma Market_h + \delta' G_h + \omega' CH_i + \sigma' M_j + \varphi' HH_h + \varepsilon_{ijh} \quad (1)$$

where H_{ijh} is one of the six alternative nutrition outcome measures: *HAZ*, *WHZ*, *WAZ*, *stunting*, *wasting*, and *underweight* of child *i* of mother *j* in household *h*. The *HAZ*, *WHZ*, and *WAZ* are continuous variables, and the prevalence of *stunting*, *wasting*, and *underweight* are binary variables. G_h, CH_i, M_j, and HH_h are vectors of women's empowerment/adequacy, child characteristics, maternal characteristics, and household features, respectively; and ε is the error term. In these models, we focus on the estimates of β and γ, which indicate whether our main variables of interest have positive, negative, or no effects on the specific nutrition outcome measure. The main variables of interest and specific controls used in the model are explained subsequently.

3.2.7   Main explanatory variables of interest

We hypothesise that smallholder vegetable production may have a positive relationship with children's nutrition. The link between household vegetable production and children's nutrition could be a result of either consumption from household production (direct), or consumption of more diverse foods due to market access and/or higher income gained from market participation (indirect) (Alderman et al. 2013; Carletto et al. 2015; Dangour et al. 2012; Gillespie et al. 2012; Herforth & Harris 2014; Kadiyala et al. 2014; Kanter et al. 2015; Pinstrup-Andersen 2014; Turner et al. 2013; Webb 2013). We measure the association of smallholder vegetable production and children's nutrition outcomes using four main variables of interest: *VegDiversity*, *TimeMarket*, *TradMarket*, and *ModMarket*.

VegDiversity$_h$ is a measure of household vegetable production diversity, and is a simple unweighted count of the number of unique vegetables cultivated by household *h* in the last 12 months prior to July/August 2016 (Keding et al. 2012). *VegDiversity$_h$* was assessed by asking the respondent about the types of vegetable cultivated for home consumption, for market, lost due to postharvest spoilage, given as gift to neighbours or used for seed storage. We hypothesise that greater diversity in vegetable production can improve dietary quality and, eventually, nutrition through the subsistence pathway (Sibhatu & Qaim 2017).

Recent studies have also pointed to the importance of markets (*Market$_h$*) on children's nutritional status, in terms of both access and market participation (e.g. Hirvonen & Hoddinott 2017; Koppmair et al. 2017; Sibhatu et al. 2015; Stifel & Minten 2017). In this case, we include *TimeMarket* to indicate market access, and *TradMarket* and *ModMarket* to indicate market participation. *TimeMarket* is the one-way travel time in hours to the nearest food market. We have added this variable to differentiate remote rural households from those in closer proximity to food markets. We hypothesise that closer proximity to food markets allows children to have more diversified food intake, and that this may explain improvements in the nutritional status of children living closer to markets as compared to children who are residing in remote areas (Abay & Hirvonen 2016). We impute the missing values and "don't know" responses with the mean of the village, commune, or the district, depending on which is available, by transport type. Two dummy variables indicate market participation in the last production cycle: if they have sold to traditional channels (*TradMarket*), and to modern channels (*ModMarket*). Traditional channels are those that are local such as the local market in the village/commune/district, selling to fellow farmers, and selling to collectors that visit the farm(s). Modern market

channels include supermarkets, wholesale markets, cooperatives, and other retailers in Hanoi and other provinces. For these two dummy variables, our hypothesis is that market participation positively affects children's nutritional status through the income gained from semi-commercialisation, allowing the household to purchase more diversified food, thus promoting better nutritional status.

3.2.8 Other explanatory variables

We also control for women's empowerment/adequacy (G_h) since previous studies suggest that women's empowerment has been a significant predictor of children's nutritional status. Women are normally more health-promoting than men through the preparation of more nutritious and healthier food, and through childcare (Quisumbing et al. 1995). Two dummy variables, which are adopted from the A-WEAI indicators[33], are used to control for women's empowerment/adequacy: woman make decisions on household income (*Income*), and woman's workload is less than the time poverty line of 10.50 hours (*Workload*). Each indicator is assigned a value of 1 if the woman's achievement is adequate, i.e. it exceeds the defined inadequacy cut-off for the specific indicator, and a value of 0 if otherwise (Malapit et al. 2015b). *Workload* indicates reduced workload, which could indicate better maternal care through mothers having sufficient time to make healthier decisions about their children's food intake, grooming, and sanitation (Cunningham et al. 2018).

The following child characteristics (***CH_i***) are also included: *DDS* (Dietary Diversity Score of child), *AgeChild* (age of the child in months); and two dummy variables,

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[33] Compared with Chapter 2, we excluded access to credit (*Credit*) and group membership (*Group*) in the estimation strategy due to its high correlation with *Income* (r=0.401 and r=0.472, respectively).

MaleChild (equal to 1 if the child is male), and *Diarrhea* (equal to 1 if some or all children experienced diarrhea in the two weeks prior to the interview). The *DDS* is the mean Dietary Diversity Score of the child in three reference periods (similar in Chapter 2). We include *Diarrhea* since it has been shown to negatively impact on children's nutritional outcomes, especially WHZ and wasting (WHO 2010a).

For the maternal characteristics (M_j), we control for the following:

- *AgeMother*. This is a continuous variable representing the child's maternal age in years.

- *EducMother*. Originally a categorical variable wherein 0=no education, 1=nursery, 2=some primary, 3=primary (completed all years), 4=lower secondary, 5=upper secondary, 6=vocational, 7=university/college, and 8=postgraduate. In the empirical analyses, this variable is treated as ordinal. This variable was highly correlated with the nutritional knowledge of the mother so we only include *EducMother*, and treat it as a proxy for better child-care practices and greater maternal nutritional knowledge.

- *MongMother*. This is a dummy variable for ethnicity which is equal to 1 if Mong, and 0 for the other ethnic groups: Kinh; Tay; Muong; Nung; Dao; Kho Mu; Giay; Phu La (Xa Pho); and Bo Y.

- *HtMother*. This is a continuous variable showing the mother's height in centimetres. A mother's height indicates her genetic endowment; women who are stunted are likely to have stunted offspring (Addo et al. 2013; de Onis & Branca 2016; Forero-Ramirez et al. 2014; Prendergast & Humphrey 2014).

- *BMIMother*. This is a continuous variable that measures the mother's body mass index (BMI) in kg/m^2. It has been shown to effect the likelihood of child stunting (Headey et al. 2012).

Finally, we also control for the following household characteristics (***HH$_h$***):

- *Stratum*. This is a categorical variable wherein 1=LV-LA (low vegetable diversity per capita and low elevation), 2=LV-HA (low vegetable diversity per capita and high elevation); 3=HV-LA (high vegetable diversity per capita and low elevation); 4=HV-HA (high vegetable diversity per capita and high elevation). This is included to control for geographical differences affecting vegetable production due to elevation or other factors.

- *CHD5b*. This is a continuous variable denoting the number of children under five years old in the household, and is a proxy for the mother's ability to undertake good child-care practices. The more infants and younger children in the household, the more time constrained the mother is as she juggles childcare and other household (including agricultural) activities (Babu et al. 2014).

- *Area*. This is a continuous variable showing the total area of the cultivated land in hectares, and is included to control for farm-specific characteristic.

- *NonFoodExp_pc*. This is a continuous variable that shows the household's monthly non-food expenditure per capita in million Vietnamese Dong (VND), used as proxy for household income.

- *ImprovedToilet*. This is a dummy variable that is equal to 1 if the household has access to an improved toilet facility, and 0 if does not. It is used as a proxy for good sanitation. Improved toilet facilities include: septic tank, biogas, double pit dry,

ventilated pit dry, and single pit dry; unimproved toilets include no toilet, pour

flush, fishpond, and ashes/bridge/bucket (WHO & UNICEF 2006).

3.2.9   Empirical strategy

We first estimate equation (1) using ordinary least-squares (OLS) regressions for the three

continuous nutrition outcome variables (*HAZ*, *WHZ*, and *WAZ*) and Logit regressions for

the three binary outcome variables (*stunting*, *wasting*, and *underweight*) to assess the

empirical relationship between children's nutritional outcomes and smallholder vegetable

production. We present the marginal effects for the Logit estimations. In both estimators,

robust standard errors are used and are clustered at the household level.

Three of our main variables of interest— *VegDiversity*, *TradMarket* and *ModMarket*—

are potentially endogenous. This renders the OLS and Logit biased and inconsistent

estimators. Using Wooldridge's robust score chi^2 and robust regression-based F-test for

exogeneity[34], we find that, in some of the models, endogeneity exists with *TradMarket*

and *ModMarket*, and hence the instrumental variable (IV) method is preferred. Therefore,

we use the percentage of surveyed neighbours in the village selling to traditional channels,

excluding the household (*PctNeighborTrad*) as an instrument for *TradMarket*; and the

percentage of surveyed neighbours in the village selling to modern channels, excluding

the household (*PctNeighborMod*) for *ModMarket*. The use of the percentage of

neighbours selling to traditional channels excluding the household (*PctNeighborTrad*) is

a good instrument for *TradMarket* since a household selling to *TradMarket* is likely to

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[34] Instead of the Durbin Wu-Hausman statistics for endogeneity test, Wooldridge's (1995) robust score test and robust regression-based test statistics are reported after 2SLS estimation with a robust VCE <https://www.stata.com/manuals13/rivregresspostestimation.pdf (p. 2)>.

have neighbours similarly engaged in selling to *TradMarket* (Andersson et al. 2015). The same can be said for *PctNeighborMod*.

Mathematically, we model them as follows:

$$VegDiversity_h^V = \beta_0^V + \beta_1^V Distance + \beta_2^V G_h + \beta_3^V CH_i + \beta_4^V M_j + \beta_5^V HH_h + \varepsilon_h^V \qquad (2)$$

$$TradMarket_h^T = \beta_0^T + \beta_1^T PctNeighborTrad + \beta_2^T G_h + \beta_3^T CH_i + \beta_4^T M_j + \beta_5^T HH_h + \varepsilon_h^T \qquad (3)$$

$$ModMarket_h^M = \beta_0^M + \beta_1^M PctNeighborMod + \beta_2^M G_h + \beta_3^M CH_i + \beta_4^M M_j + \beta_5^M HH_h + \varepsilon_h^M \qquad (4)$$

Equations (2) to (4) form a system of equations that account for the endogeneity of *VegDiversity*[35], *TradMarket* and *ModMarket.* We use the three-stage least squares (3SLS) method in all six alternative nutritional outcome measures, which is robust to the application of instrumental variables (IV) in the seemingly unrelated regression (SUR), since error terms of the system of equations might be correlated. The application of linear regression when the dependent variable is dichotomous, in this case the three prevalence outcome variables (*stunting*, *wasting*, *underweight*), has been justified by Angrist and Pischke (2009) and Hellevik (2009). Since the error terms might be correlated between the system of equations for a specific child and be uncorrelated across children, the seemingly unrelated regression (SUR) models are also estimated. The Breusch-Pagan test of independence indicated statistically significant correlations between the error terms of the system of equations in all six alternative nutritional outcomes. Therefore, the main results of the 3SLS estimates are used for inference in the subsequent section, and are

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[35] As part of a system of equations, we use distance to an agricultural office (*Distance*) as an instrument for *VegDiversity* The use of *Distance* could be a good instrument of *VegDiversity*, since proximity to an agricultural extension office, which can be found in most communes, means easy access to information on improved crop production practices and free seeds, and has therefore the potential to affect *VegDiversity* (Di Falco et al. 2011).

compared with OLS, Logit, and SUR estimates to determine the possible direction of the bias.

The following discussion of the analyses for the pooled and gender-disaggregated samples are divided into three parts. The first and the second consider the association of the main variables of interest, *VegDiversity*, *TimeMarket*, *TradMarket*, and *ModMarket*, with: (a) *HAZ*, *WHZ*, and *WAZ*; and (b) *stunting*, *wasting*, and *underweight*, after controlling for child, maternal, and household characteristics. The third identifies other significant factors that may be associated with improvements in children's nutritional outcomes.

3.3   Results and Discussion

3.3.1   Impact of smallholder vegetable production on HAZ, WHZ, and WAZ

In general, smallholder vegetable production, via market participation, is significantly associated with improvements in children's *WAZ* at the 5- and 10-per cent levels of significance (Table 3.3, Panel 9). Households that sell to the traditional channels in their locality (*TradMarket*) benefit via a *WAZ* increase of 0.334 SD ($p<0.10$). The association is larger and more significant when households sell to modern channels (*ModMarket*), with a *WAZ* increase of 0.354 SD ($p<0.05$). These associations are robust across different estimation methods (OLS and SUR). No statistically significant association was found between *VegDiversity* and *TimeMarket* on *WAZ*, and between the four main variables of interest on *HAZ* and *WHZ* (Panels 7 and 8).

3.3.1.1   *Impact on HAZ, WHZ, and WAZ of boys and girls*

Vegetable production diversity. The number of cultivated vegetables (*VegDiversity*) is associated with a 1.134 SD increase in *HAZ* ($p<0.05$) among girls (Table 3.4, Panel 7).

However, it affects the *WHZ* (Panel 8) of boys and girls differently. For girls, a 1.201 SD decrease in *WHZ* ($p<0.05$) is observed, while a 0.772 SD marginal increase ($p<0.10$) is observed for boys.

Market access. We did not find any significant association between *TimeMarket* and any of the three nutritional outcomes in either boys or girls.

Market participation. Significant associations were only found for girls, with larger coefficients and more significant positive effects of market participation on *HAZ* and *WHZ* at the 5 per cent level of significance, and *WAZ* at the 5- and 10-per cent levels of significance (Panels 7 to 9). The positive and significant association between *ModMarket* and *WAZ* is robust across different estimation techniques, similar with the findings in the pooled sample (Table 3.3, Panel 9). In particular, *ModMarket* is associated with a 1.115 SD increase in *HAZ* ($p<0.05$), and a 0.487 SD increase in *WAZ* ($p<0.10$). *TradMarket* is also associated with a 0.905 SD increase in *WHZ* ($p<0.05$), and a 0.498 SD increase in *WAZ* ($p<0.05$).

What do these results suggest? Market participation does have a significant effect in improving the HAZ, WHZ, and WAZ of the children in this province, especially among girls. Selling to traditional channels (*TradMarket*) can improve the current nutritional status (WHZ). The effect is greater when households engage in modern market participation (*ModMarket*); it positively affects children's linear growth (HAZ), which is an indication of long-term undernutrition. In addition, the link between vegetable production diversity and children's nutritional status should not be discounted. While its impact differs in HAZ and WHZ, what is crucial is that, like *ModMarket,* it is also associated with significant improvements in young girl's linear growth (HAZ). This has important implication for curbing the transmission of intergenerational linear growth

retardation (Walker et al. 2015) in rural areas, as we find that a one unit increase in maternal height decreases the probability of stunting (Table 3.5, Panel 7, $p<0.05$).

3.3.2 Impact of smallholder vegetable production on the prevalence of stunting, wasting, and underweight

In general, market participation has implications for reducing the probability of *stunting* and *underweight* (Table 3.5). For instance, *TradMarket* reduces the probability of *underweight* at the 5 per cent level of significance (Panels 9). Increased *VegDiversity*, however, is associated with an increased probability of being *underweight* although the association is marginal (Panel 9). No statistically significant association was found between *VegDiversity* and *TimeMarket* on either *stunting* or *wasting* outcomes, as with previous results for *HAZ* and *WHZ*.

3.3.2.1   Impact on stunting, wasting, and underweight outcomes of boys and girls

Vegetable production diversity. Vegetable diversity, while reducing the probability of *wasting* (Table 3.6, Panel 8), does not reduce the probability of *stunting* and *underweight* (Panels 7 and 9, respectively) among boys as initially hypothesized.

Market access. There was no significant association between *TimeMarket* and any of the three nutritional outcomes in either boys or girls.

Market participation. Table 3.6 shows that the association on *stunting*, *wasting*, and *underweight* are more pronounced for boys than girls (Panels 7-9). Market participation is strongly associated with an increased probability of a boy being stunted or underweight ($p<0.05$). However, *ModMarket* also leads to a higher prevalence of *wasting* ($p<0.05$) but this association requires further validation because the number of observations of wasted boys is only six per cent (Table 3.2).

This strengthens the finding that additional income gained from market participation can improve child nutrition outcomes. It also highlights that by simply selling to traditional channels rather than not selling, there is a strong and positive link with a reduced probability of being underweight. Addressing stunting may require gaining higher income from modern market participation, although the association is marginal.

3.3.3 Other factors associated with HAZ/stunting and WHZ/wasting outcomes

Other covariates are found to be significantly associated with *WHZ* but not with *HAZ*. This is also true with *stunting* and *wasting* outcomes. We speculate that the underlying determinants of nutrition, such as wealth, education, maternal care, and disease and sanitation, are significantly attenuated for *HAZ/stunting* when younger children (6 23 months) are combined with older children (24-59 months). With *WHZ/wasting*, the opposite effect is observed due to the inclusion of older children (Alderman & Headey 2018).

HAZ. The only other covariate that significantly and positively affects *HAZ* is *Workload* (Table 3.3, Panel 7). The association is robust across different estimation techniques. It especially impacts girls (1.604 SD increase, *p*<0.05, Appendix Table A3.8, Panel 7), which is a finding similar to previous studies (Abate & Belachew 2017; Ruel et al. 1999). Most households in these rural areas operate as a family farming system, wherein farm operation is primarily dependent on the family's manual labour and the use of animals (Tran 2003; Ye & Pan 2016). To balance their agricultural obligations and their maternal and caring roles, mothers with young children carry their babies on their backs while working in the fields. Further research is required to tease out the quality of childcare practices in the target locations because our results indicate that, in addition to

income gains from modern market participation, maternal care also significantly impacts the linear growth of girls and their future offspring (Walker et al. 2015).

Stunting. Other important covariates that reduce the probability of *stunting* are maternal height (*HtMother*) and the geographic stratum *HV-HA*. Our results show that *HtMother* is associated with a lower probability of *stunting* ($p<0.05$). A closer look, however, indicates that the effect size is relatively small. The association is true for both boys and girls (Appendix Table A3.9 and Table A3.10) supporting the findings of other studies (e.g. Prendergast & Humphrey 2014), which found a relationship between mothers who were stunted and their children having increased prevalence of stunting. Maternal height did not have a significant effect on children's *HAZ*; thus, this could suggest that other external factors, aside from the genetic predisposition, come into play; for instance, if women of reproductive age have access to adequate health and nutrition, and health care (de Onis & Branca 2016).

In addition, boys in *HV-HA* have a lower prevalence of *stunting* compared to those in the *LV-LA* areas (Appendix Table A3.9, Panel 7). Targeted interventions could focus in the *LV-LA* areas, given the higher prevalence of *stunting* compared to *HV-HA* areas. This result shows that higher altitudes do not imply a higher incidence of stunting, and higher vegetable density per capita may have additional advantages compared with lower vegetable density per capita. Predictors that magnify the probability of *stunting* are *AgeMother* and *BMIMother* (Table 3.5, Panel 7). However, the effect sizes are small, and the association (*BMIMother*) is marginal.

WHZ. For *WHZ*, overall, maternal education (*EducMother*) ($p<0.05$) and Mong ethnicity (*MongMother*) ($p<0.10$) are positively associated with a child's *WHZ*. Further,

for both boys and girls *NonFoodExp_pc* is also positively associated with *WHZ*, indicating that household income matters (Martorell and Zongrone 2012).

For boys, *WHZ* improves as they get older (*AgeChild*, $p<0.05$) (Appendix Table A3.7, Panel 8). These results are robust, but the effect sizes are small. *BMIMother* also positively impacts boys' *WHZ*, although marginally. Considering geographic location, boys in the *HV-HA* stratum are associated with lower *WHZ* ($p<0.10$) than those in the *LV-LA* stratum.

For girls, *Area*, which is another indication of household wealth, positively but marginally impacts *WHZ* ($p<0.10$), while *Income*, *Workload* and *Diarrhea* negatively affect *WHZ* (Appendix Table A3.8). These relationships are at the 1- and 5-per cent levels of significance. The incidence of diarrhea two weeks prior to the survey negatively affect a girl's *WHZ* ($p<0.01$). This negative association is robust in different estimation techniques. However, the impact of the two women's empowerment variables (*Income* and *Workload*) on *WHZ* is negative and highly significant at the 1- and 5-per cent levels. Nonetheless, while *Workload* negatively affects *WHZ* (short-term undernutrition), it has a larger positive effect on *HAZ* (long-term undernutrition).

Wasting. For the *wasting* outcome (Table 3.5, Panel 8), the results resonate with our findings in *WHZ*, where maternal education (*EducMother*) and ethnicity (*MongMother*) positively reduce the probability of *wasting*, in addition to *Income* and *AgeChild*, at the 5 per cent level of significance. However, the effect sizes of *AgeChild* and *EducMother* are relatively small. Among boys, the probability of *wasting* is reduced via *Income*, *AgeChild* and *BMIMother* (Appendix Table A3.9). The probability of *wasting* among girls is strongly reduced via *NonFoodExp_pc* ($p<0.05$).

Diarrhea, as previously shown, increases the probability of *wasting*, especially among girls, as does *Workload* (Appendix Table A3.10). The coefficients of *Workload* and *Diarrhea* are positive and significant, which imply that the incidence of *Diarrhea* increases the probability of *wasting* as expected. For *Workload*, reduced workload means more time spent at home and less time spent helping in productive agricultural activities. This may negatively affect the household's meager disposable income, and therefore alter the amount, quantity, composition and quality of food purchased and consumed by these children (Carletto et al. 2015). The prevalence is increased by *LV-HA* and *HV-HA* areas in relation to *LV-LA*, which indicates that elevation may affect the increased incidence of *wasting* among boys. As previously mentioned, these results for boys require further validation due to the small number of observations.

These results indicate that wealth (*NonFoodExp_pc*) and maternal education are important for addressing short-term undernutrition consistent with other studies (Frost et al. 2005; Makate & Makate 2017; Martorell & Zongrone 2012). However, addressing short-term undernutrition differs for boys and girls due to preferential treatment given to sons among these ethnic minority groups (Jones et al. 2014). Mothers allocate more health-promoting resources and childcare time to sons, thereby negatively affecting girls' nutritional status in the short-term (Barcellos et al. 2014). This might also explain the positive, but marginal relationship, between maternal BMI and boy's WHZ. The incidence of diarrhea severely affects girls' WHZ/wasting, and thus requires future research to identify its determinants.

3.4   Conclusions

This cross-sectional study analysed 234 children aged five years and below and has shown how smallholder vegetable production may lead to positive nutritional outcomes through

improving a child's linear growth (HAZ) and weight (WHZ and WAZ), and reducing the prevalence of stunting, wasting, and underweight. Our results are broadly consistent with the results of other studies showing how agriculture in general, and specific crop/livestock in particular, can lead to improved children's nutrition (Azzarri et al. 2015; Hoddinott et al. 2015; Kumar et al. 2015; Malapit et al. 2015a; Shively & Sununtnasuk 2015). However, the impact on children's nutrition varies for each of the smallholder vegetable production indicators and by gender, controlling for other covariates in the econometric models.

Between 72 and 85 per cent of smallholder households in the province mainly grow vegetables for home consumption (International Food Policy Research Institute 2002). For these subsistence farmers, diversifying their vegetable production has an added advantage. It has benefits in that it improves boys' WHZ and girls' HAZ. However, its health benefits are mixed because it leads to a higher prevalence of stunting and underweight among boys. It significantly improves girls' HAZ, but no significant association has been found to mitigate the stunting outcome.

Our results suggest that smallholder vegetable production has a significant indirect effect on children's nutrition via market participation. Among boys, market participation is associated with a lower probability of stunting and underweight. Policies that improve access to markets, such as road infrastructure investments or better information about market opportunities and prices, are likely to improve children's nutritional outcomes in the long-term, particularly with respect to reduced stunting.

Our results also suggest that short-term nutritional outcomes, such as WHZ and wasting, can be improved by investments in maternal education and by improving water quality and sanitation to minimise the incidence of diarrhea. Further research on the

quality of maternal care-giving practices is encouraged because it has important implications for the improvement of girls' HAZ, WHZ, and wasting. Maternal education is a significant predictor of a child's disease incidence, as well as the ability to report or seek medical care at community health centres when their children are suffering from diarrhea among the ethnic minority groups (Rheinlander et al. 2010; Teerawichitchainan & Phillips 2008). The odds of a child being reported slightly sick is 25 per cent higher if the mother has some primary schooling rather than being illiterate (Teerawichitchainan & Phillips 2008).

The country has had numerous policy actions aimed at improving safe water supply and constructing sanitation facilities in the rural areas, for instance, the 'National Rural Clean Water Supply and Sanitation Strategy 2000-2020' (revised in 2016); the 'National Target Programme' for water and sanitation (from 1998 to 2015); and the approval of standards concerning water quality and hygienic toilets (UNICEF Viet Nam 2018). However, the uptake of the water and sanitation facilities among ethnic minority communities has been slow since the current hygiene and sanitation policies fail to understand the local cultural and social factors that guide their sanitation behaviours (Rheinlander et al. 2010). Therefore, sanitation solutions that are in line with the local priorities and hygiene perceptions, and are designed appropriately to suit their living conditions, could ensure the effectiveness of future hygiene promotion strategies (Rheinlander et al. 2010).

The observed gender differences with respect to health inequality in our sample may be due to either preferential treatment towards one gender (as explained in Sec 2.4) or be biological in nature. In Sub-Saharan Africa, it has been shown that preferential treatment of girls gives rise to their slight anthropometric advantage over boys (Svedberg 1990).

However, biologically, boys are more vulnerable to stunting than girls (Keino et al. 2014; Wamani et al. 2007).

This study has several limitations. It is based on cross-sectional data that inhibits us to capture variations in household behaviour over time. In addition, the small number of observations prevents us from conducting disaggregated analysis by age group, which would have been more meaningful since various underlying determinants of children's nutrition outcomes are age-sensitive (Alderman & Headey 2018). Nevertheless, these results do show that improved child nutrition outcomes in Lao Cai province can be achieved by improving livelihoods via smallholder vegetable production and market participation. Further research is encouraged to ascertain the causal relationships using more observations and longitudinal or panel data.

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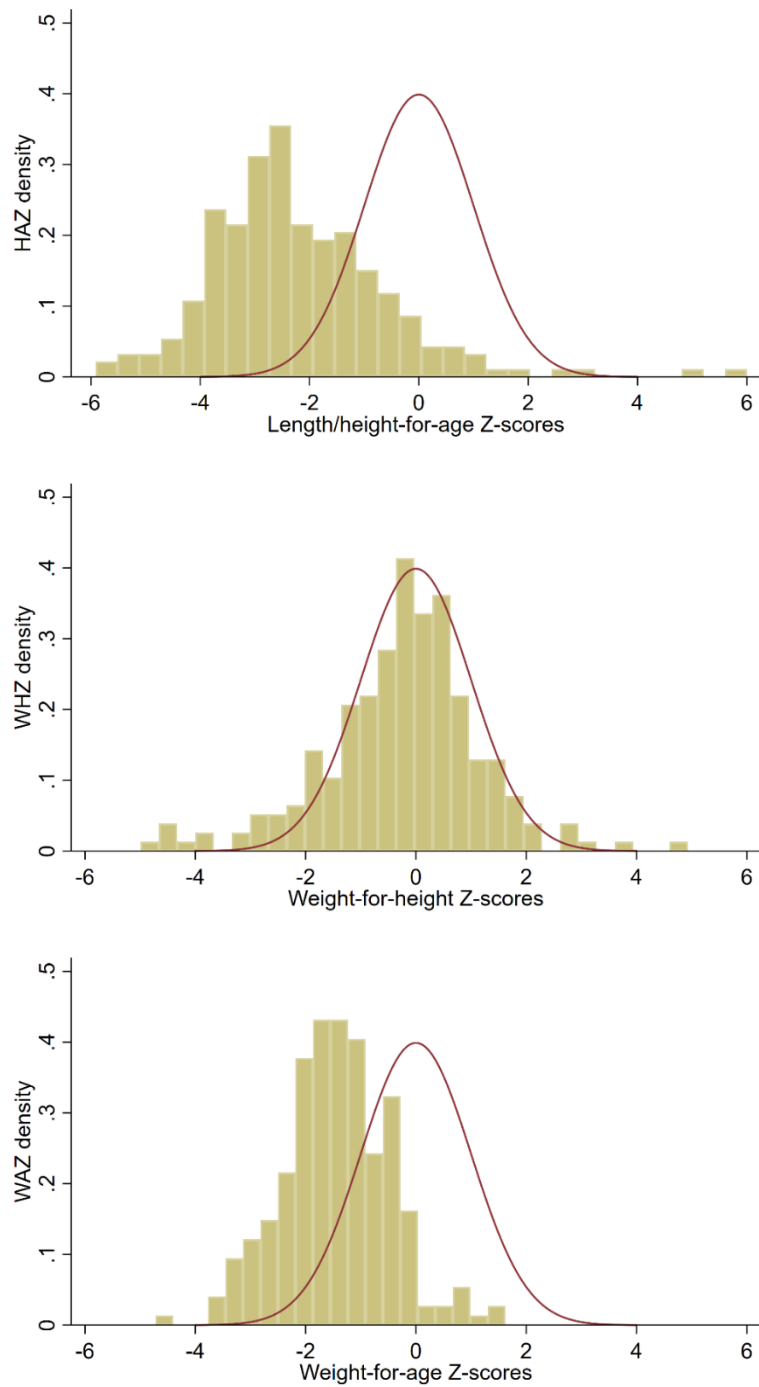
Figure 3.1 HAZ, WHZ, and WAZ of sampled children in Lao Cai province
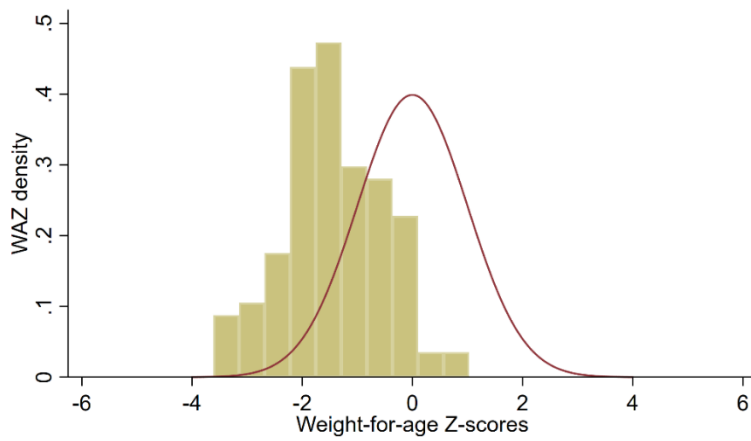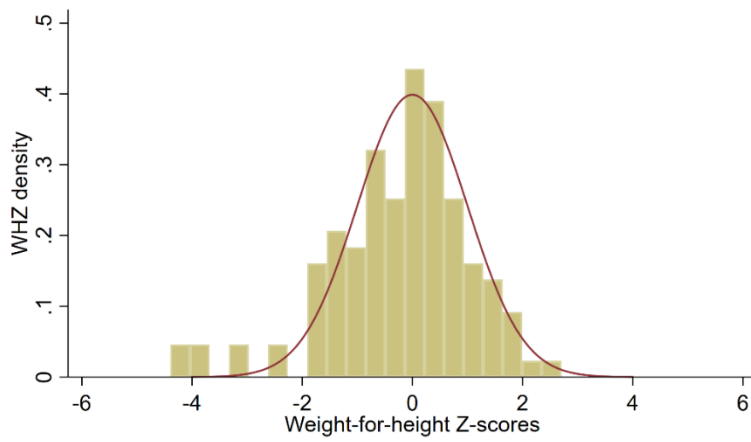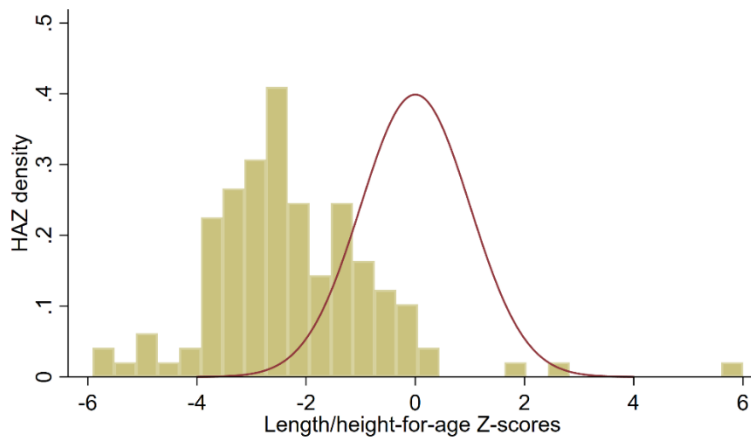
Figure 3.2 HAZ, WHZ, and WAZ of sampled boys in Lao Cai province
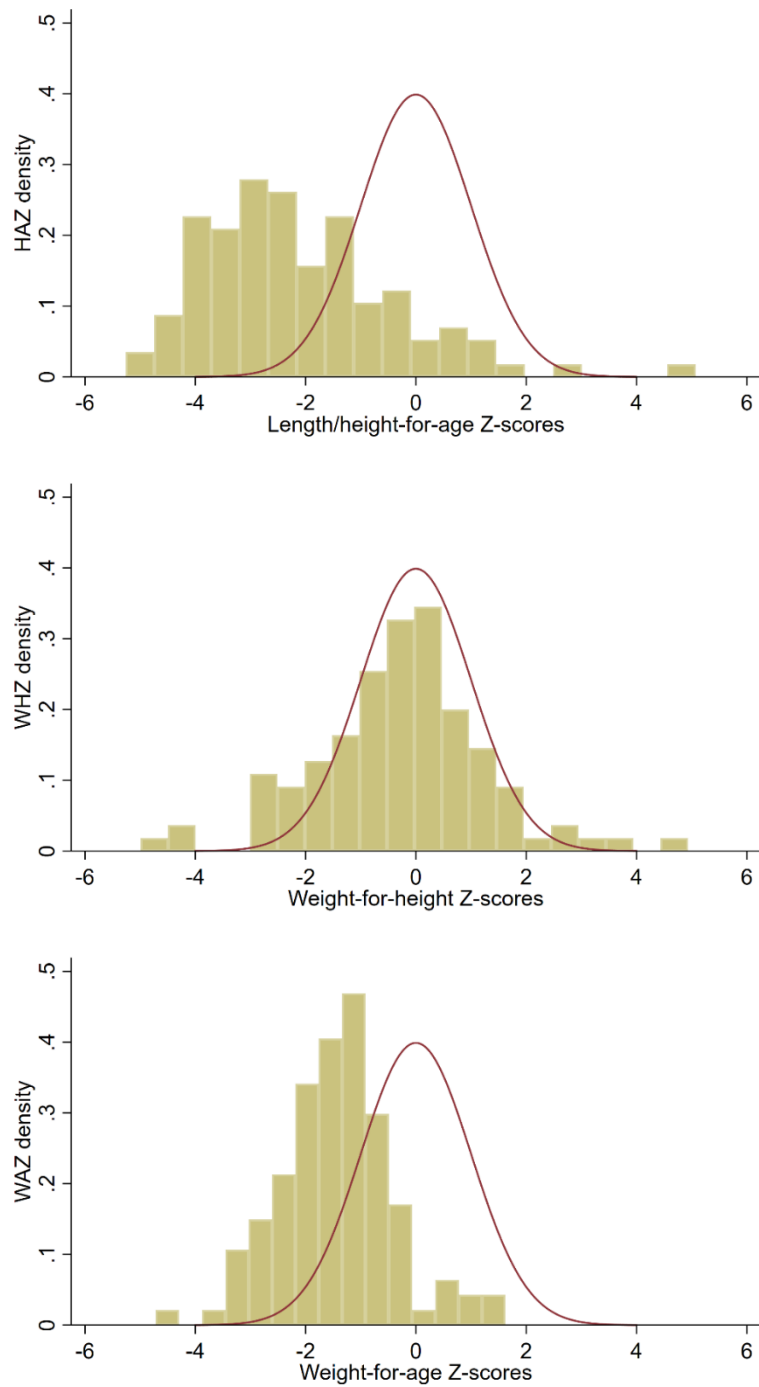
Figure 3.3 HAZ, WHZ, and WAZ of sampled girls in Lao Cai province

Table 3.1 Descriptive statistics of key variables of children six to 60 months in Lao Cai province, Vietnam

Variable	Description	Mean	SD	Min	Max
Outcome variables					
HAZ	Length/height-for-age z-score	-2.20	1.65	-5.91	6.00
WHZ	Weight-for-height z-score	-0.25	1.42	-4.99	4.93
WAZ	Weight-for-age z-score	-1.44	0.98	-4.72	1.62
Stunting	Prevalence of stunting (1=stunted [HAZ <-2 SD], 0=no)	0.62	0.49	0	1
Wasting	Prevalence of wasting (1=wasting [WHZ <-2 SD], 0=no)	0.09	0.29	0	1
Underweight	Prevalence of underweight (1=underweight [WAZ <-2 SD], 0=no)	0.24	0.43	0	1
Main variables of interest					
VegDiversity	Number of different kinds of vegetables produced at the farm in the last cropping cycle	2.95	1.79	0	13
TimeMarket	Travel time from residence to nearest food market (hour)	0.39	0.24	0.03	1.50
TradMarket	Household sold vegetables to traditional channels (1=yes, 0=otherwise)	0.42	0.50	0	1
ModMarket	Household sold vegetables to modern channels (1=yes, 0=otherwise)	0.20	0.40	0	1
Gender					
Income	Woman can make decisions on household income (1=adequate, 0=otherwise)	0.63	0.48	0	1
Workload	Woman's workload is less than the time poverty line of 10.50 hours (1=adequate, 0=otherwise)	0.27	0.44	0	1
Child characteristics					
DDS	Mean Dietary Diversity Score of children aged six to 60 months	4.13	1.17	1	8.25
AgeChild	Age of young child (month)	37.40	14.39	6	60
MaleChild	Young child is male (1=yes, 0=otherwise)	0.53	0.50	0	1
Diarrhea	Some or all children experienced diarrhea in the last two weeks (1=yes, 0=otherwise)	0.17	0.37	0	1
Maternal characteristics					
AgeMother	Maternal age (year)	41.00	16.12	19	86.58
EducMother	Maternal education (categorical treated as continuous)	2.29	2.06	0	8
MongMother	Mother is Mong (1=yes, 0=otherwise)	0.76	0.42	0	1
HtMother	Maternal height (centimetre)	149.77	5.65	129	165

Table 3.1 Continued

Variable	Description	Mean	SD	Min	Max
BMIMother	Maternal BMI (kg/m^2)	22.40	2.86	15.92	31.29
Household characteristics					
LV-LA	Commune is classified as low vegetable density per capita-low altitude area (1=yes, 0=otherwise)	0.19	0.39	0	1
LV-HA	Commune is classified as low vegetable density per capita-high altitude area (1=yes, 0=otherwise)	0.24	0.42	0	1
HV-LA	Commune is classified as high vegetable density per capita-low altitude area (1=yes, 0=otherwise)	0.29	0.45	0	1
HV-HA	Commune is classified as high vegetable density per capita-high altitude area (1=yes, 0=otherwise)	0.29	0.46	0	1
Child5b	Number of children five years old and below	1.50	0.66	1	4
Area	Total cultivated area (hectare)	1.08	2.03	0	19.60
NonFoodExp_pc	Monthly non-food expenditure per capita (million VND)	0.79	1.65	0.04	13.88
ImprovedToilet	Access to improved toilet (1=yes, 0=otherwise)	0.37	0.48	0	1
Household (number of households in sample)		188			
Observations (number of children in the sample)		234			

Notes: SD, 'standard deviation'; Min, 'minimum'; Max, 'maximum'; BMI, 'body mass index'; kg/m^2, 'kilogram per square metre'; VND, 'Vietnamese Dong'; %, 'per cent'. Initially, we included access to safe water where safe water sources are piped water and tube well, and unsafe water sources are groundwater source and surface water (WHO and UNICEF, 2006). However, there was no variation (only 3% have access to safe water source) and, hence, it was dropped. Categories included under improved toilet facilities are septic tank, biogas, double pit dry, ventilated pit dry, and single pit dry; unimproved toilets are no toilet, pour flush, fishpond, and ashes/bridge/bucket (WHO and UNICEF, 2006).
Source: Vietnam Rural Household Survey (July-August 2016).

Table 3.2 Prevalence of stunting, wasting, and underweight by age and gender grouping

Age group (month)	Gender	N	% stunted (HAZ<-2SD)	% wasted (WHZ<-2SD)	% underweight (WAZ<-2SD)
6-23	Boys	25	56.00	20.00	28.00
	Girls	22	63.64	18.18	13.64
	Pooled	47	59.57	19.15	21.28
24-60	Boys	98	67.35	3.06	22.45
	Girls	89	58.43	11.24	26.97
	Pooled	187	63.10	6.95	24.60
6-60	Boys	123	65.04	6.50	23.58
	Girls	111	59.46	12.61	21.62
	Pooled	234	62.39	9.40	23.93

Source: Vietnam Rural Household Survey (July-August 2016).

Table 3.3 Impact of smallholder vegetable production on HAZ, WHZ, and WAZ of pooled sample

	Dependent variables and estimators: Z-scores (Pooled)								
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
Variables	**HAZ OLS**	**WHZ OLS**	**WAZ OLS**	**HAZ SUR**	**WHZ SUR**	**WAZ SUR**	**HAZ 3SLS**	**WHZ SLS**	**WAZ 3SLS**
Main variables of interest									
VegDiversity	0.006	-0.065	-0.037	0.018	-0.065	-0.037	0.117	0.015	0.141
	(0.062)	(0.056)	(0.044)	(0.068)	(0.059)	(0.040)	(0.368)	(0.316)	(0.218)
TimeMarket	0.252	0.178	0.252	0.282	0.178	0.252	0.272	0.180	0.269
	(0.459)	(0.411)	(0.250)	(0.496)	(0.424)	(0.288)	(0.486)	(0.413)	(0.281)
TradMarket	0.193	0.436**	0.425***	0.215	0.436**	0.425***	0.172	0.387	0.334*
	(0.291)	(0.215)	(0.155)	(0.239)	(0.204)	(0.139)	(0.330)	(0.293)	(0.201)
ModMarket	0.316	0.199	0.335*	0.306	0.199	0.335*	0.411	0.153	0.354**
	(0.374)	(0.244)	(0.188)	(0.300)	(0.257)	(0.174)	(0.286)	(0.244)	(0.166)
Gender									
Income	-0.368	-0.095	-0.281*	-0.393	-0.095	-0.281*	-0.325	-0.063	-0.209
	(0.243)	(0.226)	(0.148)	(0.253)	(0.216)	(0.147)	(0.269)	(0.236)	(0.164)
Workload	0.681**	-0.221	0.225	0.724***	-0.221	0.225	0.775*	-0.158	0.367
	(0.312)	(0.235)	(0.144)	(0.271)	(0.232)	(0.158)	(0.407)	(0.336)	(0.232)
Child characteristics									
DDS	0.057	-0.012	0.027	0.052	-0.012	0.027	0.053	-0.006	0.033
	(0.115)	(0.102)	(0.067)	(0.115)	(0.098)	(0.067)	(0.111)	(0.095)	(0.066)
AgeChild	-0.012	0.006	-0.005	-0.012	0.006	-0.005	-0.012	0.006	-0.005
	(0.011)	(0.007)	(0.005)	(0.008)	(0.007)	(0.005)	(0.008)	(0.007)	(0.005)
MaleChild	-0.049	0.027	0.016	-0.061	0.027	0.016	-0.047	0.027	0.020
	(0.235)	(0.219)	(0.138)	(0.227)	(0.194)	(0.132)	(0.217)	(0.185)	(0.129)
Diarrhea	0.339	-0.389	-0.103	0.276	-0.389	-0.103	0.404	-0.328	0.030
	(0.363)	(0.289)	(0.198)	(0.315)	(0.270)	(0.183)	(0.387)	(0.350)	(0.242)
Maternal characteristics									
AgeMother	-0.008	0.005	-0.002	-0.008	0.005	-0.002	-0.007	0.005	-0.000
	(0.007)	(0.006)	(0.004)	(0.007)	(0.006)	(0.004)	(0.008)	(0.007)	(0.005)
EducMother	-0.092	0.117**	0.042	-0.080	0.117**	0.042	-0.091	0.118**	0.043
	(0.064)	(0.050)	(0.034)	(0.060)	(0.051)	(0.035)	(0.059)	(0.049)	(0.034)
MongMother	-0.398	0.450	0.030	-0.500	0.450*	0.030	-0.394	0.458*	0.054
	(0.297)	(0.275)	(0.183)	(0.307)	(0.262)	(0.178)	(0.302)	(0.253)	(0.176)
HtMother[a]	0.021			-0.007*			0.016		
	(0.023)			(0.004)			(0.026)		

Table 3.3 Continued

Variables	(1) HAZ OLS	(2) WHZ OLS	(3) WAZ OLS	(4) HAZ SUR	(5) WHZ SUR	(6) WAZ SUR	(7) HAZ 3SLS	(8) WHZ SLS	(9) WAZ 3SLS
					Dependent variables and estimators: Z-scores (Pooled)				
BMIMother	-0.042	0.074**	0.027	-0.040	0.074**	0.027	-0.025	0.085	0.053
	(0.045)	(0.036)	(0.025)	(0.043)	(0.037)	(0.025)	(0.067)	(0.057)	(0.040)
Household characteristics									
LV-HA (ref: LV-LA)	0.273	-0.229	-0.016	0.293	-0.229	-0.016	0.206	-0.297	-0.149
	(0.343)	(0.310)	(0.213)	(0.367)	(0.314)	(0.214)	(0.430)	(0.376)	(0.260)
HV-LA	0.150	-0.082	0.035	0.159	-0.082	0.035	0.091	-0.149	-0.092
	(0.369)	(0.282)	(0.209)	(0.349)	(0.299)	(0.203)	(0.422)	(0.366)	(0.254)
HV-HA	0.519	-0.331	0.104	0.578*	-0.331	0.104	0.438	-0.422	-0.072
	(0.334)	(0.297)	(0.186)	(0.346)	(0.296)	(0.201)	(0.470)	(0.424)	(0.293)
Child5b	-0.127	0.077	-0.045	-0.148	0.077	-0.045	-0.127	0.078	-0.042
	(0.159)	(0.146)	(0.092)	(0.177)	(0.152)	(0.103)	(0.170)	(0.145)	(0.100)
Area	0.045	0.023	0.047	0.050	0.023	0.047	0.031	0.019	0.031
	(0.051)	(0.028)	(0.039)	(0.060)	(0.051)	(0.035)	(0.062)	(0.054)	(0.037)
NonFoodExp_pc	0.022	0.099	0.084	0.024	0.099	0.084*	0.011	0.087	0.061
	(0.086)	(0.074)	(0.060)	(0.075)	(0.064)	(0.043)	(0.085)	(0.074)	(0.051)
ImprovedToilet	0.120	-0.010	0.067	0.122	-0.010	0.067	0.154	0.008	0.113
	(0.244)	(0.240)	(0.162)	(0.249)	(0.213)	(0.144)	(0.254)	(0.217)	(0.151)
Constant	-3.748	-2.870***	-2.226***	0.422	-2.870***	-2.226***	-3.816	-3.368	-3.392**
	(3.572)	(1.007)	(0.729)	(1.398)	(1.095)	(0.744)	(3.331)	(2.289)	(1.581)
Observations	234	234	234	234	234	234	234	234	234
R^2	0.113	0.120	0.147	0.106	0.120	0.147	0.101	0.112	0.067
Adjusted R^2	0.020	0.033	0.063						
Log-likelihood	-435.400	-399.200	-308.900						
Ramsey RESET test *p*-value	0.706	0.047	0.125						
Linktest *p*-value	0.809	0.281	0.225						
Correlation matrix residuals									
HAZ-WHZ				-0.502					
HAZ-WAZ				0.421					
WHZ-WAZ				0.560					
Breusch-Pagan *p*-value				0.000					

Notes: Standard errors are indicated in parentheses in the 3SLS and SUR estimators. In the OLS estimator, robust standard errors are in parentheses and clustered at the household level. We use small-sample statistics and an alternate divisor in computing the covariance matrix for the equation residuals in SUR estimator. The first-stage regression coefficients are in Appendix A-7. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. a/ *HtMother* included only in the HAZ and stunting models.
Source: Vietnam Rural Household Survey (July-August 2016).

Table 3.4 Impact of smallholder vegetable production on HAZ, WHZ, and WAZ of sampled boys and girls

Main variables	(1) HAZ OLS	(2) WHZ OLS	(3) WAZ OLS	(4) HAZ SUR	(5) WHZ SUR	(6) WAZ SUR	(7) HAZ 3SLS	(8) WHZ 3SLS	(9) WAZ 3SLS
	Dependent variables and estimators: Z-scores (Boys)								
VegDiversity	0.089	-0.093	-0.019	0.094	-0.093	-0.019	-0.795	0.772*	-0.046
	(0.102)	(0.076)	(0.050)	(0.094)	(0.074)	(0.052)	(0.541)	(0.449)	(0.273)
TimeMarket	1.007	-0.256	0.376	1.012	-0.256	0.376	1.001	-0.159	0.378
	(0.634)	(0.543)	(0.304)	(0.632)	(0.493)	(0.345)	(0.610)	(0.491)	(0.334)
TradMarket	0.025	0.422	0.331*	0.033	0.422	0.331*	0.975	-0.474	0.407
	(0.430)	(0.294)	(0.175)	(0.340)	(0.265)	(0.185)	(0.630)	(0.544)	(0.345)
ModMarket	-0.140	0.085	-0.021	-0.149	0.085	-0.021	0.301	-0.188	0.069
	(0.425)	(0.328)	(0.257)	(0.416)	(0.325)	(0.227)	(0.432)	(0.343)	(0.233)
	Z-scores (Girls)								
VegDiversity	-0.022	-0.024	-0.020	-0.016	-0.024	-0.020	1.134**	-1.201**	-0.198
	(0.080)	(0.092)	(0.073)	(0.111)	(0.100)	(0.065)	(0.503)	(0.492)	(0.309)
TimeMarket	-0.633	0.905	0.322	-0.529	0.905	0.322	-0.273	0.553	0.264
	(0.870)	(0.725)	(0.411)	(0.871)	(0.781)	(0.506)	(0.834)	(0.749)	(0.486)
TradMarket	0.156	0.392	0.396	0.230	0.392	0.396*	-0.250	0.905**	0.498**
	(0.424)	(0.355)	(0.255)	(0.384)	(0.344)	(0.223)	(0.406)	(0.381)	(0.246)
ModMarket	0.648	0.246	0.593**	0.679	0.246	0.593**	1.115**	-0.245	0.487*
	(0.546)	(0.334)	(0.261)	(0.490)	(0.440)	(0.285)	(0.473)	(0.430)	(0.278)

Notes: Full models with the control variables used are in Appendix Table A3.7 and Table A3.8. Standard errors are indicated in parentheses in the 3SLS and SUR estimators. In the OLS estimator, robust standard errors are in parentheses and clustered at the household level. We use small-sample statistics and an alternate divisor in computing the covariance matrix for the equation residuals in SUR estimator. The first-stage regression coefficients are in Appendix A-7. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

a/ Wasting for boys not available due to convergence failure (small number of observations).

Source: Vietnam Rural Household Survey (July-August 2016).

Table 3.5 Impact of smallholder vegetable production on the prevalence of stunting, wasting, and underweight of pooled sample

Variables	(1) Stunting Logit	(2) Wasting Logit	(3) Underwt Logit	(4) Stunting SUR	(5) Wasting SUR	(6) Underwt SUR	(7) Stunting 3SLS	(8) Wasting 3SLS	(9) Underwt 3SLS
				Dependent variables and estimators: Prevalence of (Pooled)					
Main variables of interest									
VegDiversity	-0.014	-0.005	0.006	-0.017	-0.003	0.006	0.150	-0.057	0.172*
	(0.019)	(0.011)	(0.016)	(0.020)	(0.012)	(0.018)	(0.111)	(0.065)	(0.103)
TimeMarket	-0.000	0.035	-0.114	0.003	0.022	-0.114	0.022	0.018	-0.101
	(0.141)	(0.071)	(0.115)	(0.145)	(0.085)	(0.131)	(0.142)	(0.083)	(0.128)
TradMarket	-0.010	-0.052	-0.078	-0.007	-0.041	-0.079	-0.089	-0.023	-0.205**
	(0.071)	(0.042)	(0.060)	(0.070)	(0.041)	(0.063)	(0.098)	(0.059)	(0.093)
ModMarket	-0.133	-0.033	-0.121	-0.133	-0.038	-0.115	-0.139*	-0.037	-0.115
	(0.084)	(0.047)	(0.080)	(0.087)	(0.052)	(0.079)	(0.083)	(0.049)	(0.075)
Gender									
Income	0.070	-0.095**	0.052	0.075	-0.100**	0.058	0.131	-0.124**	0.119
	(0.068)	(0.040)	(0.062)	(0.074)	(0.043)	(0.067)	(0.083)	(0.048)	(0.079)
Workload	-0.117	0.073*	-0.122	-0.131	0.085*	-0.111	0.015	0.042	0.023
	(0.072)	(0.038)	(0.075)	(0.080)	(0.047)	(0.072)	(0.124)	(0.069)	(0.111)
Child characteristics									
DDS	-0.037	0.009	0.007	-0.038	-0.002	0.010	-0.033	-0.003	0.019
	(0.032)	(0.018)	(0.027)	(0.033)	(0.020)	(0.030)	(0.034)	(0.020)	(0.032)
AgeChild	0.001	-0.003**	-0.002	0.001	-0.003**	-0.002	0.001	-0.003**	-0.002
	(0.003)	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)
MaleChild	0.023	-0.074*	-0.043	0.024	-0.057	-0.042	0.022	-0.057	-0.038
	(0.063)	(0.043)	(0.059)	(0.066)	(0.039)	(0.060)	(0.068)	(0.038)	(0.062)
Diarrhea	-0.100	0.140***	0.052	-0.097	0.172***	0.057	0.002	0.132*	0.186
	(0.087)	(0.043)	(0.073)	(0.093)	(0.054)	(0.084)	(0.119)	(0.072)	(0.116)
Maternal characteristics									
AgeMother	0.004**	-0.001	0.001	0.004*	-0.001	0.001	0.005**	-0.002	0.003
	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)
EducMother	0.019	-0.018*	-0.015	0.017	-0.021**	-0.016	0.024	-0.021**	-0.014
	(0.018)	(0.009)	(0.015)	(0.018)	(0.010)	(0.016)	(0.018)	(0.010)	(0.017)
MongMother	0.057	-0.111**	0.078	0.077	-0.115**	0.075	0.059	-0.122**	0.094
	(0.087)	(0.048)	(0.080)	(0.092)	(0.053)	(0.081)	(0.094)	(0.052)	(0.085)

Table 3.5 Continued

Variables	(1) Stunting Logit	(2) Wasting Logit	(3) Underwt Logit	(4) Stunting SUR	(5) Wasting SUR	(6) Underwt SUR	(7) Stunting 3SLS	(8) Wasting 3SLS	(9) Underwt 3SLS
	Dependent variables and estimators: Prevalence of (Pooled)								
HtMother[a]	-0.010			-0.006			-0.017**		
	(0.006)			(0.006)			(0.008)		
BMIMother	0.012	-0.015**	-0.008	0.011	-0.012	-0.008	0.035*	-0.020*	0.016
	(0.012)	(0.007)	(0.011)	(0.013)	(0.007)	(0.011)	(0.021)	(0.012)	(0.019)
Household characteristics									
LV-HA (ref: LV-LA)	-0.060	0.072	0.010	-0.070	0.035	0.010	-0.186	0.079	-0.111
	(0.100)	(0.062)	(0.106)	(0.107)	(0.063)	(0.097)	(0.132)	(0.077)	(0.125)
HV-LA	-0.050	0.006	0.059	-0.053	0.019	0.070	-0.170	0.059	-0.053
	(0.104)	(0.052)	(0.088)	(0.102)	(0.060)	(0.093)	(0.130)	(0.075)	(0.121)
HV-HA	-0.187*	0.043	-0.005	-0.209**	0.047	-0.003	-0.351**	0.103	-0.169
	(0.095)	(0.050)	(0.095)	(0.102)	(0.059)	(0.092)	(0.144)	(0.087)	(0.140)
Child5b	0.034	-0.037	-0.006	0.036	-0.034	-0.006	0.031	-0.035	-0.003
	(0.051)	(0.032)	(0.039)	(0.052)	(0.030)	(0.047)	(0.053)	(0.030)	(0.049)
Area	-0.008	-0.005	0.002	-0.011	0.001	0.002	-0.022	0.005	-0.011
	(0.015)	(0.012)	(0.013)	(0.017)	(0.010)	(0.016)	(0.019)	(0.011)	(0.018)
NonFoodExp_pc	0.009	-0.091**	-0.009	0.010	-0.019	-0.007	-0.012	-0.012	-0.030
	(0.021)	(0.046)	(0.029)	(0.022)	(0.013)	(0.020)	(0.026)	(0.015)	(0.025)
ImprovedToilet	-0.001	-0.001	0.019	0.001	0.005	0.018	0.042	-0.010	0.057
	(0.072)	(0.039)	(0.065)	(0.072)	(0.043)	(0.066)	(0.079)	(0.045)	(0.073)
Constant	6.288	8.223***	0.054	1.263	0.765***	0.448	1.793*	1.125**	-0.614
	(4.954)	(2.874)	(1.854)	(0.943)	(0.220)	(0.339)	(1.036)	(0.468)	(0.749)
Observations	234	234	234	234	234	234	234	234	234
R^2				0.124	0.158	0.064	-0.157	0.070	-0.305
Pseudo R^2	0.099	0.280	0.061						
Log-likelihood	-139.600	-52.520	-121.000						
χ^2	32.310	50.300	15.180						
Linktest *p*-value	0.468	0.053	0.745						

Notes: Underwt, 'Underweight'. Standard errors are indicated in parentheses in the 3SLS and SUR estimators. In the Logit estimator, marginal effects are shown with robust standard errors in parentheses clustered at the household level. We use small-sample statistics and an alternate divisor in computing the covariance matrix for the equation residuals in SUR estimator. The first-stage regression coefficients are in Appendix A-7. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

a/ *HtMother* included only in the HAZ and stunting models.

Source: Vietnam Rural Household Survey (July-August 2016).

Table 3.6 Impact of smallholder vegetable production on the prevalence of stunting, wasting, and underweight of sampled boys and girls

Main variables	(1) Stunting Logit	(2) Wasting Logit[a]	(3) Underwt Logit	(4) Stunting SUR	(5) Wasting SUR	(6) Underwt SUR	(7) Stunting 3SLS	(8) Wasting 3SLS	(9) Underwt 3SLS
	Dependent variable and estimator: Prevalence of (Boys)								
VegDiversity	-0.045*		0.029	-0.051*	0.004	0.033	0.437**	-0.211**	0.311**
	(0.024)		(0.019)	(0.029)	(0.014)	(0.026)	(0.185)	(0.089)	(0.157)
TimeMarket	-0.035		-0.362**	-0.028	-0.001	-0.198	-0.012	-0.029	-0.182
	(0.175)		(0.169)	(0.195)	(0.092)	(0.174)	(0.190)	(0.093)	(0.170)
TradMarket	0.016		-0.123	0.017	-0.125**	-0.113	-0.483**	0.088	-0.439**
	(0.097)		(0.087)	(0.105)	(0.050)	(0.094)	(0.208)	(0.106)	(0.190)
ModMarket	-0.086		0.094	-0.091	0.066	0.003	-0.297**	0.130**	-0.110
	(0.106)		(0.123)	(0.128)	(0.061)	(0.115)	(0.135)	(0.065)	(0.119)
	Prevalence of (Girls)								
VegDiversity	0.009	-0.017	-0.033	0.008	-0.014	-0.034	0.117	0.131	0.228*
	(0.028)	(0.016)	(0.026)	(0.031)	(0.020)	(0.028)	(0.138)	(0.096)	(0.137)
TimeMarket	0.040	-0.098	-0.069	0.027	-0.100	-0.072	0.082	-0.057	0.008
	(0.219)	(0.132)	(0.172)	(0.244)	(0.156)	(0.219)	(0.234)	(0.148)	(0.211)
TradMarket	0.014	0.064	-0.031	0.014	0.052	-0.028	0.043	-0.035	-0.152
	(0.107)	(0.062)	(0.090)	(0.109)	(0.069)	(0.097)	(0.114)	(0.075)	(0.107)
ModMarket	-0.167		-0.237**	-0.159	-0.176**	-0.188	-0.079	-0.120	-0.069
	(0.124)		(0.108)	(0.137)	(0.088)	(0.123)	(0.133)	(0.085)	(0.121)

Notes: Underwt, 'Underweight'. Full models with the control variables used are found in Appendix Table A3.9 and Table A3.10. Standard errors are indicated in parentheses in the 3SLS and SUR estimators. In the Logit estimator, marginal effects are shown with robust standard errors in parentheses clustered at the household level. We use small-sample statistics and an alternate divisor in computing the covariance matrix for the equation residuals in SUR estimator. The first-stage regression coefficients are in Appendix A-7. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.
a/ Wasting for boys not available due to convergence failure (small number of observations).
Source: Vietnam Rural Household Survey (July-August 2016).

Appendix. Full model estimates

Table A3.7 and Table A3.8 show the full model estimates of the impact of smallholder vegetable production on HAZ, WHZ, and WAZ of sampled boys and girls, respectively. Table A3.9 and Table A3.10 show the full model estimates of the impact of smallholder vegetable production on the prevalence of stunting, wasting, and underweight of sampled boys and girls, respectively.

Table A3.7 Impact of smallholder vegetable production on HAZ, WHZ, and WAZ of sampled boys

	Dependent variables and estimators: Z-scores (Boys)								
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
Variables	**HAZ OLS**	**WHZ OLS**	**WAZ OLS**	**HAZ SUR**	**WHZ SUR**	**WAZ SUR**	**HAZ 3SLS**	**WHZ 3SLS**	**WAZ 3SLS**
Main variables of interest									
VegDiversity	0.089	-0.093	-0.019	0.094	-0.093	-0.019	-0.795	0.772*	-0.046
	(0.102)	(0.076)	(0.050)	(0.094)	(0.074)	(0.052)	(0.541)	(0.449)	(0.273)
TimeMarket	1.007	-0.256	0.376	1.012	-0.256	0.376	1.001	-0.159	0.378
	(0.634)	(0.543)	(0.304)	(0.632)	(0.493)	(0.345)	(0.610)	(0.491)	(0.334)
TradMarket	0.025	0.422	0.331*	0.033	0.422	0.331*	0.975	-0.474	0.407
	(0.430)	(0.294)	(0.175)	(0.340)	(0.265)	(0.185)	(0.630)	(0.544)	(0.345)
ModMarket	-0.140	0.085	-0.021	-0.149	0.085	-0.021	0.301	-0.188	0.069
	(0.425)	(0.328)	(0.257)	(0.416)	(0.325)	(0.227)	(0.432)	(0.343)	(0.233)
Gender									
Income	-0.386	0.255	-0.017	-0.398	0.255	-0.017	-0.381	0.300	-0.016
	(0.362)	(0.293)	(0.179)	(0.343)	(0.268)	(0.187)	(0.382)	(0.305)	(0.171)
Workload	0.598	0.004	0.319*	0.615	0.004	0.319	-0.005	0.540	0.302
	(0.383)	(0.268)	(0.185)	(0.379)	(0.296)	(0.207)	(0.560)	(0.437)	(0.252)
Child characteristics									
DDS	0.060	0.021	0.038	0.052	0.021	0.038	0.026	0.071	0.025
	(0.176)	(0.160)	(0.110)	(0.175)	(0.137)	(0.096)	(0.194)	(0.158)	(0.090)
AgeChild	-0.014	0.015	-0.001	-0.014	0.015*	-0.001	-0.021	0.023**	-0.001
	(0.018)	(0.009)	(0.006)	(0.011)	(0.009)	(0.006)	(0.013)	(0.011)	(0.006)
Diarrhea	0.399	0.034	0.312	0.389	0.034	0.312	-0.297	0.744	0.277
	(0.405)	(0.406)	(0.209)	(0.428)	(0.334)	(0.234)	(0.620)	(0.524)	(0.307)
Maternal characteristics									
AgeMother	-0.007	0.007	0.001	-0.008	0.007	0.001	-0.010	0.009	0.001
	(0.009)	(0.007)	(0.005)	(0.010)	(0.007)	(0.005)	(0.011)	(0.009)	(0.005)
EducMother	-0.137*	0.142**	0.037	-0.127	0.142**	0.037	-0.093	0.057	0.039
	(0.083)	(0.065)	(0.043)	(0.082)	(0.064)	(0.045)	(0.098)	(0.083)	(0.048)
MongMother	-1.097***	0.745**	-0.116	-1.137***	0.745**	-0.116	-0.562	0.389	-0.097
	(0.392)	(0.373)	(0.261)	(0.438)	(0.342)	(0.239)	(0.592)	(0.431)	(0.245)
HtMother[a]	0.003			-0.008*			0.049		
	(0.032)			(0.005)			(0.044)		
BMIMother	0.008	0.031	0.024	0.012	0.031	0.024	-0.076	0.104*	0.024
	(0.061)	(0.043)	(0.031)	(0.056)	(0.044)	(0.031)	(0.083)	(0.062)	(0.036)

Table A3.7 Continued

Variables	(1) HAZ OLS	(2) WHZ OLS	(3) WAZ OLS	(4) HAZ SUR	(5) WHZ SUR	(6) WAZ SUR	(7) HAZ 3SLS	(8) WHZ 3SLS	(9) WAZ 3SLS
					Dependent variables and estimators: Z-scores (Boys)				
Household characteristics									
LV-HA (ref: LV-LA)	-0.062	-0.029	-0.089	-0.045	-0.029	-0.089	0.850	-0.992	-0.048
	(0.479)	(0.401)	(0.278)	(0.527)	(0.411)	(0.287)	(0.790)	(0.676)	(0.395)
HV-LA	-0.240	0.191	0.038	-0.229	0.191	0.038	0.535	-0.590	0.086
	(0.489)	(0.364)	(0.249)	(0.490)	(0.382)	(0.267)	(0.697)	(0.590)	(0.345)
HV-HA	-0.005	-0.113	-0.003	0.025	-0.113	-0.003	1.231	-1.446*	0.060
	(0.536)	(0.471)	(0.292)	(0.530)	(0.414)	(0.289)	(0.954)	(0.843)	(0.501)
Child5b	0.031	0.031	0.022	0.023	0.031	0.022	0.066	0.031	0.025
	(0.216)	(0.155)	(0.116)	(0.254)	(0.199)	(0.139)	(0.285)	(0.228)	(0.126)
Area	-0.142	0.106	0.006	-0.139	0.106	0.006	0.017	-0.071	0.007
	(0.113)	(0.077)	(0.056)	(0.145)	(0.113)	(0.079)	(0.186)	(0.155)	(0.089)
NonFoodExp_pc	0.068	0.216***	0.203***	0.070	0.216**	0.203***	0.070	0.204*	0.203***
	(0.110)	(0.050)	(0.057)	(0.118)	(0.092)	(0.064)	(0.132)	(0.106)	(0.059)
ImprovedToilet	0.184	0.061	0.157	0.197	0.061	0.157	0.062	0.150	0.161
	(0.353)	(0.272)	(0.194)	(0.331)	(0.258)	(0.180)	(0.380)	(0.299)	(0.167)
Constant	-1.740	-3.140**	-2.749***	-0.115	-3.140**	-2.749***	-5.361	-6.309***	-2.714**
	(4.811)	(1.478)	(0.967)	(1.803)	(1.305)	(0.912)	(5.610)	(2.222)	(1.300)
Observations	123	123	123	123	123	123	123	123	123
R^2	0.178	0.215	0.253	0.177	0.215	0.253	-0.519	-0.849	0.250
Adjusted R^2	0.010	0.061	0.107						
Log-likelihood	-218.700	-188.90	-144.800						
Ramsey RESET test *p*-value	0.629	0.419	0.339						
Linktest *p*-value	0.903	0.655	0.657						
Correlation matrix residuals									
HAZ-WHZ				-0.479					
HAZ-WAZ				0.481					
WHZ-WAZ				0.527					
Breusch-Pagan *p*-value				0.000					

Notes: Standard errors are indicated in parentheses in the 3SLS and SUR estimators. In the OLS estimator, robust standard errors are in parentheses and clustered at the household level. We use small-sample statistics and an alternate divisor in computing the covariance matrix for the equation residuals in SUR estimator. The first-stage regression coefficients are in Appendix A-7.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$.
a/ *HtMother* included only in the HAZ and stunting models.
Source: Vietnam Rural Household Survey (July-August 2016).

Table A3.8 Impact of smallholder vegetable production on HAZ, WHZ, and WAZ of sampled girls

	Dependent variables and estimators: Z-scores (Girls)								
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
Variables	**HAZ OLS**	**WHZ OLS**	**WAZ OLS**	**HAZ SUR**	**WHZ SUR**	**WAZ SUR**	**HAZ 3SLS**	**WHZ 3SLS**	**WAZ 3SLS**
Main variables of interest									
VegDiversity	-0.022	-0.024	-0.020	-0.016	-0.024	-0.020	1.134**	-1.201**	-0.198
	(0.080)	(0.092)	(0.073)	(0.111)	(0.100)	(0.065)	(0.503)	(0.492)	(0.309)
TimeMarket	-0.633	0.905	0.322	-0.529	0.905	0.322	-0.273	0.553	0.264
	(0.870)	(0.725)	(0.411)	(0.871)	(0.781)	(0.506)	(0.834)	(0.749)	(0.486)
TradMarket	0.156	0.392	0.396	0.230	0.392	0.396*	-0.250	0.905**	0.498**
	(0.424)	(0.355)	(0.255)	(0.384)	(0.344)	(0.223)	(0.406)	(0.381)	(0.246)
ModMarket	0.648	0.246	0.593**	0.679	0.246	0.593**	1.115**	-0.245	0.487*
	(0.546)	(0.334)	(0.261)	(0.490)	(0.440)	(0.285)	(0.473)	(0.430)	(0.278)
Gender									
Income	-0.325	-0.580	-0.614**	-0.345	-0.580	-0.614**	0.449	-1.373***	-0.731**
	(0.370)	(0.466)	(0.264)	(0.420)	(0.376)	(0.244)	(0.544)	(0.514)	(0.298)
Workload	0.602	-0.393	0.091	0.666	-0.393	0.091	1.604**	-1.379**	-0.055
	(0.459)	(0.382)	(0.228)	(0.431)	(0.386)	(0.250)	(0.633)	(0.588)	(0.347)
Child characteristics									
DDS	0.063	-0.075	-0.010	0.065	-0.075	-0.010	0.177	-0.191	-0.026
	(0.175)	(0.148)	(0.098)	(0.168)	(0.151)	(0.098)	(0.185)	(0.171)	(0.095)
AgeChild	-0.011	-0.002	-0.010	-0.010	-0.002	-0.010	-0.018	0.006	-0.009
	(0.014)	(0.010)	(0.006)	(0.012)	(0.011)	(0.007)	(0.014)	(0.013)	(0.007)
Diarrhea	0.402	-0.874**	-0.513	0.282	-0.874*	-0.513*	1.152*	-1.710***	-0.640*
	(0.613)	(0.436)	(0.323)	(0.508)	(0.455)	(0.295)	(0.633)	(0.594)	(0.341)
Maternal characteristics									
AgeMother	-0.007	0.002	-0.004	-0.007	0.002	-0.004	0.009	-0.015	-0.006
	(0.012)	(0.012)	(0.007)	(0.013)	(0.012)	(0.007)	(0.015)	(0.014)	(0.008)
EducMother	-0.044	0.103	0.048	-0.051	0.103	0.048	0.033	0.017	0.033
	(0.113)	(0.094)	(0.056)	(0.099)	(0.089)	(0.058)	(0.111)	(0.103)	(0.058)
MongMother	0.126	0.200	0.115	-0.008	0.200	0.115	0.653	-0.425	0.016
	(0.488)	(0.451)	(0.300)	(0.484)	(0.433)	(0.281)	(0.582)	(0.537)	(0.304)
HtMother[a]	0.032			-0.002			0.013		
	(0.034)			(0.006)			(0.039)		
BMIMother	-0.120*	0.142**	0.027	-0.132*	0.142**	0.027	0.111	-0.101	-0.010
	(0.062)	(0.064)	(0.045)	(0.076)	(0.068)	(0.044)	(0.129)	(0.126)	(0.076)

Table A3.8 Continued

Variables	(1) HAZ OLS	(2) WHZ OLS	(3) WAZ OLS	(4) HAZ SUR	(5) WHZ SUR	(6) WAZ SUR	(7) HAZ 3SLS	(8) WHZ 3SLS	(9) WAZ 3SLS
	Dependent variables and estimators: Z-scores (Girls)								
Household characteristics									
LV-HA (ref: LV-LA)	0.427	-0.358	0.014	0.452	-0.358	0.014	-0.377	0.460	0.128
	(0.515)	(0.442)	(0.284)	(0.555)	(0.497)	(0.322)	(0.671)	(0.629)	(0.359)
HV-LA	0.305	-0.524	-0.237	0.280	-0.524	-0.237	-0.617	0.405	-0.097
	(0.531)	(0.559)	(0.369)	(0.574)	(0.515)	(0.334)	(0.728)	(0.679)	(0.390)
HV-HA	0.681	-0.194	0.279	0.744	-0.194	0.279	-0.250	0.779	0.415
	(0.488)	(0.394)	(0.232)	(0.518)	(0.464)	(0.301)	(0.679)	(0.645)	(0.375)
Child5b	-0.294	0.077	-0.144	-0.323	0.077	-0.144	-0.253	0.021	-0.152
	(0.220)	(0.291)	(0.177)	(0.271)	(0.243)	(0.158)	(0.290)	(0.265)	(0.144)
Area	0.040	0.052	0.062*	0.045	0.052	0.062	-0.045	0.141*	0.076*
	(0.045)	(0.036)	(0.031)	(0.075)	(0.067)	(0.044)	(0.085)	(0.079)	(0.045)
NonFoodExp_pc	-0.019	0.062	0.029	-0.016	0.062	0.029	-0.206	0.254**	0.058
	(0.134)	(0.141)	(0.077)	(0.106)	(0.095)	(0.062)	(0.137)	(0.129)	(0.075)
ImprovedToilet	-0.018	-0.035	-0.033	-0.049	-0.035	-0.033	0.245	-0.325	-0.078
	(0.400)	(0.403)	(0.236)	(0.412)	(0.370)	(0.240)	(0.453)	(0.418)	(0.232)
Constant	-3.665	-3.399**	-1.513	1.687	-3.399*	-1.513	-10.921	7.157	0.085
	(5.327)	(1.592)	(1.190)	(2.484)	(2.048)	(1.327)	(7.264)	(4.911)	(3.030)
Observations	111	111	111	111	111	111	111	111	111
R^2	0.174	0.192	0.248	0.166	0.192	0.248	-0.830	-1.064	0.184
Adjusted R^2	-0.021	0.012	0.081						
Log-likelihood	-207.300	-195.900	-147.700						
Ramsey RESET test p-value	0.038	0.570	0.108						
Linktest p-value	0.244	0.183	0.412						
Correlation matrix residuals									
HAZ-WHZ				-0.549					
HAZ-WAZ				0.367					
WHZ-WAZ				0.563					
Breusch-Pagan p-value				0.000					

Notes: Standard errors are indicated in parentheses in the 3SLS and SUR estimators. In the OLS estimator, robust standard errors are in parentheses and clustered at the household level. We use small-sample statistics and an alternate divisor in computing the covariance matrix for the equation residuals in SUR estimator. The first-stage regression coefficients are in Appendix A-7.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$.
a/ *HtMother* included only in the HAZ and stunting models.
Source: Vietnam Rural Household Survey (July-August 2016).

Table A3.9 Impact of smallholder vegetable production on the prevalence of stunting, wasting, and underweight of sampled boys

Variables	(1) Stunting Logit	(2) Wasting Logit[a]	(3) Underwt Logit	(4) Stunting SUR	(5) Wasting SUR	(6) Underwt SUR	(7) Stunting 3SLS	(8) Wasting 3SLS	(9) Underwt 3SLS
Dependent variables and estimators: Prevalence of (Boys)									
Main variables of interest									
VegDiversity	-0.045*		0.029	-0.051*	0.004	0.033	0.437**	-0.211**	0.311**
	(0.024)		(0.019)	(0.029)	(0.014)	(0.026)	(0.185)	(0.089)	(0.157)
TimeMarket	-0.035		-0.362**	-0.028	-0.001	-0.198	-0.012	-0.029	-0.182
	(0.175)		(0.169)	(0.195)	(0.092)	(0.174)	(0.190)	(0.093)	(0.170)
TradMarket	0.016		-0.123	0.017	-0.125**	-0.113	-0.483**	0.088	-0.439**
	(0.097)		(0.087)	(0.105)	(0.050)	(0.094)	(0.208)	(0.106)	(0.190)
ModMarket	-0.086		0.094	-0.091	0.066	0.003	-0.297**	0.130**	-0.110
	(0.106)		(0.123)	(0.128)	(0.061)	(0.115)	(0.135)	(0.065)	(0.119)
Gender									
Income	0.030		-0.075	0.041	-0.114**	-0.042	0.031	-0.126**	-0.032
	(0.098)		(0.079)	(0.106)	(0.050)	(0.095)	(0.153)	(0.063)	(0.108)
Workload	-0.083		-0.130	-0.094	0.064	-0.077	0.247	-0.068	0.099
	(0.107)		(0.103)	(0.118)	(0.055)	(0.105)	(0.211)	(0.089)	(0.154)
Child characteristics									
DDS	-0.027		0.017	-0.021	-0.020	0.016	-0.011	-0.031	0.038
	(0.051)		(0.040)	(0.054)	(0.026)	(0.048)	(0.077)	(0.033)	(0.056)
AgeChild	-0.001		-0.002	-0.001	-0.004**	-0.003	0.003	-0.006***	0.000
	(0.004)		(0.003)	(0.004)	(0.002)	(0.003)	(0.005)	(0.002)	(0.004)
Diarrhea	-0.168		0.033	-0.164	0.091	0.037	0.206	-0.082	0.275
	(0.117)		(0.097)	(0.132)	(0.063)	(0.118)	(0.233)	(0.106)	(0.184)
Maternal characteristics									
AgeMother	0.004		-0.001	0.004	-0.001	0.000	0.005	-0.001	0.001
	(0.003)		(0.002)	(0.003)	(0.001)	(0.003)	(0.004)	(0.002)	(0.003)
EducMother	0.038		-0.017	0.031	-0.029**	-0.014	0.012	-0.008	-0.042
	(0.024)		(0.020)	(0.026)	(0.012)	(0.023)	(0.039)	(0.017)	(0.029)
MongMother	0.197		0.051	0.228	-0.170***	0.080	-0.085	-0.084	-0.043
	(0.120)		(0.125)	(0.138)	(0.064)	(0.121)	(0.228)	(0.089)	(0.152)
HtMother[b]	-0.003				0.003			-0.028*	
	(0.009)				(0.008)			(0.017)	
BMIMother	-0.009		0.016	-0.012	-0.005	0.015	0.038	-0.023*	0.037*
	(0.016)		(0.013)	(0.018)	(0.008)	(0.016)	(0.031)	(0.013)	(0.022)

Table A3.9 Continued

Variables	(1) Stunting Logit	(2) Wasting Logit[a]	(3) Underwt Logit	(4) Stunting SUR	(5) Wasting SUR	(6) Underwt SUR	(7) Stunting 3SLS	(8) Wasting 3SLS	(9) Underwt 3SLS
Household characteristics									
LV-HA (ref: LV-LA)	0.077		-0.027	0.055	-0.011	-0.023	-0.429	0.227*	-0.335
	(0.144)		(0.148)	(0.163)	(0.077)	(0.145)	(0.296)	(0.137)	(0.237)
HV-LA	0.036		0.038	0.016	-0.091	0.038	-0.391	0.101	-0.223
	(0.138)		(0.123)	(0.151)	(0.071)	(0.135)	(0.262)	(0.119)	(0.207)
HV-HA	-0.094		-0.104	-0.137	0.011	-0.080	-0.789**	0.340**	-0.516*
	(0.153)		(0.146)	(0.165)	(0.077)	(0.146)	(0.347)	(0.169)	(0.296)
Child5b	0.037		-0.109*	0.040	0.001	-0.088	0.018	0.001	-0.089
	(0.068)		(0.058)	(0.079)	(0.037)	(0.070)	(0.115)	(0.047)	(0.080)
Area	0.028		-0.020	0.025	-0.013	-0.019	-0.063	0.031	-0.075
	(0.038)		(0.025)	(0.045)	(0.021)	(0.040)	(0.072)	(0.032)	(0.054)
NonFoodExp_pc	-0.006		-0.196*	-0.007	-0.007	-0.028	-0.007	-0.005	-0.032
	(0.030)		(0.106)	(0.036)	(0.017)	(0.033)	(0.053)	(0.022)	(0.037)
ImprovedToilet	0.003		-0.051	-0.005	-0.017	-0.037	0.072	-0.040	-0.014
	(0.103)		(0.085)	(0.102)	(0.048)	(0.091)	(0.151)	(0.062)	(0.105)
Constant	3.581		-0.233	0.304	0.765***	0.157	3.144	1.558***	-0.821
	(7.217)		(2.847)	(1.318)	(0.244)	(0.461)	(2.212)	(0.449)	(0.780)
Observations	123		123	123	123	123	123	123	123
R^2				0.138	0.274	0.126	-2.154	-1.452	-0.856
Pseudo R^2	0.116		0.164						
Log-likelihood	-70.400		-56.150						
χ^2	19.720		19.410						
Linktest p-value	0.217		0.716						

Notes: Underwt, 'Underweight'. Standard errors are indicated in parentheses in the 3SLS and SUR estimators. In the Logit estimator, marginal effects are shown with robust standard errors in parentheses clustered at the household level. We use small-sample statistics and an alternate divisor in computing the covariance matrix for the equation residuals in SUR estimator. The first-stage regression coefficients are in Appendix A-7. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

a/ Wasting for boys not available due to convergence failure (small number of observations).

b/ *HtMother* included only in the HAZ and stunting models.

Source: Vietnam Rural Household Survey (July-August 2016).

Table A3.10 Impact of smallholder vegetable production on the prevalence of stunting, wasting, and underweight of sampled girls

Variables	(1) Stunting Logit	(2) Wasting Logit	(3) Underwt Logit	(4) Stunting SUR	(5) Wasting SUR	(6) Underwt SUR	(7) Stunting 3SLS	(8) Wasting 3SLS	(9) Underwt 3SLS
				Dependent variables and estimators: Prevalence of (Girls)					
Main variables of interest									
VegDiversity	0.009	-0.017	-0.033	0.008	-0.014	-0.034	0.117	0.131	0.228*
	(0.028)	(0.016)	(0.026)	(0.031)	(0.020)	(0.028)	(0.138)	(0.096)	(0.137)
TimeMarket	0.040	-0.098	-0.069	0.027	-0.100	-0.072	0.082	-0.057	0.008
	(0.219)	(0.132)	(0.172)	(0.244)	(0.156)	(0.219)	(0.234)	(0.148)	(0.211)
TradMarket	0.014	0.064	-0.031	0.014	0.052	-0.028	0.043	-0.035	-0.152
	(0.107)	(0.062)	(0.090)	(0.109)	(0.069)	(0.097)	(0.114)	(0.075)	(0.107)
ModMarket	-0.167		-0.237**	-0.159	-0.176**	-0.188	-0.079	-0.120	-0.069
	(0.124)		(0.108)	(0.137)	(0.088)	(0.123)	(0.133)	(0.085)	(0.121)
Gender									
Income	0.175*	-0.128	0.098	0.186	-0.048	0.099	0.261*	0.046	0.274**
	(0.098)	(0.105)	(0.097)	(0.117)	(0.075)	(0.106)	(0.138)	(0.095)	(0.138)
Workload	-0.156*	0.144*	-0.126	-0.194	0.122	-0.122	-0.087	0.243**	0.096
	(0.094)	(0.083)	(0.098)	(0.121)	(0.077)	(0.108)	(0.164)	(0.110)	(0.159)
Child characteristics									
DDS	-0.042	0.047	0.013	-0.045	0.025	0.016	-0.036	0.040	0.041
	(0.042)	(0.033)	(0.036)	(0.047)	(0.030)	(0.042)	(0.045)	(0.031)	(0.045)
AgeChild	0.002	-0.001	-0.001	0.002	-0.002	-0.001	0.002	-0.003	-0.003
	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)
Diarrhea	-0.081	0.331***	0.071	-0.049	0.288***	0.091	-0.004	0.392***	0.277*
	(0.123)	(0.080)	(0.107)	(0.145)	(0.091)	(0.128)	(0.159)	(0.109)	(0.159)
Maternal characteristics									
AgeMother	0.005	-0.002	0.003	0.005	-0.003	0.003	0.006	-0.001	0.006*
	(0.003)	(0.002)	(0.003)	(0.004)	(0.002)	(0.003)	(0.004)	(0.003)	(0.004)
EducMother	-0.003	-0.008	-0.034	-0.000	-0.028	-0.034	0.002	-0.016	-0.015
	(0.025)	(0.018)	(0.021)	(0.028)	(0.018)	(0.025)	(0.027)	(0.019)	(0.027)
MongMother	-0.041	-0.113	-0.010	0.011	-0.082	0.001	0.031	-0.003	0.141
	(0.131)	(0.080)	(0.108)	(0.139)	(0.086)	(0.122)	(0.144)	(0.098)	(0.143)
HtMother[a]	-0.016*			-0.009			-0.018*		
	(0.009)			(0.009)			(0.010)		
BMIMother	0.041**	-0.050***	-0.042**	0.042*	-0.023*	-0.039**	0.061*	0.007	0.015
	(0.016)	(0.016)	(0.021)	(0.021)	(0.014)	(0.019)	(0.034)	(0.024)	(0.034)

Table A3.10 Continued

	(1) Stunting Logit	(2) Wasting Logit	(3) Underwt Logit	(4) Stunting SUR	(5) Wasting SUR	(6) Underwt SUR	(7) Stunting 3SLS	(8) Wasting 3SLS	(9) Underwt 3SLS
Variables				Dependent variables and estimators: Prevalence of (Girls)					
Household characteristics									
LV-HA (ref: LV-LA)	-0.163	0.222*	0.054	-0.182	0.063	0.065	-0.255	-0.035	-0.114
	(0.131)	(0.118)	(0.155)	(0.155)	(0.099)	(0.140)	(0.168)	(0.116)	(0.168)
HV-LA	-0.035	0.238**	0.064	-0.036	0.212**	0.106	-0.125	0.097	-0.100
	(0.152)	(0.104)	(0.140)	(0.160)	(0.103)	(0.145)	(0.184)	(0.125)	(0.182)
HV-HA	-0.236**	0.102	0.023	-0.258*	0.014	0.034	-0.335*	-0.104	-0.178
	(0.114)	(0.128)	(0.118)	(0.145)	(0.093)	(0.130)	(0.173)	(0.120)	(0.173)
Child5b	0.028	-0.163*	0.066	0.032	-0.053	0.065	0.030	-0.047	0.078
	(0.074)	(0.096)	(0.057)	(0.076)	(0.048)	(0.068)	(0.070)	(0.047)	(0.069)
Area	-0.005	-0.020	0.007	-0.007	0.001	0.005	-0.017	-0.009	-0.014
	(0.015)	(0.081)	(0.016)	(0.021)	(0.013)	(0.019)	(0.021)	(0.014)	(0.021)
NonFoodExp_pc	0.020	-0.215**	-0.004	0.021	-0.035*	0.001	0.005	-0.059**	-0.041
	(0.027)	(0.089)	(0.043)	(0.030)	(0.019)	(0.027)	(0.035)	(0.024)	(0.035)
ImprovedToilet	0.005	-0.071	0.076	0.021	0.002	0.078	0.044	0.037	0.143
	(0.107)	(0.088)	(0.084)	(0.115)	(0.074)	(0.104)	(0.111)	(0.076)	(0.110)
Constant	8.165	14.812*	4.311	0.993	0.933**	1.023*	1.339	-0.368	-1.320
	(8.232)	(7.985)	(3.350)	(1.573)	(0.408)	(0.575)	(1.814)	(0.946)	(1.355)
Observations	111	88	111	111	111	111	111	111	111
R²				0.207	0.280	0.145	0.099	-0.149	-0.684
Pseudo *R²*	0.174	0.411	0.144						
Log-likelihood	-61.930	-22.700	-52.690						
χ²	30.790	40.740	29.920						
Linktest *p*-value	0.382	0.149	0.976						

Notes: Underwt, 'underweight'. Standard errors are indicated in parentheses in the 3SLS and SUR estimators. In the Logit estimator, marginal effects are shown with robust standard errors in parentheses clustered at the household level. We use small-sample statistics and an alternate divisor in computing the covariance matrix for the equation residuals in SUR estimator. The first-stage regression coefficients are in Appendix A-7. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

a/ *HtMother* included only in the HAZ and stunting models.

Source: Vietnam Rural Household Survey (July-August 2016).

Table A3.11 Instrumental variables used and results of endogeneity tests

Nutrition outcome	Variable of interest	Instrumental variable	N	Endogeneity test[a]		Weak instrument test	Preferred estimator
				Robust score test χ^2 p-value	Robust regression F p-value	Robust F-stat	
HAZ	*VegDiversity*	*Distance*	234	0.3074	0.3524	6.7401	OLS
	TradMarket	*PctNeighborTrad*	234	0.5575	0.5786	26.1301	OLS
	ModMarket	*PctNeighborMod*	234	0.0714	0.0899	6.5143	3SLS
WHZ	*VegDiversity*	*Distance*	234	0.3752	0.3998	7.7050	OLS
	TradMarket	*PctNeighborTrad*	234	0.7765	0.7873	26.3764	OLS
	ModMarket	*PctNeighborMod*	234	0.2692	0.2983	6.7931	OLS
WAZ	*VegDiversity*	*Distance*	234	0.8303	0.8376	7.7050	OLS
	TradMarket	*PctNeighborTrad*	234	0.4540	0.4749	26.3764	OLS
	ModMarket	*PctNeighborMod*	234	0.5750	0.5935	6.7931	OLS
Stunting	*VegDiversity*	*Distance*	234	0.2112	0.2612	6.7401	Logit
	TradMarket	*PctNeighborTrad*	234	0.2606	0.2857	26.1301	Logit
	ModMarket	*PctNeighborMod*	234	0.7582	0.7720	6.5143	Logit
Wasting	*VegDiversity*	*Distance*	234	0.4641	0.4742	7.7050	Logit
	TradMarket	*PctNeighborTrad*	234	0.0565	0.0654	26.3764	3SLS
	ModMarket	*PctNeighborMod*	234	0.4519	0.4784	6.7931	Logit
Underweight	*VegDiversity*	*Distance*	234	0.1812	0.1976	7.7050	Logit
	TradMarket	*PctNeighborTrad*	234	0.2732	0.2910	26.3764	Logit
	ModMarket	*PctNeighborMod*	234	0.5438	0.5650	6.7931	Logit

Notes: Distance, distance of the household to an agriculture office in meters; *PctNeighborTrad*, per cent of surveyed neighbours in the village selling to traditional channels excluding self/household; *PctNeighborMod*, per cent of surveyed neighbours in the village selling to modern channels excluding self/household.

Statement of Authorship

Title of Paper	Understanding food choice factors of rural households from northwest Vietnam
Publication Status	☐ Published ☐ Accepted for Publication ☐ Submitted for Publication ☒ Unpublished and Unsubmitted work written in manuscript style
Publication Details	This chapter is being prepared for submission to the Journal of Agribusiness in Developing and Emerging Economies[36].

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Name of Principal Author (Candidate)	Christian Genova II		
Contribution to the Paper	Involved in the study design; performed primary data collection, data encoding, data cleaning, data analysis, data interpretation; and wrote and revised the manuscript.		
Overall percentage (%)	80		
Certification:	This paper reports on original research I conducted during the period of my Higher Degree by Research candidature and is not subject to any obligations or contractual agreements with a third party that would constrain its inclusion in this thesis. I am the primary author of this paper.		
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Co-Author Contributions

By signing the Statement of Authorship, each author certifies that:

i. the candidate's stated contribution to the publication is accurate (as detailed above);

ii. permission is granted for the candidate in include the publication in the thesis; and

iii. the sum of all co-author contributions is equal to 100% less the candidate's stated contribution.

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[36] This version is formatted to meet the University thesis requirement. It includes references to other chapters, which are removed in the preprint version.

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4 Understanding food choice factors of rural households from northwest Vietnam

Abstract: In northwest Vietnam, young children from ethnic minority households have stunting and underweight rates that are 1.4 times higher than the national average. One reason posited for this is poor diet and nutrition. Parental food choices have been shown to directly influence children's diets, dietary behaviours, and, ultimately, nutritional outcomes. This paper investigates the food choice motivations of rural households using a cross-sectional data set of 510 households from northwest Vietnam interviewed in July and August 2016. A modified Food Choice Questionnaire (FCQ) is used to assess factors related to food choice, and to explore relationships between food choice factors, diet quality and various sociodemographic characteristics. Results show four distinct food choice factors: 'Natural and healthy', 'Familiarity', 'Balanced diet', and 'Convenience'. Two distinct consumer clusters are identified: 'Health-conscious' households and 'Pragmatic' households. 'Health-conscious' households rank 'Balanced diet' and 'Natural and healthy' highly, while 'Pragmatic' households prioritise 'Convenience' and 'Familiarity'. 'Health-conscious' households have significantly more diverse diets, are wealthier, and have greater geographic concentration in the high vegetable density per capita-high elevation areas (36%). Their main food preparers are more educated and about 13 per cent have Kinh ethnicity. These results indicate the importance of incorporating food choice motivations in future dietary change interventions to ensure that they are tailored to different groups with distinct motivations and particular sociodemographic and lifestyle characteristics.

Keywords: cluster analysis; ethnic groups; factor analysis; food choice; rural households; Vietnam

4.1   Introduction

Globally, studies have shown that ethnic minorities (also known as indigenous peoples'
groups) have a higher prevalence of noncommunicable diseases and poorer health
outcomes, including stunting and wasting in children under five, compared to the rest of
the population (Damman 2005; Einsiedel et al. 2013; Montenegro & Stephens 2006;
Murphy et al. 1997; Schulz & Chaudhari 2015; Teufel-Shone et al. 2015). In Lao Cai
province, Vietnam, ethnic minority groups comprise 64 per cent of the total population,
and the ratios of stunting and underweight among children are 1.4 times higher than the
national average (Lao Cai People's Committee 2016; NIN 2015).[37] Poor dietary intake
and low variety of healthy food are posited as reasons for these higher rates of stunting
and underweight among children (Swinburn et al. 2019)

In Chapter 2, the dietary quality of the ethnic minorities in the province was found to
be relatively diverse, with food consumption derived mainly from four food groups
(cereals, vegetables, meat and poultry, and nuts and beans). However, considering the
prevalence of noncommunicable diseases, especially among children under five (Chapter
3) that may be preventable with improved diet and nutrition, there is a need to understand
the factors influencing the food choices of these rural Vietnamese households. Previous
research has shown that parental food choice motivations directly influence children's
diets, which implies that food choice affects dietary behaviours and, ultimately,
nutritional outcomes (Hursti 1999; Oellingrath et al. 2013; Russell et al. 2015;
Søndergaard & Edelenbos 2007).

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[37] Vietnam is composed of 54 ethnic groups, with the Kinh (86 per cent) and the Hoa (1 per
cent) being the two largest; the rest are referred to as ethnic minorities or "*dân tộc thiểu số*"
(Dang 2012; GSO 2010; van de Walle & Gunewardena 2001).

Food choices and diet-related behaviours are complex as they are influenced not only by biology and personal experience with food (e.g., taste, familiarity, satiety), but also by other individual factors (e.g., acquired knowledge, beliefs and feelings about food, and family and social networks), and the physical, social, and cultural environment (e.g., food availability, culture, price, income, time, education, media influences) (Contento 2011).

The study of food choice among urban populations has gained traction due to the significant changes in diets arising from market globalisation, economic development, supermarket evolution, and changed work patterns (Cunha et al. 2018; Damman et al. 2008). For instance, "Westernization" of traditional diets has been observed in Asia, and it is characterised by higher fat and protein content as opposed to traditional Asian diets that are high in carbohydrates (Pingali 2007). These dietary changes have resulted in a rising incidence of noncommunicable diseases (WHO 2002). Hence, the literature on food choice not only focuses on market research (e.g., Baudry et al. 2017; Chen 2007; Forestell et al. 2012; Hoek et al. 2011; House 2016; Lockie et al. 2004; Prescott et al. 2002; Prescott et al. 2004; Stolz et al. 2011), but also on the promotion of healthy food intake (Locher et al. 2009; Mardon et al. 2015; Miedema et al. 2016; Mitterer-Daltoe et al. 2013; Pollard et al. 2002; Steptoe et al. 2016).

The Food Choice Questionnaire (FCQ) is an instrument that is well established in the food choice literature, designed to assess the relative importance of several factors related to an individual's dietary choices (Steptoe et al. 1995). These factors include health, mood, convenience, sensory appeal, natural content, price, weight control, familiarity, and ethical concerns. The FCQ has been adapted and validated for use in several cross-cultural studies in Asia, Europe, and Latin America (Ares & Gambaro 2008; Heitor et al. 2015; Januszewska et al. 2011; Mardon et al. 2015; Milosevic et al. 2012; Prescott et al.

2002; Prescott et al. 2004), and has been modified to meet specific objectives, such as the addition of complementary scales or development of new food motivation typology (Fotopoulos et al. 2009; Lindeman & Vaananen 2000). Cunha et al. (2018) provides a detailed systematic review of previous FCQ studies.

To date, there is little research looking at factors motivating food choices in rural, developing country contexts. Most studies that use the FCQ in Asia have focused on urban consumer samples, with an aim of testing the validity and reliability of the FCQ in different countries, and/or exploring the relative importance of gender and ethnicity (e.g., Malay, Chinese, and Indian ethnicities) in determining food choice motives (Abdul Rahman et al. 2013; Asma et al. 2010; Chen 2011; Januszewska et al. 2011; Maulida et al. 2016; Mohd-Any et al. 2014; Ooi et al. 2015; Prescott et al. 2002; Prescott et al. 2004).

Sociodemographic and lifestyle characteristics, including culture, also influence the importance that individuals place on food choice factors (Ares & Gambaro 2007; Axelson 1986; Maulida et al. 2016; Steptoe et al. 1995). As such, creating subgroups, based on these demographic profiles, could prove useful for future intervention strategies, especially when they are sensitive to the culture of the target population.

This paper, therefore, aims to understand the factors motivating the food choices of rural households in Lao Cai province, Vietnam. In addition, we want to determine if unique groups or segments of the population exist that share similar motivating factors, and how food choice motivations relate to their household diets, food security, and other sociodemographic characteristics. Understanding the characteristics or profiles of segments or subgroups can aid in developing targeted intervention strategies and programs aimed at improving diet and, ultimately, nutritional outcomes.

4.2   Materials and Methods

4.2.1   Household data and survey questionnaire

The data in this study are from the same quantitative survey of rural farming households analysed in Chapters 2 and 3. The survey was conducted in July and August 2016 in Lao Cai Province, northwest Vietnam. This study was part of a large project 'Towards more profitable and sustainable vegetable farming systems in north-western Vietnam (AGB/2012/059)', funded by the Australian Centre for International Agricultural Research (ACIAR), aiming to improve the livelihoods of smallholder farmers in north-western Vietnam through market engagement and improved resource and disease-management practices.

This study contributes to the broader aim of the ACIAR project by investigating whether there is a relationship between smallholder household characteristics and diets and nutritional outcomes. Ultimately, the goal of the research is to contribute information that may lead to programs and policies that address undernutrition among children in Lao Cai province, and improve livelihoods of the population in these remote areas in the long run.

We used a multistage stratified random sampling approach in selecting households from four districts in the province: Bac Ha, Sa Pa, Muong Khuong, and Si Ma Cai. Chapter 2 provides further information on the sampling design. Ethnic minority households are geographically concentrated in these areas, mainly composed of the Mong (22%), the Tay (16%), the Dao (14%), the Giay (5%), and the Nung (4%) (Lao Cai People's Committee 2016). These different ethnic groups have developed their own distinctive cultures and farming systems, depending on the environment in which they live. The altitude of more than one-third of the communes in this region is at least 600

meters above sea level (Tran 2003). In some areas, access to markets is difficult due to distance, altitude, and poor infrastructure.

In total, face-to-face interviews were conducted with 510 rural farming households using the digital data platform CommCare v.2.28.0 (Dimagi, Cambridge, MA). The main food-related decision-maker and food preparer was the target respondent because the major focus of the research was measuring food consumption, dietary quality, and understanding food choice motivations.

The semi-structured questionnaire included modules on sociodemographic information and anthropometric measurements, intrahousehold food consumption, motives for food choice, dietary beliefs, and the Household Food Insecurity Access Scale (HFIAS), among others. The questionnaire was translated from English to Vietnamese by two translators, working separately and verifying each other's work. The translated questionnaire was then validated by two native-speaking researchers from the Vietnam Women's Union and the Vietnam National University of Agriculture. It was further refined by five researchers from the Mekong Development Research Institute (MDRI), which provided trained enumerators for data collection and administered the survey in the field. Several pilot interviews were conducted in March and July 2016 to confirm the accuracy and nuance of the questionnaire's use of the local language.

4.2.2   Food choices factors

Food choice motivations were measured using a modified FCQ adapted from Steptoe et al. (1995) and Lindeman and Vaananen (2000). The modified FCQ was deemed useful since it is multidimensional and has been validated in cross-cultural studies worldwide.

The original FCQ consisted of 36 questions used to measure health- and non-health-related factors that may influence an individual's food choices. Each question was

categorised into one of nine factors: health, mood, convenience, sensory appeal, natural content, price, weight control, familiarity, and ethical concerns. This study modified the FCQ by adding two factors (religion and balanced), and six questions under convenience, natural content, and familiarity based on results of the pre-tests and the literature (Table 4.2). One item from the original FCQ (i.e. "… *is packaged in an environmentally friendly way*") was removed and one item was rephrased (the phrase "*... and supermarkets*" was removed from one question). A two-item religion factor was adapted from Lindeman and Vaananen (2000). Based on the pre-tests and the Participant Observation Study, ethnic minority communities follow certain religious and traditional beliefs in worshipping their ancestors; rituals during pregnancy, marriage, sickness, funerals; and rituals performed by shamans to ward off negative energies. At times, these entail abstinence from consumption of certain foods, for instance, before and after childbirth. Under convenience, the item "*... is readily available in my farm or garden*" was included as most of these rural communities are engaged in small-scale agriculture production (International Food Policy Research Institute 2002). Likewise, two questions on natural content were added to reflect the suite of government policies on safe vegetable production: RAT ("*Rau An Toan*" or safe vegetables), Safe Agricultural Zones, Vietnam Good Agricultural Practices (VietGAP), and basic Good Agricultural Practices (basic GAP) (World Bank 2017). The three questions on familiarity were added to incorporate how other household members' preferences, neighbours (similar ethnicities cluster together geographically), and ethnicity influence the main food preparer's food choices (Resnicow et al. 1999).

A four-item balanced factor was also created to incorporate the balance between hot and cold (*am* and *duong*) (Ladinsky et al. 1987; Rydstrøm 2004), in addition to questions

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of being full or satiated (Hough & Sosa 2015), and concepts of a balanced diet consisting of meat and vegetables only or a balanced diet indicating one composed of rice, meat and/or vegetables. The 'hot' and 'cold' food classification is a belief that stems from traditional Vietnamese medicine in treating illnesses and is not related to the physical characteristics of food. This belief is passed on to women and is carried across generations (Ladinsky et al. 1987). In total, we have 47 items in the modified FCQ (Table 4.2). To prevent the order effect, the 47 items were randomised and unclassified when presented to respondents. The respondent is asked to rate the importance of each item using a 5-point[38] Likert scale, where 1 is not at all important, 2 is slightly important, 3 is normal, 4 is important, and 5 is very important (Milosevic et al. 2012). This differs from the original FCQ that uses a 1-4 scale.

4.2.3   Dietary quality indicator

The dietary quality of a household has been shown to be influenced by the food choices of the main food preparer. As such, we want to understand the relationship between food choice motivating factors and diet quality. In this study, we use the Household Dietary Diversity Score (HDDS) to measure household dietary quality, which is the average number of food groups consumed by all household members (Kennedy et al. 2011). This measure is derived from the household food consumption module that was collected in July-August and November 2016. The HDDS is the mean dietary diversity score of each household for the two survey periods. Foods items consumed by the household are categorised according to the 14-food group classification in the 2007 Vietnamese Food Composition Table. The hypothesis is that household decision-makers, who are more

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[38] Initially, we used a 10-point Likert scale. However, the respondents (and the enumerators) had difficulty in responding during the pre-tests.

motivated by health-related factors versus other factors, may have diets that are more diverse. However, as discussed previously, other factors such as income and geographical access may also limit a household's access to nutritious food.

4.2.4 Household Food Insecurity Access Scale (HFIAS)

We use the Household Food Insecurity Access Scale (HFIAS) to measure food insecurity in terms of resource constraints affecting access to food (Coates et al. 2007). It has a recall period of four weeks or 30 days. The HFIAS module is composed of nine occurrence questions that assess anxiety and uncertainty about the household's food supply, insufficient quality, and insufficient food intake and its physical consequences, in the four weeks prior to the survey. In each of the occurrence questions, the respondent is asked whether the situation (insufficient quality) has occurred in the previous four weeks. If the respondent answered yes, frequency-of-occurrence is then asked to assess if the situation happened rarely (once or twice), sometimes (three to ten times) or often (more than ten times) in the past four weeks. The HFIAS score of each household is computed as the summation of frequency-of-occurrence questions where the minimum score is 0 and the maximum score is 27. The higher the score, the greater the food insecurity, in terms of access, experienced by the household in the past four weeks.

4.3 Analysis and Results

4.3.1 Exploratory Factor Analysis

An Exploratory Factor Analysis (EFA) was conducted on the modified FCQ using IBM SPSS Statistics for Windows, Version 25.0 (IBM Corp., Armonk, NY) to focus on key factors prior to the conduct of two-step cluster analysis. The factorability of the 47 items was assessed using several diagnostic tests (Field 2013; Norman & Streiner 2008;

Tabachnick & Fidell 2007; Yong & Pearce 2013). Exploratory Factor Analysis was deemed suitable for 44 items after evaluating the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (MSA), diagonals of the anti-image correlation matrix, the Bartlett's test of sphericity, and the communalities. Principal Axis Factoring with oblique rotation (promax)[39] was done yielding a stable solution of four distinct factors explaining 54 per cent of the variance (30%, 11%, 8%, and 5%). The factor loading matrix is presented in Table 4.3.

The four distinct food choice motivation factors are: Factor 1 is labelled as 'Natural and healthy', Factor 2 as 'Familiarity', Factor 3 as 'Balanced diet', and Factor 4 as 'Convenience'. Unlike the original FCQ, natural content (e.g., "… *is free from heavy metals*", "… *contains no artificial ingredients*", "… *contains natural ingredients*") and health ("… *contains a lot of vitamins and minerals*" and "… *is high in protein*") loaded onto one factor ('Natural and healthy'). Factor 3 was retained although it only has two variables. Norman and Streiner (2008) considers this a candidate for removal; however, Yong and Pearce (2013) suggests verifying its reliability by ensuring high correlation between the individual variables included in the factor (r>0.70) and low correlation with variables included in other factors. Results show that both variables in Factor 3 are highly correlated (r=0.76) and are uncorrelated with other variables (r ranges from 0.09 to 0.47, with most under 0.40). Internal consistency for each of the scales was examined using Cronbach's alpha. The alphas showed good reliability (>0.70): 0.88 for Factor 1 (11 items), 0.83 for Factor 2 (8 items), 0.87 for Factor 3 (2 items), and 0.71 for Factor 4 (3 items).

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[39] Several factors were found to be correlated (>0.50) based on the Factor Correlation Matrix (Factor 1 is correlated with Factor 3 [r=0.56], Factor 2 is correlated with Factor 3 [r=0.51]) (Appendix Table A4.9).

Table 4.4 shows the mean values for each factor, where higher scores indicate greater importance placed on the factor. All four factors are considered important by most rural households, showing negatively skewed distributions. In order of importance, 'Balanced diet' is the food choice factor that rural households consider most important, followed by 'Familiarity', 'Convenience', and 'Natural and healthy'.

For each household included in the analyses, regression-based factor scores were obtained for each factor (Tabachnick & Fidell 2007). These factor scores were used as segmentation variables for the cluster analysis, which is explained in the subsequent section.

4.3.2   Cluster Analysis

A two-step cluster analysis was performed using each household's four regression-based factor scores to determine if there are 'clusters' or segments of rural households with similar motivational profiles, and to assess how the 'clusters' differ in terms of household diets, food security, and other sociodemographic characteristics. Defining these clusters of households can provide important insights that can aid in the development of effective nutrition programs and policies to improve nutritional outcomes for ethnic minority households.

The cluster analysis was performed using IBM SPSS, Version 25.0 (IBM Corp., Armonk, NY). The analysis identified the segments by pre-clustering the households using a sequential clustering approach in the first stage, and then by an agglomerative hierarchical clustering method in the second stage (Honkanen & Frewer 2009; SPSS 2001). The number of clusters was automatically determined using the Schwarz's Bayesian information criterion (BIC) and with the log-likelihood as a distance measure.

Two clusters are generated from the two-step auto-clustering procedure, with a moderately balanced number of households in each cluster. The centroids show that the clusters are well separated by the four distinct factors. The cluster quality is considered "fair" based on the silhouette measures of cohesion and separation (nearly 0.50) (Norušis 2012). The results of the independent samples t-tests confirm that the clusters vary significantly across the segmentation variables (Table 4.5).

Cluster 1 accounts for 49 per cent of the rural households in the sample (Table 4.5). Respondents in Cluster 1 have significantly higher mean scores for all four factors, compared to Cluster 2. Specifically, they rank 'Balanced diet' and 'Natural and healthy' highest when considering their most important factors motivating their food choices. The rankings of the four factors based on importance in Cluster 1 are 'Balanced diet', 'Natural and healthy', 'Familiarity', and 'Convenience'. In this regard, Cluster 1 can be described in broad terms as the 'Health-conscious' households.

Cluster 2 accounts for 51 per cent of the rural households in the sample. Respondents place a slightly higher level of importance on 'Convenience' and 'Familiarity', with mean scores ranging between 3.22 and 3.28, and less on 'Balanced diet' and 'Natural and healthy'. The rankings of the four factors based on importance are 'Convenience', 'Familiarity', 'Natural and healthy', and 'Balanced diet'. Accordingly, we name Cluster 2 as 'Pragmatic' households.

4.3.3   Cluster Profiles

In addition to exploring the heterogeneity in food choice motives among the rural households, we also assessed if households who are concerned about the healthfulness (i.e., nutrition, quality, or safety) of their food have higher dietary quality. The two clusters were, therefore, profiled according to available proxies for household dietary

quality (HDDS) and household food insecurity (HFIAS), and selected household (annual non-food expenditure, household size, one-way travel time to the nearest food market, and number of children in different age groups), food preparer (age, gender, ethnicity, and education), and community characteristics (geographic stratification and district). Independent samples t-tests and Pearson chi-square statistics were used to test significant differences between the two clusters.

4.3.3.1 'Health-conscious' versus 'Pragmatic' households

Table 4.6 shows the sociodemographic profiles of each cluster. The 'Health-conscious' households consume statistically higher quality diets as indicated by HDDS. On average, the 'Health-conscious' households consume food items belonging to approximately five food groups per day compared to only four good groups for the 'Pragmatic' household cluster ($p<0.000$). The range of vegetables consumed among the 'Health-conscious' households are also larger (84) as compared to the 'Pragmatic' households (64). While the main types of vegetables normally consumed are the same in both clusters (Sec 2.2.6), there is a relatively higher concentration of 'Pragmatic' households that consume and prepare dishes using only five vegetables: pumpkin leaves, pumpkin squash, mustard greens, bamboo shoot, and chili pepper (Table 4.8).

The average HFIAS score of the "Health-conscious" households is slightly higher at 4.11 as compared to 4.06 in the "Pragmatic" households. However, no statistical difference is found between the two HFIAS scores.

Several sociodemographic variables are significantly different between the two clusters. The annual non-food household expenditure is used as a proxy for household income, which is likely to affect household food choices with higher income providing greater economic food access. The 'Health-conscious' households have an annual

household income that is nearly 1.9 times (64.62 VND versus 34.47 VND) larger than that of the 'Pragmatic' households ($p<0.002$). Their household composition is also slightly smaller (4.66 versus 4.95, $p<0.059$), with fewer children under five years of age living in the household (0.47 versus 0.59, $p<0.067$).

With respect to the profile of the main food-related decision-maker and food preparer, there are significant differences with age, ethnicity, and education between the two clusters. In the 'Health-conscious' households, the food preparer is marginally older (40 years of age) than those in the 'Pragmatic' households (38 years of age) ($p<0.090$).

In the 'Health-conscious' households, we find higher share of food preparers belonging to Kinh (13%) and Nung (11%) and lower concentration of Mong (60%) ($p<0.000$). Conversely, the majority (83%) of the 'Pragmatic' households are Mong, and only one respondent belongs to Kinh (0.4%). One study showed that Kinh mothers provide their children with more diverse diets as compared to mothers from other ethnic minority groups (e.g. Thai-Muong, Tay-Nung, E De-Mnong) (Nguyen et al. 2016), which could explain the significant difference in HDDS between the two clusters.

There are also large and statistically ($p<0.000$) significant differences in the educational attainment of the main food preparer between the two groups. Only 45 per cent of the food preparer in the 'Health-conscious' households have no formal education as compared to 62 per cent in the 'Pragmatic' households. A higher percentage (14%) also finished upper secondary or higher– with about 6 per cent reaching university and postgraduate studies– as compared to only 2 per cent in the latter. These significant differences in both the income and educational attainment of the households suggest that the 'Health-conscious' households are more affluent than the 'Pragmatic' households. These differences may influence their food choice motives.

With respect to geographical location, a significantly ($p<0.006$) larger share of the 'Health-conscious' households are located in high vegetable production density and high altitude (HV-HA, 36% versus 23%) areas. A higher share of the 'Health-conscious' households are located in Sa Pa (27% versus 12%) and Muong Khuong (27% versus 20%) districts compared to the 'Pragmatic' households. Conversely, a significantly higher per cent of 'Pragmatic' households reside in Bac Ha (39% versus 27%) and Si Ma Cai (29% versus 18%) districts compared to 'Health- conscious' households. However, considering physical access to markets, both groups face a similar (not statistically different) amount of travel time (0.37 hours) to reach their nearest food market on a single trip.

4.4   Discussion

This study explored the food choice motivations of rural smallholder farming households in Lao Cai province. A modified FCQ was used to explore the most important motives of the rural households when selecting the food to eat on ordinary days. Overall, the exploratory factor analysis revealed four underlying factors, where 'Balanced diet' and 'Familiarity' are the main motives for food choice, and 'Convenience' and 'Natural and healthy' are ranked the lowest.

An analysis of factor scores using two-step cluster analysis identified two unique clusters, which differ in food choice motivations. These clusters could be distinguished from each other based on personal characteristics of the main food preparer, household dietary quality, and other household and community characteristics. This was done to determine how future interventions related to changing food-related behaviours could be tailored to targeted segments of rural populations.

The two clusters identified are 'Health-conscious' and 'Pragmatic' households. When choosing food, compared to 'Pragmatic' households, 'Health-conscious' households

place more emphasis on a 'Balanced diet' and 'Natural and healthy' foods, rather than on 'Familiarity' and 'Convenience' factors. These differences resonate with previous studies which found that there are segments of the population, which are at both ends of the spectrum– the health conscious and the unconcerned about health (Cabral et al. 2017; Honkanen & Frewer 2009; Milosevic et al. 2012). The clusters are stratified by age, gender, education, income, and other household characteristics, which confirm the influence of these parameters on food choice. The 'Health-conscious' households have better dietary quality and are wealthier compared to the 'Pragmatic' households. Food preparers in this cluster are also more educated and have larger share with Kinh ethnicity. These households are also more geographically concentrated in the high vegetable density per capita-high elevation areas. These further validate the results in Chapter 2 on how wealth, education, and ethnicity are significant determinants of dietary diversity.

Although our sample is composed of rural consumers and is quite unique, these results are consistent with other studies in Asia where 'health' and/or 'natural content' are also ranked highly (Januszewska et al. 2011; Prescott et al. 2002). In the Philippines, 'health' was also considered the most important food choice factor, and 'natural content' was ranked fifth among the nine factors (Januszewska et al. 2011). Female consumers from several urban cities in Japan, Malaysia, and Taiwan, were evaluated for their food choice motives on a variety of different foods– red meat in Japan, powdered milk products in Malaysia, and processed tea in Taiwan (Prescott et al. 2002). Consumers in all three countries ranked 'health' and 'natural content' as among their most important food choice motivations. The concern for health may exist among northwest Vietnam's ethnic minorities because they, too, share the cultural beliefs of the traditional Chinese in Taiwan and Malaysia, which views food as 'medicine'.

The 'Health-conscious' cluster may have also maximised their knowledge retention of healthy eating, from media coverage of food safety concerns due to contamination from heavy metals and pesticide residues (Nguyen-Viet et al. 2017; Parks et al. 2009), as well as the government's continued initiatives on safe vegetable production. A major provincial initiative was the "Master Plan of Safe Vegetable Production in Lao Cai, 2008-2015" in 2007 (VNUA Baseline Survey Report, 2014; personal communication with Mr. Nguyen Thien Thanh[40]), followed by Decision No. 92/KH-UBND Lao Cai to implement the project 'Restructuring Agricultural and Forestry Economy in Lao Cai province for 2016-2020'[41] in 2016. Both programs involved the provision of training and capacity building for extension officers and farmers. Being in an agricultural area, households in this cluster are immediately affected by these initiatives as they are more connected to their food supply, in that they grow, harvest and cook most of their food.

Compared with the 'Health-conscious' households, the 'Pragmatic' households have lower quality diets, lower socioeconomic status, and its members have lower educational attainment. They place more importance on 'Convenience' and 'Familiarity'. In Vietnam, most rural households operate as a family farming system (Tran 2003; Ye & Pan 2016). The farm operation is primarily dependent on family manual and animal labour, where a considerable proportion of a family member's time is spent on land preparation, crop establishment, nutrient management, pest and disease management, and other activities related to agricultural production. This especially affects women in the 'Pragmatic' households, as they need to perform multiple roles (farm labourer, food preparer, carer of children and older adults). As such, these households have to maximise the time spent on

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[41] http://laocai.gov.vn/Uploads/1604151035397403CV92.PDF

farm production and time allocated to food preparation, among other tasks (Catacutan &
Naz 2015), and they therefore opt for 'Convenience' in food preparation.

In addition, our results shows ethnicity has an identifiable and significant role in these
'Pragmatic' households, where food is one of the central experiences in maintaining
ethnic identity (McIntosh 1996; Smith & Hendry 2007). They prepare food that "*... is
familiar*", "*… is what I usually eat*", "*… is like the food I ate when I was a child*", and
"*… is similar with what my ethnic group cooks*". At the very core is the family, where
ethnic identity is moulded, transmitted, and strengthened via familial ethnic socialisation
(Gonzales, Umana-Taylor, & Bamaca (2006) as cited by Smith & Hendry 2007). This
socialisation especially affects the children because this is when they learn their food
culture's beliefs and norms (e.g., food avoidance and taboos, food classification systems),
and the social role of food (Birch 1999; Contento 2011; den Hartog et al. 2006).

In urban areas, 'Familiarity' is the least important motive (Januszewska et al. 2011;
Lindeman & Vaananen 2000; Prescott et al. 2002), due to constant exposure to different
types of food (Prescott et al. 2002). Urban areas are a conglomeration of food varieties
with food from different regions of the country or from different countries.

4.5   Conclusions

In conclusion, our results indicate the importance of incorporating food choice
motivations into future dietary change interventions. It confirms the results of other
studies showing that ethnic minority groups in low-income households do not necessarily
prioritise health when making food choice decisions (Antin & Hunt 2012). For these
ethnic minorities, food is part of their identity; hence, any future intervention strategies
should not marginalise them vis-à-vis the dominant food culture and their choices related
to the concept of healthier diets (Dowler 2003).

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Table 4.1 Sociodemographic characteristics of the rural households in Lao Cai province, Vietnam by district

Variable	Bac Ha (N=170) Mean	SD	Sa Pa (N=100) Mean	SD	Muong Khuong (N=120) Mean	SD	Si Ma Cai (N=120) Mean	SD	Total (N=510) Mean	SD
HDDS	4.42	1.04	4.52	1.20	4.51	1.19	3.98	1.10	4.36	1.14
HFIAS	4.06	3.87	6.35	6.62	4.27	4.61	2.04	3.14	4.08	4.77
Annual non-food expenditure (mill VND)	35.60	58.07	72.67	191.20	59.32	122.08	39.53	40.54	49.37	110.97
Household size	4.86	1.76	4.85	1.86	4.55	1.65	4.93	1.57	4.80	1.71
Age of food preparer (years)	41.06	13.41	38.13	14.56	37.91	11.05	37.64	11.87	38.94	12.84
Travel time to nearest food market (hour)	0.24	0.16	0.71	0.46	0.32	0.21	0.33	0.17	0.37	0.31
No of child 5 years and below	0.55	0.72	0.62	0.76	0.47	0.69	0.48	0.72	0.53	0.72
No of child >5-10 years	0.71	0.89	1.01	0.96	0.72	0.83	0.76	0.81	0.78	0.88
No of child >10-17 years	0.71	0.89	0.74	0.92	0.54	0.80	0.85	1.03	0.71	0.92
	N	%	N	%	N	%	N	%	N	%
Gender										
female	128	75.29	71	71.00	54	45.00	105	87.50	358	70.20
male	42	24.71	29	29.00	66	55.00	15	12.50	152	29.80
Ethnicity										
Mong	136	80.00	55	55.00	77	64.17	96	80.00	364	71.37
Nung	13	7.65	-	-	23	19.17	8	6.67	44	8.63
Kinh	10	5.88	23	23.00	-	-	1	0.83	34	6.67
Tay	9	5.29	1	1.00	-	-	12	10.00	22	4.31
Dao	1	0.59	20	20.00	-	-	1	0.83	22	4.31
Others	1	0.59	1	1.00	20	16.66	2	1.66	24	4.83
Education										
no education	95	55.88	53	53.00	52	43.33	75	62.50	275	53.92
nursery/kindergarten	1	0.59	1	1.00	-	-	1	0.83	3	0.59
some primary	21	12.35	9	9.00	21	17.50	8	6.67	59	11.57

Table 4.1 Continued

Variable	Bac Ha (N=170)		Sa Pa (N=100)		Muong Khuong (N=120)		Si Ma Cai (N=120)		Total (N=510)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
primary (completed all years)	20	11.76	7	7.00	17	14.17	10	8.33	54	10.59
lower secondary	24	14.12	15	15.00	22	18.33	18	15.00	79	15.49
upper secondary	3	1.76	4	4.00	4	3.33	3	2.50	14	2.75
vocational	2	1.18	5	5.00	2	1.67	1	0.83	10	1.96
university/college	4	2.35	5	5.00	2	1.67	3	2.50	14	2.75
postgraduate	-	-	1	1.00	-	-	1	0.83	2	0.39
Geographic stratification										
LV-LA	-	-	-	-	40	33.33	80	66.67	120	23.53
LV-HA	-	-	-	-	80	66.67	40	33.33	120	23.53
HV-LA	80	47.06	40	40.00	-	-	-	-	120	23.53
HV-HA	90	52.94	60	60.00	-	-	-	-	150	29.41

Notes: -, 'no observations'; N, 'number of households'; SD, 'standard deviation'; %, 'column per cent'; no, 'number of'; HDDS, 'Household Dietary Diversity Score'; HFIAS, 'Household Food Insecurity Access Scale'; mill VND, 'million Vietnamese Dong'; Others, 'other ethnicities like Phu La - Xa Pho, Bo Y, Muong, Mnong, Kho Mu, Giay, and La Chi'; LV-LA, 'low vegetable diversity per capita-low altitude'; LV-HA, 'low vegetable diversity per capita-high altitude'; HV-LA, 'high vegetable diversity per capita-low altitude'; HV-HA, 'high vegetable diversity per capita-high altitude'.
Source: Vietnam Rural Household Survey (July-August 2016).

Table 4.2 Descriptive statistics of the modified FCQ statements

Factor	Code	Item/Statement	Mean	SD
		It is important to me that the food I eat on a typical day ...		
Convenience	c1_easy_prep	is easy to prepare	3.56	1.13
	c2_cook_simply	can be cooked very simply	3.60	1.07
	c3_notime_prep	takes no time to prepare	3.48	1.10
	c4_buy_nearby_shops	can be bought in shops close to where I live or work	3.56	1.15
	c5_avail_shops	is easily available in shops	3.22	1.20
	c6_avail_farm$^\forall$	is readily available in my farm or garden	4.11	0.96
Natural content	c7_no_additives	contains no additives and preservatives	3.72	1.24
	c8_natural_ingr	contains natural ingredients (contains no additives, preservatives, or food colours)	3.65	1.18
	c9_no_artificial	contains no artificial ingredients	3.81	1.16
	c10_free_pesticide$^\forall$	is free from any pesticide residue or toxic chemicals	4.03	1.08
	c11_free_heavy_metals$^\forall$	is free from heavy metals	3.39	1.34
Ethical concern	c12_country_approve	comes from a country I approve politically	2.87	1.39
	c13_origin_marked	has the country of origin clearly marked	3.21	1.38
Weight control	c14_low_calories	is low in calories	2.79	1.22
	c15_control_weight	helps me control my weight	3.12	1.27
	c16_low_fat	is low in fat	2.86	1.17
Sensory appeal	c17_good_taste	tastes good	3.95	0.99
	c18_nice_smell	smells nice	3.80	1.01
	c19_pleasant_texture	has a pleasant texture	3.59	1.09
	c20_looks_nice	looks nice	3.04	1.21
Price	c21_not_expensive	is not expensive	3.53	1.10
	c22_good_value_money	is good value for money	3.89	1.00
	c23_cheap	is cheap	3.43	1.28
Religion	c24_religious_harmony$^\forall$	is in harmony with my religious views	2.66	1.44
	c25_allowed_religion$^\forall$	is not forbidden in my religion	2.40	1.34

Table 4.2 Continued

Factor	Code	Item/Statement	Mean	SD
		It is important to me that the food I eat on a typical day …		
Familiarity	c26_familiar	is familiar	3.51	1.07
	c27_same_ate_child	is like the food I ate when I was a child	3.20	1.20
	c28_usually_eat	is what I usually eat	3.49	1.10
	c29_like_hh_members$^\triangledown$	is favoured by other household members	3.48	1.12
	c30_same_neighbors_cook$^\triangledown$	is similar with what my neighbours cook	2.64	1.26
	c31_same_ethnic_cooks$^\triangledown$	is similar with what my ethnic group cooks	3.25	1.23
Health	c32_high_fiber	is high in fibre and roughage	3.18	1.26
	c33_nutritious	is nutritious	3.65	1.25
	c34_vit_min	contains a lot of vitamins and minerals	3.52	1.24
	c35_keeps_me_healthy	keeps me healthy	4.09	0.98
	c36_high_protein	is high in protein	3.28	1.32
	c37_good_skin	is good for my skin/teeth/hair/nails, etc.	3.14	1.28
Mood	c38_cheers_me	cheers me up	3.41	1.12
	c39_cope_stress	helps me cope with stress	3.58	1.12
	c40_awake	keeps me awake/alert	3.56	1.10
	c41_relax	helps me relax	3.64	1.17
	c42_feel_good	makes me feel good	3.74	1.04
	c43_cope_life	helps me to cope with life	3.39	1.17
Balanced	c44_full_satiated$^\triangledown$	makes me feel full or satiated	3.59	1.08
	c45_balanced_ricemeatveg$^\triangledown$	is a balanced meal of rice and meat and/or vegetables	3.62	1.20
	c46_balanced_meatveg$^\triangledown$	is a balanced meal of meat and vegetables	3.55	1.20
	c47_balanced_hotcold$^\triangledown$	is a balance of hot, cold and neutral food	2.65	1.28

Notes: These questions are adapted from the Food Choice Questionnaire (FCQ) by Steptoe et al. (1995) and Lindeman and Vaananen (2000) (Religion). Based on a Likert-scale: 1 "not important at all"; 2 "slightly unimportant"; 3 "normal"; 4=important; and 5 "very important".

$^\triangledown$Statements not included in the original FCQ of Steptoe et al. (1995).

Source: Vietnam Rural Household Survey (July-August 2016). N=510.

Table 4.3 Overview of the four distinct food choice factors from Exploratory Factor Analysis

Variable	Pattern matrix[a]	Structure matrix	Eigenvalues	% of variance	Cronbach's α	Communality
Factor 1 (Natural and healthy)			7.193	29.970	0.877	
c11_free_heavy_metals	0.730	0.639				0.431
c9_no_artificial	0.725	0.669				0.462
c8_natural_ingr	0.694	0.655				0.433
c34_vit_min	0.663	0.731				0.587
c36_high_protein	0.630	0.732				0.556
c32_high_fiber	0.628	0.654				0.453
c10_free_pesticide	0.621	0.620				0.387
c13_origin_marked	0.619	0.616				0.396
c12_country_approve	0.566	0.539				0.306
c7_no_additives	0.559	0.572				0.455
c14_low_calories	0.454	0.516				0.287
Factor 2 (Familiarity)			2.572	10.715	0.825	
c26_familiar	0.841	0.784				0.630
c28_usually_eat	0.672	0.632				0.404
c27_same_ate_child	0.654	0.619				0.388
c31_same_ethnic_cooks	0.647	0.579				0.347
c42_feel_good	0.505	0.665				0.509
c43_cope_life	0.469	0.528				0.290
c22_good_value_money	0.424	0.508				0.321
c35_keeps_me_healthy	0.419	0.584				0.429
Factor 3 (Balanced diet)			1.878	7.827	0.865	
c45_balanced_ricemeatveg	0.989	0.923				0.858
c46_balanced_meatveg	0.831	0.798				0.642
Factor 4 (Convenience)			1.273	5.302	0.707	
c3_notime_prep	0.744	0.761				0.584
c1_easy_prep	0.675	0.675				0.455
c2_cook_simply	0.550	0.566				0.347

Notes: Principal Axis Factoring extraction method, oblique rotation (promax). Total % of variance explained is 53.814. a/ Rotation converged in 6 iterations.
Source: Vietnam Rural Household Survey (July-August 2016).

Table 4.4 Descriptive statistics of the four food choice factors

Food choice motives	Mean	SD
Factor 1 'Natural and healthy'	3.40	0.84
Factor 2 'Familiarity'	3.57	0.74
Factor 3 'Balanced diet'	3.59	1.13
Factor 4 'Convenience'	3.55	0.88

Notes: SD, 'standard deviation'; Likert scale from 1 'not at all important' to 5 'very important'.
Source: Vietnam Rural Household Survey (July-August 2016).

Table 4.5 Two distinct clusters using the four food choice factors as segmentation variables

Food choice motives	C1 (N=252) 'Health-conscious' households		C2 (N=258) 'Pragmatic' households		*t*-value	*p*-value
	Mean	SD	Mean	SD		
Factor 1 'Natural and healthy'	3.96	0.56	2.86	0.71	19.43	0.000
Factor 2 'Familiarity'	3.93	0.61	3.22	0.68	12.27	0.000
Factor 3 'Balanced diet'	4.37	0.65	2.83	0.95	21.42	0.000
Factor 4 'Convenience'	3.81	0.79	3.28	0.88	7.18	0.000
Centroid						
Factor 1 'Natural and healthy'	0.65	0.59	-0.64	0.78	21.29	0.000
Factor 2 'Familiarity'	0.47	0.78	-0.46	0.81	13.27	0.000
Factor 3 'Balanced diet'	0.72	0.50	-0.70	0.74	25.30	0.000
Factor 4 'Convenience'	0.29	0.76	-0.28	0.89	7.80	0.000

Notes: C1 and C2 are the two clusters. Using independents samples t-tests. Equal variances assumed for F2 and F4 using Levene's Test of Equality of Variances.
Source: Vietnam Rural Household Survey (July-August 2016).

Table 4.6 Cluster profiling based on selected sociodemographic and household characteristics of the sampled rural households

Variables	C1 (N=252) 'Health-conscious' households		C2 (N=258) 'Pragmatic' households		*t*-value	*p*-value
	Mean	SD	Mean	SD		
HDDS	4.62	1.15	4.10	1.07	5.30	0.000
HFIAS	4.11	4.96	4.06	4.58	0.12	0.900
Non-food expenditure (mill VND)	64.62	142.34	34.47	64.45	3.07	0.002
Household size	4.66	1.62	4.95	1.76	-1.89	0.059
Age of food preparer (year)	39.92	13.44	37.99	12.16	1.70	0.090
Travel time to nearest food market (hr)	0.37	0.31	0.37	0.30	-0.03	0.974
No. child 5 years and below	0.47	0.68	0.59	0.76	-1.84	0.067
No. child >5-10 years	0.79	0.90	0.77	0.86	0.34	0.736
No. child >10-17 years	0.66	0.90	0.76	0.93	-1.20	0.232
	N	%	N	%	χ^2	*p*-value
Gender of food preparer					0.00	0.984
male	75	29.76	77	29.84		
female	177	70.24	181	70.16		
Ethnicity of food preparer					49.07	0.000
Mong	151	59.92	213	82.56		
Nung	27	10.71	17	6.59		
Kinh	33	13.10	1	0.39		
Tay	12	4.76	10	3.88		
Dao	11	4.37	11	4.26		
Others	18	7.14	6	2.33		
Education of food preparer					37.16	0.000
no education	114	45.24	161	62.40		
nursery/kindergarten	0	-	3	1.16		
some primary	33	13.10	26	10.08		
primary (completed all years)	28	11.11	26	10.08		
lower secondary	42	16.67	37	14.34		
upper secondary	10	3.97	4	1.55		
vocational	9	3.57	1	0.39		
university/college	14	5.56	0	-		
postgraduate	2	0.79	0	-		
Geographic stratification					12.40	0.006
LV-LA	60	23.81	60	23.26		
LV-HA	55	21.83	65	25.19		
HV-LA	47	18.65	73	28.29		
HV-HA	90	35.71	60	23.26		
District					28.15	0.000
Bac Ha	69	27.38	101	39.15		
Sa Pa	68	26.98	32	12.40		
Muong Khuong	69	27.38	51	19.77		
Si Ma Cai	46	18.25	74	28.68		

Notes: -, 'no observation'; No, 'number of'; %, 'row per cent'; χ^2, 'Pearson's chi-square; SD, 'standard deviation'; N, 'number of households'; LV-LA, 'low vegetable density per capita-low altitude', LV-HA, 'low vegetable density per capita-high altitude', HV-LA, 'high vegetable density per capita-low altitude', HV-HA, 'high vegetable density per capita-high altitude'; mill VND, 'million Vietnamese Dong'. Using independent samples t-test and Pearson chi-square. Equal variances assumed for HDDS, HFIAS, household size, age of food preparer, travel time, no. of children >5-10yrs, and no. of children >10-17yrs. *Source*: Vietnam Rural Household Survey (July-August 2016).

Table 4.7 The original and modified FCQ statements

Factor	Steptoe et al. (1995)	Lindeman and Vaananen (2000)	This study
Convenience	is easy to prepare can be cooked very simply takes no time to prepare can be bought in shops close to where I live or work is easily available in shops and supermarkets		is easily available in shops is readily available in my farm or garden
Natural content	contains no additives and preservatives contains natural ingredients (contains no additives, preservatives, or food colours) contains no artificial ingredients		is free from any pesticide residue or toxic chemicals is free from heavy metals
Ethical concern	comes from a country I approve politically has the country of origin clearly marked is packaged in an environmentally friendly way*		
Weight control	is low in calories helps me control my weight is low in fat		
Sensory appeal	tastes good smells nice has a pleasant texture looks nice		
Price	is not expensive is good value for money is cheap		
Religion		is in harmony with my religious views is not forbidden in my religion	

Table 4.7 Continued

Factor	Steptoe et al. (1995)	Lindeman and Vaananen (2000)	This study
Familiarity	is familiar is like the food I ate when I was a child is what I usually eat		is favoured by other household members is similar with what my neighbours cook is similar with what my ethnic group cooks
Health	is high in fibre and roughage is nutritious contains a lot of vitamins and minerals keeps me healthy is high in protein is good for my skin/teeth/hair/nails, etc.		
Mood	cheers me up helps me cope with stress keeps me awake/alert helps me relax makes me feel good helps me to cope with life		
Balanced			makes me feel full or satiated is a balanced meal of rice and meat and/or vegetables is a balanced meal of meat and vegetables is a balance of hot, cold and neutral food

Note: *removed

Table 4.8 List of vegetables consumed by households by cluster

Code	Vegetable	C1 'Health-conscious' households		C2 'Pragmatic' households	
		Freq	Per cent	Freq	Per cent
S4066	Pumpkin leaves, raw	374	22.12	459	25.59
S4003	Pumpkin squash, raw	235	13.90	341	19.01
S4016	Mustard greens, India, leaves and stems, raw	119	7.04	136	7.58
VEG_99	Chili pepper, small, spicy	117	6.92	250	13.94
N4050	Bamboo shoot, spring variety	109	6.45	84	4.68
N4086	Chayote, fruit raw	98	5.80	87	4.85
N4047	Bamboo shoot, unspecified	63	3.73	126	7.02
S4083	Kangkong, swamp cabbage, water spinach, water convolvulus, raw	52	3.08	10	0.56
N4057	Chili pepper, green	48	2.83	35	1.95
S4005	Tomato, raw	43	2.54	30	1.67
N4056	Chili pepper, yellow	35	2.07	17	0.95
S4002	Ashgourd waxgourd, winter melon, raw	31	1.83	15	0.84
N4051	Gourd, sponge gourd	24	1.42	3	0.17
S4086	*Sauropus*, sp. Leaves, raw	24	1.42	14	0.78
S4010	Cabbage, common, raw	22	1.30	20	1.11
N4039	Onion, Welsh, raw	22	1.30	11	0.61
S4103	Garlic bulbs, raw	18	1.06	8	0.45
S4030	Cowpeas, yard long, Chinese long bean, raw	15	0.89	10	0.56
N4028	Cucumber	14	0.83	13	0.72
S4009	Aubergine, raw	12	0.71	8	0.45
S4076	Sweet potato leaves, raw	12	0.71	8	0.45
N4017	Chinese cabbage, unspecified	11	0.65	5	0.28
N4037	Soybean sprouts	11	0.65	2	0.11
S4080	Malabar nightshade, Vine spinach; Ceylon spinach, raw	11	0.65	1	0.06
N4001	Calabash/ bottlegourd	10	0.59	11	0.61
VEG_99	Choy sum	10	0.59	2	0.11

Table 4.8 Continued

Code	Vegetable	C1 'Health-conscious' households		C2 'Pragmatic' households	
		Freq	Per cent	Freq	Per cent
VEG_99	Mong mustard	10	0.59	5	0.28
VEG_99	Chayote leaves	9	0.53	10	0.56
N4082	Mint leaves	6	0.35	N/A	N/A
S4007	Carrot, raw	6	0.35	N/A	N/A
S4036	Mungbean sprouts, green gram, tiensin green bean, raw	6	0.35	N/A	N/A
VEG_99	*Coong*	6	0.35	N/A	N/A
N4097	Mustard green, pickled	5	0.30	4	0.22
S4055	Bitter gourd, balsam pear, balsam-apple, bitter melon, raw	5	0.30	2	0.11
VEG_99	*Diplazium esculentum*	5	0.30	1	0.06
VEG_99	Lemongrass	5	0.30	1	0.06
N4032	Green peas; field pea; peas garden	4	0.24	5	0.28
N4040	Onion, common, garden	4	0.24	2	0.11
N4090	Chinese leek, onion fragrant	4	0.24	N/A	N/A
S4029	Kidney beans, in pod, French bean; Navy bean, raw	4	0.24	N/A	N/A
VEG_99	Lemon leaves	4	0.24	1	0.06
N4034	Papaya, unripe, raw	3	0.18	1	0.06
N4044	Banana, buds and flowers	3	0.18	1	0.06
N4049	Bamboo shoots, dried	3	0.18	3	0.17
S4070	Jute potherb, raw	3	0.18	1	0.06
S4121	Jew' ear, Judas' ear, dried, wood ear, tender variety, raw	3	0.18	N/A	N/A
N4004	Pumpkin, dried	2	0.12	N/A	N/A
N4022	Radish garden white, raw	2	0.12	4	0.22
N4027	*Colocasia indica*	2	0.12	1	0.06
N4048	Asparagus, white	2	0.12	4	0.22
N4058	Tamarind	2	0.12	N/A	N/A
N4101	Onion, pickled	2	0.12	N/A	N/A
N4107	mushroom, straw	2	0.12	1	0.06

Table 4.8 Continued

Code	Vegetable	C1 'Health-conscious' households		C2 'Pragmatic' households	
		Freq	Per cent	Freq	Per cent
N4115	Wild plant	2	0.12	N/A	N/A
S4073	Amaranth, sp. red, raw	2	0.12	N/A	N/A
S4082	Parsley, curly, raw	2	0.12	N/A	N/A
S4102	Balm-mint, garden-balm, raw	2	0.12	1	0.06
VEG_99	*Lactuca indica*	2	0.12	N/A	N/A
VEG_99	Pickled pepper	2	0.12	7	0.39
VEG_99	Sponge gourd, leaves	2	0.12	N/A	N/A
N4016	Cress, sp.	1	0.06	N/A	N/A
N4055	Corn, small variety immature, baby corn	1	0.06	N/A	N/A
N4074	Kangkong, dried	1	0.06	N/A	N/A
N4078	*Polygonum odoratum*	1	0.06	N/A	N/A
N4092	Chinese olive	1	0.06	N/A	N/A
N4094	Tomato, pickled	1	0.06	N/A	N/A
N4104	Mushroom, Chinese raw	1	0.06	N/A	N/A
N4118	*La lot*	1	0.06	N/A	N/A
N5012	Pineapple, wild	1	0.06	N/A	N/A
S4019	Banana, dwarf, young fruit, raw	1	0.06	N/A	N/A
S4042	Onion, fragrant, Chinese leek, raw	1	0.06	N/A	N/A
S4074	Amaranth, sp white, raw	1	0.06	N/A	N/A
VEG_99	*Brassica integrifolia*	1	0.06	N/A	N/A
VEG_99	*Canarium spp.*	1	0.06	N/A	N/A
VEG_99	Dracontomelon	1	0.06	N/A	N/A
VEG_99	Ginger leaves	1	0.06	N/A	N/A
VEG_99	Napa cabbage	1	0.06	N/A	N/A
VEG_99	Pea leaves	1	0.06	N/A	N/A
VEG_99	Raw vegetables	1	0.06	N/A	N/A

Table 4.8 Continued

Code	Vegetable	C1 'Health-conscious' households		C2 'Pragmatic' households	
		Freq	Per cent	Freq	Per cent
VEG_99	Salted *coong*	1	0.06	N/A	N/A
VEG_99	Sour leaves	1	0.06	N/A	N/A
VEG_99	Taro tuber leaves	1	0.06	N/A	N/A
VEG_99	Wild eggplant	1	0.06	1	0.06
N4053	Sponge gourd, rag (young flower)	N/A	N/A	1	0.06
N4071	Coriander	N/A	N/A	1	0.06
N4095	Eggplant, garden; brinjan; aubergine salted	N/A	N/A	1	0.06
N4108	mushroom, common	N/A	N/A	2	0.11
VEG_99	Sweet potato buds	N/A	N/A	5	0.28
VEG_99	*Xi*	N/A	N/A	5	0.28
VEG_99	Wild vegetable roots	N/A	N/A	4	0.22
VEG_99	Hill mushroom	N/A	N/A	2	0.11
VEG_99	Apricot leaves	N/A	N/A	1	0.06
VEG_99	Fried pickled bamboo shoots	N/A	N/A	1	0.06
VEG_99	*Lốc tâu* - a local dish	N/A	N/A	1	0.06
VEG_99	Mixed raw vegetables	N/A	N/A	1	0.06
VEG_99	Mugwort, common sagebrush	N/A	N/A	1	0.06
VEG_99	Pickled bamboo shoots	N/A	N/A	1	0.06
VEG_99	*Quất hồng bì*	N/A	N/A	1	0.06
VEG_99	*Rau giap ca, diep ca*	N/A	N/A	1	0.06
VEG_99	Unknown name	N/A	N/A	1	0.06
VEG_99	Winter melon leaves (ashgourd waxgourd)	N/A	N/A	1	0.06
	Total	**1690**	**100.00**	**1793**	**100.00**

*Note*s: Freq, "frequency of response"; Per cent, "per cent of response to total"; N/A, "not applicable or did not consume".
Source: Vietnam Rural Household Survey (n=510, July-August 2016).

Appendix. Scree plot and factor correlation matrix

Figure A4.1 shows the scree plot of the remaining 24 food choice items after removing variables with low correlations, communalities, and factor loadings. Table A4.9 shows the factor correlation matrix of the four district factors derived from Exploratory Factor Analysis.
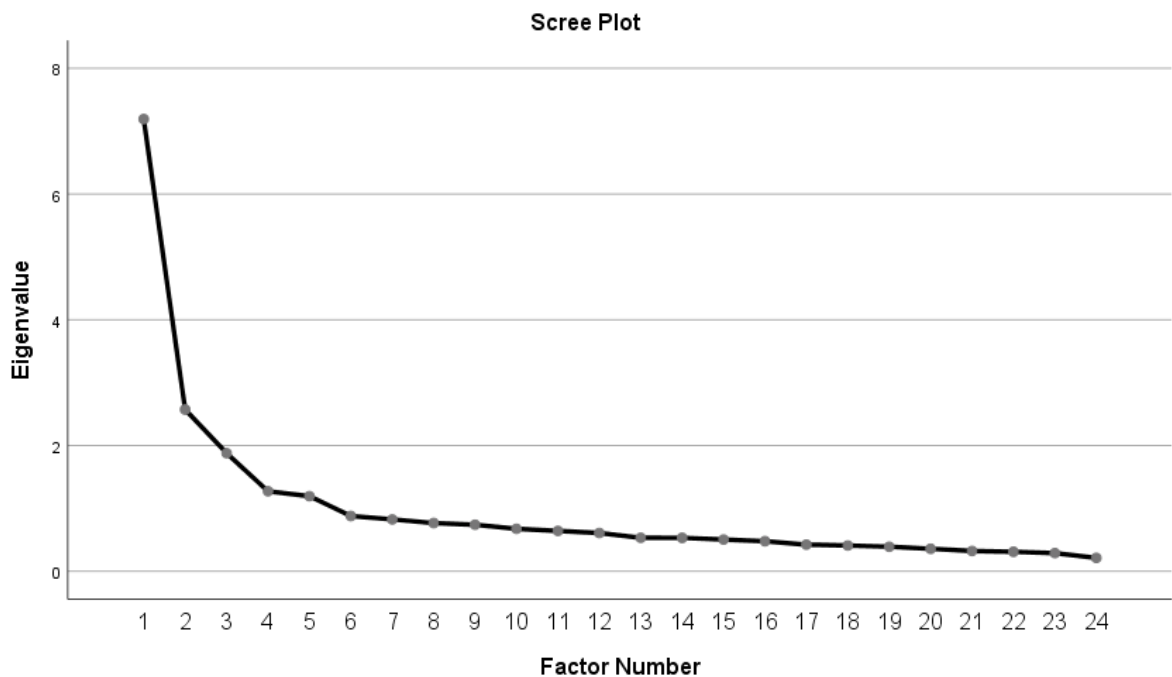
Figure A4.1 Scree plot

Table A4.9 Factor Correlation Matrix

Factor	1	2	3	4
1	1.000	0.413	0.561	0.354
2	0.413	1.000	0.510	0.243
3	0.561	0.510	1.000	0.143
4	0.354	0.243	0.143	1.000

Notes: Extraction Method- Principal Axis Factoring. Rotation Method- Promax with Kaiser Normalization.

5 Summary and Conclusion

This chapter presents an overview of the thesis and summarises the major findings of the three analytical chapters (Chapters 2 to 4). It also presents the contributions and the limitations of the study, and outlines potential areas for future research.

5.1 Overview of the research

This PhD was part of a large multi-year research-for-development AGB/2012/059 "Towards more profitable and sustainable vegetable farming systems in north-western Vietnam" project, funded by the Australian Centre for International Agricultural Research (ACIAR). The broad aim of the overarching AGB/2012/059 project was to improve the livelihoods of smallholder farmers in north-western Vietnam. The household-level research conducted for this PhD aimed to contribute to the central aim of the principal project (i.e. improved livelihoods for smallholder households) by addressing three broad questions:

1. *What is the relationship between smallholder vegetable production and the dietary quality of preschool, schoolchildren, and adolescents? What other factors are also key determinants of improved dietary quality?*

2. *What is the relationship between smallholder vegetable production and nutritional outcomes of children under five years old? What other factors are also key determinants of better child nutritional outcomes?*

3. *What are the factors motivating food choices of the main food decision-makers in smallholder households? Can we find unique segments with similar factors motivating their food choices, and develop profiles of these segments to allow*

targeted nutrition programs to improve nutritional outcomes, particularly of young children?

The three questions posed in this thesis, support the main motivation for undertaking the PhD research, which was to contribute to improved diets and nutritional outcomes for children from smallholder households in northwest Vietnam.

As discussed in earlier chapters, childhood undernutrition remains a global problem. To date, not all countries have made significant progress in reducing childhood undernutrition between 2012 and 2015 (FAO et al. 2018). The stunting rate could be reduced by 20 per cent if 10 nutrition-specific interventions were scaled up to achieve 90 per cent coverage among targeted populations (Bhutta et al. 2013). What about the remaining 80 per cent of stunting? This is where this PhD research comes in.

Leveraging agriculture to improve nutritional outcomes has been proposed in recent years. This is because agriculture is both a source of food and of livelihood to three-fourths of the world's poor in rural areas where most undernutrition persists (Paciorek et al. 2013; Ravallion et al. 2007). Termed 'nutrition-sensitive agriculture', it is an approach that attempts to address the underlying cause of undernutrition, and to enhance the coverage and effectiveness of nutrition-specific interventions (Alderman et al. 2013; Ruel et al. 2013).

The first two analytical chapters (Chapters 2 and 3) attempt to find empirical evidence of the role smallholder vegetable production plays in improving dietary quality and nutritional outcomes among children[42]. Three pathways that link agriculture and nutrition at the household level are explored: (1) household production of agricultural products

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[42] In Chapter 2, we focused on preschool, schoolchildren, and adolescents; while in Chapter 3, only on young children six months to five years old.

which may subsequently be consumed by the household members; (2) market engagement where at least a share of the agricultural products produced by the household are sold at markets generating agricultural income used to purchase diverse food products, or access to a wide variety of food due to market proximity; and (3) gender-related factors influencing women's empowerment with respect to household decisions (Dangour et al. 2012; Gillespie et al. 2012; Herforth & Harris 2014; Kadiyala et al. 2014; Kanter et al. 2015; Pinstrup-Andersen 2014; Turner et al. 2013). The main premise is that all three pathways lead to improved dietary diversity and nutritional outcomes. The third analytical chapter (Chapter 4) assesses the food choice motives of the rural Vietnamese households, and identifies unique groups with similar food choices.

5.2   Study design

The three analytical chapters explore data collected from smallholder farming households in Lao Cai province, northwest Vietnam. As there are various factors that could confound our ability to understand the link between smallholder vegetable production, dietary quality, and nutrition outcomes, the study was designed carefully to address these factors via sampling strategy and questionnaire design. The main steps are explained below.

Sampling. Multistage stratified random sampling was undertaken using four strata, based on elevation and vegetable production density per capita, to account for the geographic heterogeneity of the study areas. Appendix A-2 lists the selected villages and communes from each of the pre-selected four districts. Information about the selected communes/villages, including the list of households in the selected villages, was collected from each commune by the PhD student and a locally-based researcher in June 2016. Appendix A-3 shows the request letter submitted to acquire access to the list of

households for each of the selected villages, and Appendix A-4 contains the Commune/Village Questionnaire used to collect background information.

Primary data collection. A Participant Observation Study was conducted in July and August 2015 to document the consumption and shopping behaviours of six households with varying ethnic and sociodemographic profiles in selected areas in the districts of Bac Ha and Sa Pa, and in Lao Cai city. The PhD student, accompanied by a locally-based researcher from the Vietnam National University of Agriculture (VNUA), stayed in each household for a week to record the types and portion sizes of food prepared and consumed in each meal, food source, main decision-maker in food preparation/selection, and market days in the local areas. Results were then incorporated into the Vietnam Rural Household Survey, specifically into the design of the food consumption module.

The Vietnam Rural Household Survey was conducted over two rounds (July-August and November 2016) to capture seasonal fluctuations in household food consumption. In total, 510 households from four districts in the province were interviewed, with the main food preparer in household as the target respondent.

Survey instrument. The survey instrument was composed of 13 modules that examined: sociodemographic and anthropometric information; household and intrahousehold food consumption using 24-hour food recall; the Household Food Insecurity Access Scale (HFIAS); food choices and dietary beliefs; the modified Abbreviated-Women's Empowerment in Agriculture Index (A-WEA) and gender roles; maternal care and micronutrient supplementation; disease, water and sanitation, and lifestyle; other household characteristics; non-farm household expenditure; household income; farm information; crop and animal output disposal; vegetable input expenditure; and economic

shocks. Some modules were adapted from various sources. Table 1.1 details these sources, and Appendix A-6 contains a copy of the survey questionnaire.

Dietary assessment using 24-hour food recall. In collecting household and intrahousehold food consumption data, the 24-hour food recall was conducted on three non-consecutive reference periods (one weekday and one weekend day in the first survey round, and any week day in the second round) to address within-person random error in food consumption (Baranowski 2012; Gibson & Ferguson 2008). Enumerators were instructed and trained on how to properly estimate food intake using digital kitchen scales, graduated plastic cylinders, modelling clay, and shredded paper (Gibson & Ferguson 2008) during the training in July 2016. In addition, the training also included advice on how to properly collect anthropometric measurements using the infantometer, digital weight scale, ruler, and tape measure (see Training Manual in Appendix A-5), following the National Health and Nutritional Examination Survey (NHANES) anthropometry protocol (Centres for Disease Control and Prevention 2007).

5.3   Major findings

Chapter 2 investigated the association of vegetable production diversity, market engagement, and women's empowerment with the dietary diversity of children aged six months to 17 years. Results show that smallholder vegetable production is associated with improved dietary diversity via market access and market participation. While the positive association between market access and dietary diversity is observed for both boys and girls regardless of age group, the associations are more significant for older children. The effect size is larger for girls, especially for younger girls, whose DDS is increased by up to two food groups. Although the effect size is negligible, income from vegetable

production is also positively associated with dietary diversity especially among schoolchildren and adolescents, boys in general, and older boys in particular. Other covariates have also shown positive associations with dietary diversity for both boys and girls and age groups; they are food preparer's education and monthly non-food expenditure (used as a proxy for household income). No significant association was found between vegetable production diversity and women's empowerment on dietary diversity in any of the regression analyses.

Chapter 3 examined the association between vegetable production diversity, market access, and market participation on the nutritional outcomes of young children aged six to 60 months. Results indicate that in the pooled sample, smallholder vegetable production has a significant indirect effect only on children's WAZ, wherein the association is larger and more significant for modern market channel participation. Selling to traditional and modern channels are associated with improvements in girls' HAZ and WHZ scores, and a lower probability of boys being stunted and underweight. Households that sell to traditional channels can improve girls' current nutritional status (WHZ). Engaging in modern marketing channels can positively affect girls' long-term undernutrition indicator (HAZ). Except for a marginal association on boys' HAZ, market access was not significantly associated with children's nutritional outcomes. Further research is suggested on vegetable production diversity because it showed mixed results: it improves boys' WHZ and girls' HAZ but leads to a higher prevalence of stunting and underweight among boys.

Another important covariate that improves HAZ is workload (women working less than 10.50 hours per day), and it significantly affects girls. Other factors that reduce the probability of stunting among these children are geographic strata (HV-HA vs LV-LA

for boys) and maternal height. Similarly, wealth (monthly non-food expenditure per capita and/or total cultivated area) and maternal education are important for addressing short-term undernutrition (WHZ/wasting). However, short-term undernutrition differs for boys and girls due to the preferential treatment given to sons by these ethnic minority groups (Jones et al. 2014). The incidence of diarrhea severely affects girls' WHZ/wasting, and thus requires future research to identify its determinants.

Chapter 4 explored the relationships between food choice factors, household dietary quality, and various sociodemographic characteristics. Results of the Exploratory Factor Analysis show that, among the smallholder households, four distinct factors motivating their food choices exist: Factor 1, labelled 'Natural and healthy'; Factor 2, labelled 'Familiarity'; Factor 3, labelled 'Balanced diet'; and Factor 4, labelled 'Convenience'. Using the four regression-based factor scores as segmentation variables, the two-step cluster analysis indicate two distinct consumer clusters, with a balanced number of households in each cluster: 'Health-conscious' households and 'Pragmatic' households. The 'Health-conscious' households rank 'Balanced diet' and 'Natural and healthy' highly, while 'Pragmatic' households prioritise 'Convenience' and 'Familiarity'. Results confirm the influence of other parameters [e.g., Household Dietary Diversity Score (as proxy for dietary quality), Household Food Insecurity Access Scale (as proxy for food security); and other household (annual non-food expenditure, household size, one-way travel time to nearest food market, and number of children in different age groups), food preparer (age, gender, ethnicity, and education), and community characteristics (geographic stratification and district)] on food choice motives. The 'Health-conscious' households have better dietary quality, are wealthier, and have food preparers who are more educated and belonging to Kinh ethnic group than in the 'Pragmatic' households.

More than one-third of 'Health-conscious' households are located in high altitude areas with high vegetable production density than in lower altitudes. These results indicate the importance of incorporating food choice motivations into future dietary change interventions. For many of these ethnic minorities, future intervention strategies should capture food choices based on their concepts of healthier diets and not marginalise vis-à-vis the dominant food culture.

5.4   Overall conclusions

Overall, this study shows the direct and indirect contributions of smallholder vegetable production on dietary quality and nutritional outcomes consistent with the findings of other studies that have analysed the agriculture (or specific crop/livestock) and nutrition linkages (Azzarri et al. 2015; Hoddinott et al. 2015; Kumar et al. 2015; Malapit et al. 2015a; Shively & Sununtnasuk 2015). Specifically, the additional income generated from market participation improves children's dietary diversity and their nutritional outcomes. Market access, while significantly increasing dietary diversity among children, especially among girls by up to two food groups, is not a significant predictor of nutritional outcomes among children under five years. Given that two-thirds of boys aged five years and below in our sample are stunted, encouraging households to sell to the default local marketing channels and even to modern channels could reduce the probability of them being stunted. However, properly addressing the intergenerational transmission of stunting requires tackling the linear growth of young girls. Three crucial factors emerge that improve girls' linear growth: vegetable production diversity, modern market participation, and better maternal care arising from mothers spending less time working in fields.

These results add further evidence to the nutrition-sensitive agriculture literature, which links agriculture with nutritional outcomes. While home garden intervention projects, promoting the production and consumption of fruit and vegetables, have shown improvements in the consumption of these crops (Berti et al. 2004; Girard et al. 2012; Kawarazuka and Bene 2010; Leroy and Frongillo 2007; and Masset et al. 2012), the positive relationship between farm (and specifically, vegetable) diversification and dietary diversity is not linear and is situation-specific. For instance, in rural Malawi where subsistence production dominates, production diversity is positively associated with dietary diversity, but the effect size is small (Koppmair et al. 2017).

Data from smallholder households in four developing countries (Indonesia, Kenya, Ethiopia, and Malawi) show that in situations where production diversity is already high, the effect on dietary diversity is insignificant due to foregone revenues from diversification beyond what is optimal (Sibhatu, et al 2015). Hence, recent studies suggest the larger importance of market access and/or market engagement than production diversity per se (Hirvonen & Hoddinott 2017; Koppmair et al. 2017; Sibhatu et al. 2015; Stifel & Minten 2017). Closer proximity to nearby food markets allows households to buy a wider variety of food than what they produce in their farm, and sell goods and products bringing in income to remain afloat for the next production season. Eventually, this income from market engagement can also improve the determinants of nutritional outcomes, for instance, dietary food intake, health status, sanitation, and caring practices (Darrouzet-Nardi and Masters 2015).

This study applies a comprehensive and novel research methodology that incorporates gender, nutrition and food security, maternal care, farm production, food choice motivations, anthropometry, and ethnicity in its survey design to measure the associations

between smallholder vegetable production and nutritional outcomes. To date, it is the first study to investigate the contribution of smallholder vegetable production in the province using several cross-culturally validated instruments, like the modified Food Choice Questionnaire (FCQ) and the Abbreviated-Women's Empowerment in Agriculture Index (A-WEAI). It provides new understanding about ethnic communities in Lao Cai province, and how future intervention programs can be tailored specifically for these communities.

5.5 Potential implications of key findings

This study confirms existing evidence about the factors that are considered crucial in addressing childhood undernutrition. Income from market participation is an important predictor of improvements in both dietary diversity and nutritional outcomes. Therefore, encouraging farmers to participate, by creating and/or improving existing market linkages in the locality, so that farmers' transaction costs are minimized, should be integrated in any future intervention programs. The success of linking farmers with markets can only be sustained if there is continued support from local agricultural extension offices in providing farmers with cost-effective, time- and input-saving agronomic practices. Further, farmers should have access to inputs and microfinance, market opportunities and price information, knowledge of consumer preferences, better roads, and other infrastructure.

Aside from increasing income, for rural households who could only be engaged in subsistence production due to resource constraints (labour, land and other factors), and therefore whose main objective is only to produce crops primarily for home consumption, encouraging them to diversify their vegetable production can also improve children's nutrition outcomes (improve HAZ of girls and reduce the probability of wasting of boys).

In addition, education promotion especially among the Mong ethnic minority group is warranted because educational attainment has proven to be a significant predictor of both dietary diversity and nutritional outcomes in children. As discussed in the Introduction (Sec 1.8.1), mothers' (who are normally the main food preparers) ability to select and spend on diverse food for the family, their educational level, and their nutritional knowledge are strong predictors in reducing childhood undernutrition and ensuring the effectiveness of food-based interventions (Berti et al. 2004; Girard et al. 2012; Kawarazuka & Bene 2010; Leroy & Frongillo 2007; Smith & Haddad 2000). Therefore, encouraging girls' schooling is an important step since school curricula may include information on balanced diets and nutrition that they can imbibe and inculcate in their immediate families, and, eventually, in their future offspring.

For mothers and/or food preparers, a nutrition education program, which incorporates several things, could be promoted. Firstly, it should highlight the benefits of diversified diets, and better maternal childcare and feeding practices. The latter starts when they participate in decision-making over the use of income and/or having a workload less than 10.50 hours per day; this workload is the marker of poverty. Secondly, nutrition education programs could subtly include how preferential treatment of sons, culturally entrenched in the Mong culture (Jones et al. 2014), adversely affects young girl's health and development, leading to an intergenerational cycle of undernutrition (Branca et al. 2015; Walker et al. 2015). Lastly, a nutrition education program could be packaged according to households' locations, based on the geographic stratification in this study, because our results show that children in certain geographic strata fare better than others. For instance, young children in HV-HA have better dietary diversity and reduced probability of stunting compared to those in LV-LA, although altitude can increase the prevalence of

wasting. This is possibly due to the high concentration of 'Health-conscious' households in high elevation-high vegetable production density per capita area compared to the low-lying, low vegetable production density per capita areas.

5.6 Limitations

This study has limitations that should be considered. The results are based on cross-sectional data focusing on rural smallholder households from four districts in Lao Cai province. The study sample included a relatively high share (93%) of ethnic minority households and, as such, the results are not representative of the general Vietnamese population. Further, because of the cross-sectional nature of the data, we are unable to capture variations in household behaviour over time.

The mean dietary diversity scores in Chapter 2 are not comparable with previous studies in Vietnam. The dietary diversity score in this study is calculated using the 14 food groups in the Vietnamese Food Composition Table 2007 edition (Ministry of Health & NIN 2007). Other studies have used seven and nine food group classification of the FAO (Kennedy et al. 2011) and the WHO Infant and Young Child Feeding (IYCF) module (WHO et al. 2010) (e.g. Humphries et al. 2017; Nguyen et al. 2013).

This thesis also did not adequately address the potential endogeneity problems of the main variables of interest (vegetable production diversity, market participation, and the four women's empowerment indicators) due to the absence of strong instruments in Chapter 2. Chapter 3 used a relatively small number of observations, preventing the analyses to be disaggregated by age group. These limitations, therefore, point to the recommendations for further research outlined in the next section.

5.7   Further research

Further research on dietary quality is advised to show how it positively affects child nutritional outcomes. Analyses could be improved by conducting micronutrient adequacy analysis on all the food items included in the calculation of dietary diversity scores, to ascertain if macronutrient and micronutrient adequacies are strong predictors of a child's nutritional outcomes. Similarly, the analyses could be extended by comparing the existing dietary diversity indicator with other dietary quality indicators, for instance, the Healthy Food Diversity Index (HFD-i) or Food Consumption Score (FCS). The analyses could also be extended by using other statistical estimation strategies like the reduced rank regression (RRR) to investigate how diet is related to disease risk, or by using different food groups based on the limitations mentioned previously to allow comparison with other studies. The current definitions of the DDS and vegetable production diversity may be too broad, and exploring the use of other count measures that disaggregate vegetables into different sub-groups may show better positive associations. This is because the number may only be equally important to the type of vegetables cultivated given different nutritional characteristics.

Also, since this study finds a weak association between dietary quality and women's empowerment, further research is encouraged to assess the contributions of women's empowerment on dietary quality using different statistical estimation techniques and considering men's and joint (men's and women's) contributions to dietary quality. Integrating a gendered analysis of men's and women's empowerment may provide more meaningful insights on tackling household food security. Further research is also encouraged to investigate the quality of maternal care-giving practices in the province because this has important implications, especially for stunting outcomes among girls.

Analyses could also be extended to show the link between market access and vegetable production, exploring the diversity, type, and nutritional characteristics of vegetables cultivated as a household gains access to food markets. Further research could also be explored to assess if the same results on dietary diversity and child nutritional indicators would occur if the household grew more fruit or pulses, among others. Future studies could also investigate the barriers to vegetable production in the province.

Finally, future studies using more observations, and longitudinal or panel data, are encouraged to ascertain the causal relationships between smallholder vegetable production and children's nutritional outcomes.

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Appendices

Appendix A-1 Human Research Ethics

Appendix A-2 List of study sites

Appendix A-3 Request letter seeking access to list of households in the commune

Appendix A-4 Commune-Village Questionnaire

Appendix A-5 Training Manual

Appendix A-6 Survey Questionnaire (paper version)

Appendix A-7 First-stage regression results

Appendix A-8 Copyright permission from NIN

A-1   Human Research Ethics

a. Approval Letter (H-2015-159)

THE UNIVERSITY of ADELAIDE

RESEARCH BRANCH
OFFICE OF RESEARCH ETHICS, COMPLIANCE
AND INTEGRITY

LEVEL 7, 115 GRENFELL STREET
THE UNIVERSITY OF ADELAIDE
SA 5005 AUSTRALIA

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CRICOS Provider Number 00123M

24 July 2015

Dr S Newman
School: Global Food Studies

Dear Dr Newman

ETHICS APPROVAL No: **H-2015-159**

PROJECT TITLE: **Towards more profitable and sustainable vegetable farming systems in north-western Vietnam**

The ethics application for the above project has been reviewed by the Low Risk Human Research Ethics Review Group (Faculty of Arts and Faculty of the Professions) and is deemed to meet the requirements of the *National Statement on Ethical Conduct in Human Research (2007)* involving no more than low risk for research participants. You are authorised to commence your research on **24 Jul 2015**.

Ethics approval is granted for three years and is subject to satisfactory annual reporting. The form titled *Annual Report on Project Status* is to be used when reporting annual progress and project completion and can be downloaded at http://www.adelaide.edu.au/ethics/human/guidelines/reporting. Prior to expiry, ethics approval may be extended for a further period.

Participants in the study are to be given a copy of the Information Sheet and the signed Consent Form to retain. It is also a condition of approval that you **immediately report** anything which might warrant review of ethical approval including:

- serious or unexpected adverse effects on participants,
- previously unforeseen events which might affect continued ethical acceptability of the project,
- proposed changes to the protocol; and
- the project is discontinued before the expected date of completion.

Please refer to the following ethics approval document for any additional conditions that may apply to this project.

Yours sincerely

PROFESSOR RACHEL A. ANKENY
Co-Convenor
Low Risk Human Research Ethics Review Group
(Faculty of Arts and Faculty of the Professions)

PROFESSOR PAUL BABIE
Co-Convenor
Low Risk Human Research Ethics Review Group
(Faculty of Arts and Faculty of the Professions)

Applicant: **Dr S Newman**

School: **Global Food Studies**

Project Title: Towards more profitable and sustainable vegetable
                      farming systems in north-western Vietnam

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The University of Adelaide Human Research Ethics Committee
Low Risk Human Research Ethics Review Group (Faculty of Arts and Faculty of the Professions)

ETHICS APPROVAL No: H-2015-159   **App. No.: 0000019950**

APPROVED for the period: 24 Jul 2015 to 31 Jul 2018

Thank you for your responses dated 01.07.2015 and 20.07.2015 to the matters raised.

This study is to be undertaken by Christian Genova II, PhD candidate.

PROFESSOR RACHEL A. ANKENY   PROFESSOR PAUL BABIE
Co-Convenor   Co-Convenor
Low Risk Human Research Ethics Review Group   Low Risk Human Research Ethics Review Group
(Faculty of Arts and Faculty of the Professions)   (Faculty of Arts and Faculty of the Professions)

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b. Participant Information Sheet and Consent Form

PARTICIPANT INFORMATION SHEET (Survey)
THÔNG TIN THAM GIA NGHIÊN CỨU (Phỏng vấn)

PROJECT TITLE: Towards more profitable and sustainable vegetable farming systems in north-western Vietnam (AGB/2012/059)
PRINCIPAL INVESTIGATOR: Dr. Suzie Newman
STUDENT RESEARCHER: Christian Genova II
STUDENT'S DEGREE: PhD
TÊN DỰ ÁN: Xây dựng hệ thống sản xuất – kinh doanh rau hiệu quả, bền vững khu vực Tây Bắc Việt Nam (AGB/2012/059)
NGƯỜI HƯỚNG DẪN NGHIÊN CỨU: Ts. Suzie Newman
NGƯỜI THỰC HIỆN NGHIÊN CỨU: Christian Genova II
TRÌNH ĐỘ NGHIÊN CỨU: TIẾN SỸ

Dear Participant,
Kính gửi Ông/ Bà,

You are invited to participate in the research project described below.
Ông/ Bà được đề nghị tham gia một cuộc nghiên cứu khảo sát mô tả dưới đây.

What is the project about?
Giới thiệu về dự án nghiên cứu?
The project aims to enhance the profitability and sustainability of smallholder vegetable farmers in north western Vietnam through improved market engagement and integrated resource and disease management practices. In this regard, the project will analyse the composition of food demand including consumption of specific vegetables, quantity, variety, and prices paid for each product, location typically purchased, diet quality and dietary diversity, and changes in consumption over a 3 and 5 year time period; respondents' knowledge, attitudes, and practices regarding food quality and nutrition attributes in vegetable purchases; and respondents' preferences regarding different types of retail food outlets for purchasing vegetables and other food products.
Dự án nghiên cứu này nhằm nâng cao lợi nhuận và tính bền vững của các nông hộ trồng rau quy mô nhỏ khu vực Tây Bắc Việt Nam thông qua cải thiện sự tham gia thị trường, lồng ghép nguồn lực và các phương pháp quản lý dịch bệnh. Về vấn đề này, nghiên cứu sẽ phân tích cơ cấu của nhu cầu thực phẩm bao gồm sự tiêu thụ của các loại rau cụ thể, khối lượng, chủng loại và giá cho từng loại sản phẩm, nơi thường xuyên mua, chế độ dinh dưỡng và tính đa dạng của khẩu phần ăn, và sự thay đổi trong việc tiêu dùng trong giai đoạn 3 tới 5 năm; kiến thức, thái độ và cách thực hành của người được phỏng vấn đối với chất lượng thực phẩm và các thuộc tính dinh dưỡng khi mua rau; và sở thích tiêu dùng của người được phỏng vấn về các hình thức bán lẻ khi mua rau và các loại thực phẩm khác.

Who is undertaking the project?
Những người thực hiện nghiên cứu?
This project is being conducted by Mr. Christian Genova II, Dr. Suzie Newman, Dr. Wendy Umberger and Dr. Dale Yi. This research will form the basis for the degree of PhD in Global Food Studies at the University of Adelaide in Australia under the supervisions of Dr. Wendy Umberger and Dr. Suzie Newman. Our partners for this research include the Vietnam Women's Union (VWU), Fruit and Vegetable Research Institute (FAVRI), Soils and Fertilizers Research Institute (SFRI), National Institute of Medicinal Materials (NIMM), Institute of Policy and Strategy in Agriculture and Rural Development

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(IPSARD), Vietnam National University of Agriculture (VNUA), and the Plant Protection Sub-Department (PPsD) of Lao Cai province. This research project is funded by the Australian Centre for International Agricultural Research (ACIAR).

Dự án nghiên cứu được thực hiện bởi ông Christian Genova II, Ts. Suzie Newman, Ts. Wendy Umberger và Ts. Dale Yi. Nghiên cứu này phục vụ cho chương trình tiến sỹ của Khoa Lương thực Thế Giới trường Đại học Adelaide Úc dưới sự hướng dẫn của Ts. Wendy Umberger và Ts. Suzie Newman. Các đối tác trong dự án nghiên cứu này bao gồm Trung ương Hội liên hiệp Phụ nữ Việt Nam, Viện Nghiên cứu Rau Quả, Viện Thổ nhưỡng Nông hóa, Viện Dược liệu Trung ương, Viện Chính sách và Chiến lược Phát triển nông nghiệp, Học viện Nông nghiệp Việt Nam, và Chi cục Bảo vệ thực vật tỉnh Lào Cai. Dự án nghiên cứu này được tài trợ bởi Trung tâm Nghiên cứu Nông nghiệp Quốc tế Úc.

Why am I being invited to participate?
Vì sao Ông/ Bà được mời tham gia nghiên cứu này?

You have been randomly selected as one of our target households to interview in Lao Cai and other provinces in NW Vietnam and Hanoi.

Ông/ Bà được lựa chọn ngẫu nhiên là một trong số các hộ để phỏng vấn tại tỉnh Lào Cai và các tỉnh ở khu vực Tây Bắc Việt Nam và Hà Nội.

What will I be asked to do?
Ông/ Bà sẽ được hỏi những gì?

You will be asked a series of questions related to your food consumption habits. We would also like to get height and weight measurements for each member of your household. Pending you agree, the interview will be done in your house by our local enumerators. We may also ask to take some photographs or record the interviews. This would only be done to illustrate the data collection procedure and to recall information provided by you during the interview. Participation in this survey is entirely voluntary and you have the right to refuse participation or answer any question. In addition, we will separately request consent to take pictures or record interviews. If you agree to participate, please kindly sign our consent form, which will allow us to use the information you will provide for research and teaching purposes.

Ông/ Bà sẽ trả lời những câu hỏi có liên quan đến thói quen tiêu dùng thực phẩm. Ngoài ra, chúng tôi sẽ tiến hành đo chiều cao và cân nặng của từng thành viên trong gia đình Ông/ Bà. Khi nhận sự đồng ý của Ông/ Bà, cuộc phỏng vấn sẽ được thực hiện tại nhà của Ông/ Bà bởi các nghiên cứu viên địa phương của chúng tôi. Chúng tôi có thể yêu cầu được chụp ảnh và ghi âm lại cuộc phỏng vấn nhằm giúp cho quá trình thu thập dữ liệu và hỗ trợ những thông tin được cung cấp bởi Ông/ Bà trong cuộc phỏng vấn. Tham gia cuộc phỏng vấn là hoàn toàn tự nguyện và Ông/ Bà có quyền được từ chối tham gia hoặc trả lời. Ngoài ra, chúng tôi sẽ có sự yêu cầu riêng về việc chấp thuận chụp ảnh hoặc ghi âm. Nếu Ông/ Bà đồng ý tham gia, xin vui lòng ký vào đơn đồng ý tham gia của chúng tôi, và điều này sẽ cho phép chúng tôi được sử dụng thông tin mà Ông/ Bà cung cấp cho mục đích nghiên cứu và giảng dạy.

How much time will the project take?
Nghiên cứu này sẽ tốn bao nhiêu thời gian?

The interview is expected to last for 1-2 hours. You have the right to stop the interview at any given time, and if you would still like to participate, you may ask us to return at another time / date. No financial remuneration will be given in exchange for your participation.

Cuộc phỏng vấn dự kiến kéo dài từ 1-2 giờ đồng hồ. Ông/ Bà có quyền dừng phỏng vấn bất cứ thời điểm nào, và nếu Ông/ Bà vẫn muốn tham gia, Ông/ Bà có thể yêu cầu chúng tôi quay lại vào một khoảng thời gian khác. Không có các khoản hỗ trợ tài chính cho việc tham gia của Ông/ Bà.

Are there any risks associated with participating in this project?
Có những rủi ro gì liên quan đến việc tham gia nghiên cứu này?

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We do not foresee any risks that may arise during the interview process. However, it is possible that you may be uncomfortable responding to certain questions that may be too personal or of no interest to you, or you may feel exhausted during the course of the interview. If any of these situations arise, please inform the enumerator.

Chúng tôi không lường trước được những rủi ro có thể phát sinh trong quá trình phỏng vấn. Tuy nhiên, có thể là Ông/ Bà cảm thấy không thoải mái khi trả lời các câu hỏi thuộc về riêng tư hoặc không có lợi cho Ông/ Bà, hoặc Ông/ Bà cảm thấy mệt mỏi trong quá trình phỏng vấn. Nếu bất cứ trường hợp nào trên đây xảy ra, xin vui lòng thông báo cho các nghiên cứu viên.

What are the benefits of the research project?
Lợi ích khi tham gia nghiên cứu?

Your participation in our research can help us to project changes in preferences and purchasing patterns with changes in income and urbanization that are expected over the next 10-20 years. We will also be able to conduct market segment analyses and understand drivers of demand for different vegetables, vegetable varieties and quality attributes by market segment. We also aim to understand how household diets and nutrition differ across households, and how fruit and vegetable production leads to improved diet quality.

Sự tham gia của Ông/ Bà trong nghiên cứu này sẽ giúp chúng tôi dự báo sự thay đổi trong sở thích và xu hướng tiêu dùng với sự thay đổi trong thu nhập và quá trình đô thị hóa trong vòng từ 10-20 năm tới. Chúng tôi có thể tiến hành phân tích về phân khúc thị trường và hiểu được điều gì tác động đến nhu cầu của các loại rau khác nhau, giống rau và các thuộc tính chất lượng cho từng loại thị trường. Chúng tôi cũng hướng đến tìm hiểu cách khẩu phần ăn và dinh dưỡng giữa các hộ gia đình lại khác nhau, và việc tự sản xuất rau, quả liệu có thể nâng cao chất lượng khẩu phần ăn.

Can I withdraw from the project?
Ông/ Bà có thể rút khỏi nghiên cứu được không?
You can withdraw from the project at any time.
Ông/ Bà có thể rút khỏi nghiên cứu bất cứ thời gian nào.

What will happen to my information?
Điều gì sẽ xảy ra với thông tin của Ông/ Bà?

All information you provide will be stored confidentially at the University for a minimum of 5 years and will only be accessible to the core research team. The data will be analysed, aggregated and published in journals and presented in conferences. Any information that may identify you, including audio and video recordings, and photographs, will only be used with your consent. We may provide you a copy of the report should you wish to receive one for your personal reference depending on availability.

Toàn bộ thông tin Ông/ Bà cung cấp sẽ được lưu trữ bảo mật tại Đại học Adelaide trong vòng ít nhất 5 năm và sẽ chỉ được cung cấp cho nhóm nghiên cứu chính. Dữ liệu sẽ được phân tích, tổng hợp và công bố trên các tạp chí và trình bày tại các hội nghị. Bất cứ thông tin nào có thể nhận dạng, bao gồm băng ghi âm và ghi hình, tranh ảnh, sẽ chỉ được sử dụng với sự cho phép của Ông/ Bà. Chúng tôi có thể cung cấp cho Ông/ Bà một bản sao của báo cáo nếu Ông/ Bà muốn nhưng điều này phụ thuộc vào sự sẵn có của tài liệu.

Who do I contact if I have questions about the project?
Ông/ Bà liên hệ với ai nếu có câu hỏi liên quan đến nghiên cứu này?

Dr. Suzie Newman	Ts. Suzie Newman
Vietnam Women's Union	Hội Liên hiệp Phụ nữ Việt Nam
39 Hang Chuoi, Hanoi Vietnam	39 Hang Chuối, Hà Nội
Mobile: +84 167 643 4799	Số điện thoại: +84 167 643 4799
Email: suzie.newman@adelaide.edu.au	Email: suzie.newman@adelaide.edu.au

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What if I have a complaint or any concerns?
Nếu Ông/ Bà có sự than phiền gì thì làm sao?

The study has been approved by the Human Research Ethics Committee at the University of Adelaide in Australia (approval number H-2015-159). If you have questions or problems associated with the practical aspects of your participation in the project, or wish to raise a concern or complaint about the project, then you should consult the Principal Investigator. Contact the Human Research Ethics Committee's Secretariat on phone +61 8 8313 6028 or by email to hrec@adelaide.edu.au if you wish to speak with an independent person regarding concerns or a complaint, the University's policy on research involving human participants, or your rights as a participant. Any complaint or concern will be treated in confidence and fully investigated. You will be informed of the outcome.

Nghiên cứu đã được chấp thuận bởi Ủy ban Đạo đức Nghiên cứu Con người của trường Đại học Adelaide tại Úc (số xác nhận H-2015-159). Nếu Ông/ Bà có câu hỏi hoặc thắc mắc liên quan đến việc tham gia trong dự án nghiên cứu, hoặc bày tỏ sự quan tâm hoặc khiếu nại về nghiên cứu, Ông/ Bà nên tham khảo ý kiến của người phụ trách nghiên cứu. Liên hệ với thư ký của Uỷ ban Nghiên cứu Đạo đức Con người theo số điện thoại +61 8 8313 6028 hoặc qua email hrec@adelaide.edu.au nếu Ông/ Bà muốn trao đổi độc lập về các mối quan tâm hoặc khiếu nại, chính sách của trường Đại học trong nghiên cứu liên quan đến tham gia của con người, hoặc các quyền cá nhân như một người tham gia chương trình. Bất kỳ khiếu nại hoặc quan tâm sẽ được giữ kín và xử lý đầy đủ. Ông/ Bà sẽ được thông báo về kết quả.

If I want to participate, what do I do?
Nếu đồng ý tham gia, Ông/ Bà làm gì?

The enumerator will assist you in completing the survey questionnaire. No additional action is required from your end.

Nghiên cứu viên sẽ trợ giúp Ông/ Bà trong quá trình phỏng vấn. Không có yêu cầu nào được đưa ra cho đến khi hoàn thành quá trình điều tra.

Yours sincerely,
Trân trọng,

Dr. Suzie Newman
Project Manager
Giám đốc Dự án

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CONSENT FORM
GIẤY CHẤP NHẬN THAM GIA NGHIÊN CỨU

1. I have read the attached Participant Information Sheet and agree to take part in the following research project:
   Tôi đã đọc tờ Thông tin Tham gia Phỏng vấn và đồng ý tham gia vào dự án nghiên cứu:

Title: *Tên dự án:*	Towards more profitable and sustainable vegetable farming systems in north-western Vietnam (AGB/2012/059) *Xây dựng hệ thống sản xuất – kinh doanh rau hiệu quả, bền vững khu vực Tây Bắc Việt Nam (AGB/2012/059)*
Ethics Approval Number: *Số xác nhận:*	H-2015-159

2. I have had the project, so far as it affects me, fully explained to my satisfaction by the research worker. My consent is given freely.
   Tôi đã được các nghiên cứu viên của dự án giải thích một cách đầy đủ theo yêu cầu của tôi, nếu có ảnh hưởng đến tôi. Việc chấp thuận tham gia là hoàn toàn tự nguyện.

3. I have been given the opportunity to have a member of my family or a friend present while the project was explained to me.
   Đã có một thành viên trong gia đình hoặc bạn bè có mặt cùng tôi khi nghe được giải thích về dự án.

4. Although I understand the purpose of the research project it has also been explained that involvement may not be of any benefit to me.
   Mặc dù tôi hiểu mục đích của dự án nghiên cứu, tôi cũng đã được giải thích rằng sự tham gia này có thể không mang lại lợi ích cá nhân cho tôi.

5. I have been informed that, while information gained during the study may be published, I will not be identified and my personal results will not be divulged.
   Tôi cũng đã được thông báo rằng, thông tin được thu thập trong nghiên cứu này có thể được công bố, tôi sẽ không bị nhận dạng và thông tin cá nhân sẽ không bị tiết lộ.

6. I understand that I am free to withdraw from the project at any time.
   Tôi hiểu rằng tôi được quyền rời khỏi dự án nghiên cứu này bất cứ thời gian nào.

7. I agree to the interview being audio/video recorded and photographs taken. Yes ☐   No ☐
   Tôi đồng ý buổi phỏng vấn sẽ được ghi âm/ ghi hình cũng như chụp ảnh lại.   Có ☐   Không ☐

8. I am aware that I should keep a copy of this Consent Form, when completed, and the attached Information Sheet.
   Tôi nhận thức rằng tôi nên giữ một bản photo của giấy chấp nhận tham gia nghiên cứu này, khi hoàn thành, và tờ thông tin tham gia phỏng vấn.

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THE UNIVERSITY *of* **ADELAIDE**

Participant to complete:
Phần dành cho người tham gia phỏng vấn:

Name / *Họ và tên:*   Signature / *Chữ ký:*

_____

Date / *Ngày tháng:*

_____

Researcher/Witness to complete:
Phần dành cho nghiên cứu viên/ người làm chứng:

I have described the nature of the research to _____
Tôi đã mô tả mục đích nghiên cứu cho   (print name of participant) / *(tên của người tham gia phỏng vấn)*

and in my opinion she/he understood the explanation.
và theo ý kiến cá nhân của tôi thì Ông/ Bà hiểu được phần giải thích này.

Signature / *Chữ ký:*   Position / *Công việc:*

_____

Date / *Ngày tháng:*

_____

A-2   List of study sites

No	District	Commune	Stratum[a]	Village	
D1	Bac Ha	*Tả Vạn Chư*	HV-HA	*Sử Mần Khang*	*Nhiều Cồ Ván B*
				Lao Chải	*Pù Chù Ván*
		Thải Giảng Phố	HV-LA	*Sân Bay 2*	*Ngài Ma*
				Sản Chư Ván	*Sán Sả Hồ*
		Bản Phố	HV-LA	*Làng Mới*	*Quán Dìn Ngài*
				Phéc Bủng 1	*Kháo Sáo*
		Na Hối	HV-HA	*Na Hối Nùng*	*Dì Thàng 2*
				Na Áng A	*Ngải Thầu*
				Dì Thàng 1	
D2	Sa Pa	*Sa Pa Town*	HV-HA	*11B*	*12*
		Tả Giàng Phình	HV-HA	*Suối Thầu 2*	*Móng Xóa*
				Lao Chải (Lao Trải)	*(Mông Xáo)*
					Cửa Cải
		Trung Chải	HV-LA	*Sín Chải (Xín Chải)*	*Mống Sến II (Mống Xến)*
				Vù Lùng Sung	*Chu Lìn 2*
D3	Muong Khuong	*Pha Long*	LV-HA	*Pao Chải*	*Nì Xỉ 4*
				Suối Thầu	*Lao Mao Chải*
		Tả Ngải Chồ	LV-HA	*Sừ Ma Tủng B*	*Lùng Vùi*
				Thàng Chư Pến	*Sín Chải B*
		Thanh Bình	LV-LA	*Sín Chải*	*Thính Chéng*
				Nậm Pản	*Lao Hầu*
D4	Si Ma Cai	*Thảo Chư Phìn*	LV-LA	*Hồ Sáo Chải*	*Sán Chả*
				Cẩu Pi Chải	*Sín Pao Chải*
		Si Ma Cai	LV-HA	*Phố Mới*	*Phố Thầu*
				Na Cáng	*Nàng Cảng*
		Sán Chải	LV-LA	*Ngài Pản*	*Seo Khai Hóa*
				Hòa S Pan	*Sín Tần*
	Total	**13**		**51**	

Notes: a/ Communes were categorised according to geographic elevation and vegetable density per capita. Each commune was coded as either low (=1 if <=1335 meters) or high elevation (=2 if >1335m) based on the median elevation 1,335 meters. Vegetable density per capita was calculated using the population and vegetable area (vegetable density per capita = population/vegetable area). Each commune was coded as low (=1 if <=97.57) and high vegetable density per capita (=2 if >97.57) based on the median 97.57. Four strata were created (LV-LA, LV-HA, HV-LA, and HV-HA), and each commune was categorised to a stratum.

A-3   Request letter seeking access to list of households in the commune

Date: 23 May 2016

Name: _____
Designation: Commune Leader
Address: _____
               _____

Dear Sir/Madame:

I am **Mr. Christian Genova**, a PhD student at the University of Adelaide. I am doing a small research project on vegetable producers in Lao Cai province, Vietnam as part of an ACIAR-funded project "Towards more profitable and sustainable farming systems in north-western Vietnam and Australia" (AGB 2012-059). This is led by **Dr. Suzie Newman** from the University of Adelaide and the **Vietnam Women's Union (VWU)**. Helping me on this is ____, a researcher at the ____, which is also one of our project partners in this research.

The aim of this PhD research is to assess the role of small-scale vegetable production on improving household diet quality in Lao Cai province, Vietnam. Lao Cai province is one of the provinces with the highest rate of child malnutrition in the country. To suggest an effective solution to this problem, we want to interview some households in your commune/village to study their dietary intake, access to clean water and sanitation, gender, micronutrient supplementation, among others.

In this regard, we would like to seek permission from your office to have access to the list of households in your commune for us to do random sampling. The list of households will be used for research purposes only, and will not be shared with any other organizations or individuals except the people mentioned in this request letter.

Thank you very much in advance.

Kind regards,   Noted by:

Mr. Christian Genova   **Dr. Suzie Newman**
PhD student   Project Leader
The University of Adelaide   AGB 2012-059

A-4   Commune-Village Questionnaire

This questionnaire was adapted from the Department of Agriculture, Forestry and Fishery Statistics – Ministry of Planning and Investment questionnaire (2006). It was used to collect secondary information on the communes under study in June 2016 prior to the survey implementation in July 2016. The PhD student was assisted by two researchers from the local partner institutions: Pham Mai Huong from the International Centre for Tropical Agriculture (CIAT) and Do Trong Thang from the Soils and Fertiliser Research Institute (SFRI).

Commune (and Village-level) Questionnaire
Bảng hỏi điều tra địa phương (và cấp thôn/ bản)

Basic Information and Infrastructure of Commune
Thông Tin Cơ Bản Và Cấu Trúc Của Xã

Is this a commune or village you are interviewing? *Note: Please tick the appropriate box.*	☐ Commune	☐ Village

Name of respondent		Mobile Number	

Province:
Tỉnh:
District or Town:
Quận, huyện hoặc Thị xã
Commune or Ward
Xã hoặc Phường
Village name:
Thôn, bản

Link to Cover Page for code
Liên kết với trang bìa cho phần mã
Link to Back of Cover Page for code
Liên kết với mặt sau của trang bìa cho phần mã

Part I: Basic Information
Phần I: Thông tin cơ bản

CQ1 GPS coordinates of the commune committee office
Toạ độ GPS của văn phòng uỷ ban xã

Latitude / Vĩ độ — A
Longitude / Kinh độ — B
Elevation (meters) / Độ cao (mét) — C

CQ2 Is the commune categorised as a poor commune under Program 135? *If no, go to CQ4*
Xã có thuộc chương trình 135 không? *Không, chuyển sang CQ4.*
0. no (không)
1. yes (có)

CQ3 What does the commune belong to?

Xã thuộc loại nào dưới đây?

1. "bad off" commune [Xã "đặc biệt khó khăn"]
2. border commune [Xã biên giới]
3. national security commune [Xã an toàn khu]
99. other (specify) [khác (ghi rõ)]

CQ4 Number of villages in the commune
Số thôn, bản của xã — CQ4

CQ5 Total number of households in the commune
Tổng số hộ trong xã — CQ5 households (số hộ)

	CQ6 Yr 2016	CQ7 Yr 2015
Total number of households in the list of poor households in the commune Tổng số hộ thuộc danh sách hộ nghèo trong xã		

CQ8 Total number of people in the commune
Tổng số nhân khẩu trong xã — CQ8 persons (người)

Part II: Electricity, rural roads
Phần II: Điện, đường giao thông nông thôn

CQ9 Number of villages with electricity in the commune
Số thôn, bản có điện trong xã — CQ9

CQ10 Number of villages covered by National Electricity network in the commune
Số thôn, bản có điện lưới Quốc gia — CQ10

CQ11 Are inter-communal roads covered by asphalt/concrete?
Đường liên thôn trong xã có được nhựa, bê tông hoá không?
0. no [không]
1. yes [có]

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Part III: Kindergartens, schools
Phần III: Trường học, giáo dục mầm non

Number of nursery schools, kindergartens, schools in the commune (including private schools)
Số trường phổ thông, mẫu giáo, mầm non trên địa bàn xã (kể cả tư thục)

Code Mã số	Type of school Loại trường	Type Kiểu			Total [CQ13+CQ14+CQ15]
		Permanent Kiên cố	Semi-permanent Bán kiên cố	Other Khác	Tổng số [CQ13+CQ14+CQ15]
CQ12i		CQ13i	CQ14i	CQ15i	CQ16i
1	Nursery school Trường mẫu giáo				
	a. No. of private nursery school a. Trường mẫu giáo tư thục				
2	Kindergarten Trường mầm non				
	a. No. of private kindergarten a. Trường mầm non tư thục				
3	Primary school Trường tiểu học				
4	Junior high school Trường trung học cơ sở				
5	Senior high school Trường trung học phổ thông				

CQ17 Number of villages with a nursery in the commune
Số thôn, bản có lớp mẫu giáo
☐ CQ17

CQ18 Number of villages with a kindergarten in the commune
Số thôn, bản có nhà trẻ
☐ CQ18

CQ19 What is the schooling age for children in the commune?
Tuổi đi học của trẻ con trong xã là bao nhiêu?
☐ CQ19
Years (Tuổi)

Part IV: Other infrastructures in the commune
Phần IV: Cơ sở hạ tầng khác trong xã

Code Mã số	Item Cơ sở hạ tầng	Does the commune have [item]? Trên địa bàn xã có [cơ sở hạ tầng] không? 0. no [không] 1. yes [có]	If yes, how many? Nếu có, số lượng là bao nhiêu? 88888 NA	Number of villages with [item] Số thôn, bản có [cơ sở hạ tầng] 88888 NA
CQ20i		CQ21i	CQ22i	CQ23i
1	Post-office Bưu điện			
2	Private internet provider Điểm dịch vụ internet tư nhân			
3	Commune culture house Nhà văn hoá xã			
4	Cultural village(s) Nhà văn hoá thôn, bản			
5	Library Thư viện			
6	Local radio system that is linked to villages Hệ thống loa truyền thanh đến thôn, bản		■	
7	Local market Chợ địa phương			
8	Local market with permanent/semi-permanent construction Chợ địa phương được xây kiên cố, bán kiên cố			
9	Bank Ngân hàng			
10	People's Credit Fund station Quỹ tín dụng nhân dân			
11	Agricultural product processing plant (rice husking and milling, tea roasting, coffee/cashew processing, animal feed processing, production of rice noodles, chili paste, tomato paste, etc.) Cơ sở chuyên chế biến nông sản (xay xát lúa, sao sấy chè, chế biến cà phê, hạt điều, thái nghiền thức ăn gia súc, làm bún, miến, tương ớt…)			

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12	Forestry product processing establishments (production of rattan and bamboo handicrafts, carved/engraved wooden products, etc.) Cơ sở chuyên chế biến lâm sản (làm mây, tre đan, đóng đồ mộc, chạm khắc, khảm đồ gỗ, chế biến cánh kiến, chế biến nhựa thông…)			
13	Aquacultural product processing establishments (production of fish sauce, processing of frozen fishery products, etc.) Cơ sở chuyên chế biến thủy sản (làm mắm các loại, chế biến thuỷ sản đông lạnh, ….)			
14	Agriculture forestry cooperative HTX nông, lâm nghiệp			
15	Aquaculture cooperative HTX thuỷ sản			
16	Industrial cooperative HTX công nghiệp			
17	Construction cooperative HTX xây dựng			
18	Commercial cooperative HTX thương nghiệp			
19	Transportation cooperative HTX vận tải			
20	Other type of cooperative Các loại hình HTX khác			

Note: These should all be in operation and active as of 30 April 2016.
Ghi chú: Tổ hợp tác đang hoạt động tính đến thời điểm 30/04/2016

Part V: Irrigation, Agriculture, Forestry, Fishery Extension, Veterinary Services
Phần V: Thuý lợi, khuyến nông, lâm, ngư, thú y

CQ24 Length of irrigation channels under commune or cooperative management (km)
Tổng chiều dài kênh mương thủy lợi do xã/HTX quản lý (km) ☐ CQ24 km

CQ25 Number of pump stations in the commune
Số trạm bơm nước trên địa bàn xã ☐ CQ25 unit (đơn vị)

Code Mã số	Item Loại	Total Tổng số	% female % nữ
CQ26i		CQ27i	CQ28i
1	Number of extension officers in agriculture, forestry, aquaculture of commune (excluding freelance contractors) Số cán bộ khuyến nông, lâm, ngư của xã (không kể cộng tác viên)		
2	Number of villages having agriculture, forestry, fishery extension freelance contractors Số thôn, bản có cộng tác viên khuyến nông, lâm, ngư		▉
3	Number of veterinary officers in the commune Số cán bộ thú y của xã		
4	Number of villages having veterinary officers Số thôn, bản có cán bộ thú y		▉
5	Number of private service veterinary officers in the commune Số người trong xã hành nghề thú y tư nhân		

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Agriculture and livestock production in the 12 months
Tình hình trồng trọt và chăn nuôi trong vòng 12 tháng qua

Code Mã số	Crop/Livestock Cây trồng/ Vật nuôi	Ave. price Giá bình quân	Unit of measure Đơn vị tính	Ave. yield Năng suất bình quân
		in '000 VND nghìn đồng		in t/ha tấn/ ha
			1. kg [kg] 2. ton [tấn] 3. no. of heads [sl. vật nuôi] 99. other (specify) [khác (ghi rõ)]	
CQ29i		CQ30i	CQ31i	CQ32i
	A. Staples and pulses:			
1	1 rice			
2	2 maize			
3	3 sweet potato			
4	4 cassava			
5	5 peanuts			
6	6 soybeans			
10	10 beans			
	B. Vegetables:			
11	11 bamboo shoot			
12	12 cabbage			
13	13 cauliflower			
14	14 celery			
15	15 chayote (fruit)			
16	16 chayote (leaves)			
17	17 chilli			
18	18 choy sum			
19	19 chrysanthemum			
20	20 cucumber			
21	21 garlic			
22	22 ginger			
23	23 green onion (leaves)			
24	24 green onion (bulb)			
25	25 kangkong			
26	26 kohlrabi			
27	27 lettuce			
28	28 mustard			
29	29 potato			
30	30 pumpkin (leaves)			
31	31 pumpkin (fruit)			
32	32 radish			
33	33 snow pea			
34	34 sweet potato leaves			
35	35 tomato			
36	36 watercress			
37	37 cardamom			
38	38 onion			
51	51 *bap cai xoe*			
52	52 *cai meo*			
53	53 *khoi tu*			
54	54 *rau bi*			
55	55 *rau cai*			
56	56 *rau đắng*			
57	57 *rau đay*			
58	58 *rau dền*			
59	59 *rau mồng tơi*			
60	60 *rau ngót*			
61	61 *tang ki*			
62	62 *tia to*			
	C. Fruits:			
101	101 apple			
102	102 mong apple			
103	103 banana			
104	104 kiwi fruit			
105	105 litchi			
106	106 longan			
107	107 orange			
108	108 peach			
109	109 pear (Asian)			
110	110 pineapple			
111	111 plum			
	D. Other crops:			
151	151 tobacco			
152	152 tea			
153	153 artichoke			
99	99 other (specify)			

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Code Mã số	Crop/Livestock Cây trồng/ Vật nuôi	Ave. price Giá bình quân	Unit of measure Đơn vị tính	Ave. yield Năng suất bình quân
		in '000 VND nghìn đồng		in t/ha tấn/ ha
			1. kg [kg] 2. ton [tấn] 3. no. of heads [sl. vật nuôi] 99. other (specify) [khác (ghi rõ)]	
CQ1i		CQ2i	CQ3i	CQ4i
	E. Marine animals:			
154	Fish			
155	Shrimp			
99	Other (specify)			
	F. Livestock and other animals:			
156	1. buffalo (trâu)			
157	2. cow (bò)			
158	a. dairy/milking (lấy sữa)			
159	b. beef (all ages) (lấy thịt (của tất cả các lứa tuổi))			
160	3. pig (lợn)			
161	4. chicken (gà)			
162	5. duck (vịt)			
163	6. goose (ngỗng)			
164	7. goat (dê)			
165	8. horse (ngựa)			
166	9. dog (chó)			
99	99. other (specify) (khác (ghi rõ))			

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Labor prices in the last 12 months for different agricultural activities (in '000 VND/person-day)
Giá lao động trong vòng 12 tháng qua ở các hoạt động nông nghiệp khác nhau (tính trên nghìn đồng/ngày-người)

Code	Activity	With meals	No meals	Adjustment/unit
		999 don't know	999 don't know	
CQ33i		CQ34i	CQ35i	CQ36i
1	Seedling preparation Chuẩn bị giống			
2	Land preparation Làm đất			
3	Direct seeding/transplanting Gieo hạt/ cấy			
4	Mulching Phủ rơm (trên đất)			
5	Trellising Dựng giàn giáo hoặc hàng rào			
6	Application of animal manure/ compost Bón phân hữu cơ/ phân ủ			
7	Application of inorganic fertilizers Bón phân vô cơ			
8	Application of foliar fertilizers Bón phân bón lá			
9	Application of insecticides Phun thuốc diệt côn trùng			
10	Application of fungicide Phun thuốc diệt nấm			
11	Application of herbicides Phun thuốc diệt cỏ			
12	Application of organic/bio pesticide Phun thuốc trừ sâu hữu cơ/ sinh học			
13	Manual pest/insect removal Bắt sâu/ côn trùng bằng tay			
14	Watering/Irrigation Tưới nước/ Thuỷ lợi			
15	Weeding Nhổ cỏ			
16	Harvesting (record % share if paid in terms of crop share) Thu hoạch (ghi lại % nếu được trả theo tỷ lệ các loại cây trong tổng chi phí)			
17	Threshing (record % share if paid in terms of crop share) Đập, tách hạt (Ghi rõ % nếu được trả theo tỷ lệ các loại cây trồng trong tổng chi phí)			
18	Postharvest (drying, milling, hauling, packaging, transporting, etc.) Hoạt động sau thu hoạch (phơi/ sấy, xay/ nghiền/ kéo/ đóng gói/ vận chuyển,..)			
19	Rearing of livestock and other animals Chăm sóc gia súc, gia cầm và các loại động vật khác			
20	Aquaculture operation (construction/modification, fertilization, stocking, feeding, harvesting) Các hoạt động ngư nghiệp (xây dựng/sửa chữa, nhân giống, dự trữ, thả thức ăn và đánh bắt)			
99	Others (specify) Khác (ghi rõ)			

Part VI: Health Care, Purified Water, Environment, Sanitation
Phần VI: Y tế, Nước sạch, Vệ sinh Môi trường

Code Mã số	Facility/Personnel Cơ sở/ Nhân sự	Does the commune have [facility/ personnel]? Trong xã có [cơ sở/ nhân sự]? 0. no [không] 1. yes [có]	If yes, how many? Nếu có, số lượng bao nhiêu? 999 don't know [không biết] 88888 NA [không áp dụng]	% female % nữ 999 don't know [không biết] 88888 NA [không áp dụng]
CQ37i		CQ38i	CQ39i	CQ40i
1	Hospital Bệnh viện			
2	Commune health clinic Trạm xá			
3	Private health care centre Phòng khám tư nhân			

4	Doctor Bác sỹ			
5	Nurse Y tá			
6	Pharmacist Dược sỹ			
7	Other health care officials Nhân viên y tế khác			
8	Common purified water supply tower Công trình cấp nước sinh hoạt			
9	Piped metered water connection Hệ thống đường ống nước			
10	Sewage drainage system Hệ thống thoát nước thải			
11	Trash and litter collection team Người đi thu gom rác thải			

CQ41 Number of villages with health care personnel in the commune
Số thôn, bản có cán bộ y tế trong xã   ☐ CQ41

CQ42 Number of villages with sewage drainage system in the commune
Số thôn, bản có hệ thống thoát nước thải   ☐ CQ42

CQ43 Type of garbage treatment used in the commune   ☐
Xử lý rác thải chủ yếu bằng cách nào sau đây

0. none [không làm gì cả]
1. burned [đốt]
2. buried [chôn lấp]
3. transported to common waste-damp
[Chuyển đến bãi rác tập trung]
99. other (specify) [khác (ghi rõ)]
999. don't know [không biết]

Part VII: Institutions that implemented projects in the community from 2013 until present (30 April 2016)
Phần VII: Các tổ chức đó thực hiện các dự án cộng đồng từ năm 2013 đến nay (30/04/2016)

Code Mã số	Name of institution Tên tổ chức	Name of project Tên dự án
CQ44i	CQ45i	CQ46i
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		

Part VIII: Extreme weather events
Part VIII: Các hiện tượng thời tiết cực đoan

CQ47 Were there extreme weather events during 2013-present (30 April 2016) like heavy rains, drought,
strong winds, snow, hail, etc. that affected the community's agricultural and livestock production?
Đã xảy ra trường hợp có các hiện tượng thời tiết cực đoan từ 2013-nay (30/04/2016) như mưa lớn,
hạn hán, gió mạnh, tuyết, mưa đá… ảnh hưởng đến sản xuất nông nghiệp và chăn nuôi của địa
phương?
If no, FINISH. (Nếu không, KẾT THÚC.)

☐ 0. no (không)
1. yes (có)

If yes, what were these weather events and what year did you experience them?
Nếu có, các hiện tượng thời tiết này là gì và chúng xảy ra trong những năm nào?

Code Mã số	Weather event Hiện tượng thời tiết	Year Năm
CQ48i	CQ49i	CQ50i
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

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A-5   Training Manual

This version is an instruction manual for the paper-based survey questionnaire that was finalised in April 2016. Some of the instructions may not apply in the final questionnaire (Appendix A-6) after several modifications from the Training of Enumerators in July 2016. The overall structure, however, remains the same.

Training Manual

General guidelines for conducting the survey questionnaire
Survey of rural households in Lao Cai province, Vietnam

Introduction

This research is a small component of the AGB/2012/059 "Towards more profitable and sustainable vegetable farming systems in north-western Vietnam and Australia" funded by the Australian Centre for International Agricultural Research (ACIAR). Christian Genova, a PhD student at the Centre of Global Food and Resources, University of Adelaide in Australia, is undertaking this research. The purpose is to look at the relationship between vegetable production and diet quality, on whether or not increased household vegetable production leads to increased vegetable consumption, which in turn leads to improved household nutritional outcomes. The emphasis is on ethnic minorities.

The survey covers 510 households in four selected districts (Bac Ha, Si Ma Cai, Muong Khuong and Sa Pa) in the province. This research builds on the information collected by the Vietnam National University of Agriculture (VNUA), supplementing the detailed baseline farm production information with other factors that have been found to be causing poor diets leading to higher incidence of child undernutrition. These information will be helpful in explaining why households in these areas have poor diets and what actions can be implemented especially targeted to the most vulnerable groups – ethnic minorities, women and children.

This general guideline is organised as follows:
- A. Quality control measures
- B. Consent
- C. Survey instrument: Questionnaire descriptors and specific instructions

A. Quality control measures

These are methods and procedures to ensure that data are collected with minimal levels of error and inconsistencies.

Development of survey instrument. The survey questionnaire was developed by the PhD student in consultation with the PhD supervisors at the University of Adelaide in Australia. Its main purpose is to look at the relationship between vegetable production and diet quality, on whether or not increased household vegetable production leads to increased vegetable consumption, which in turn leads to improved household nutritional outcomes. It will also identify the other factors that may be causing the high incidence of child malnutrition.

Definition of terms. Because there are many different topics included in the questionnaire, take heed of definitions of specific terms, which are included in the Notes section. For instance, Micronutrient Day.

> *Micronutrient Day is an activity conducted twice a year at commune health clinics (CHC) in Vietnam with the support of UNICEF. It includes "vitamin A supplementation for all children aged 6-36 months at the national level and for all children up to 59 months in the most disadvantaged provinces and districts... Micronutrient Days also include growth monitoring for children, and iron and folic acid supplementation for pregnant women."*[1]

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[1] Bisin, S. (2014, October 22). Micronutrient Days fight Viet Nam's 'hidden hunger'. UNICEF Newsline: At a glance: Viet Nam. Retrieved from http://www.unicef.org/health/vietnam_62201.html

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Pilot testing of survey instrument. This survey instrument has been pilot tested last March 2016. We will pretest the questionnaire again during the training to make sure we capture the remaining loopholes and inconsistencies, if there are any.

General guidelines. This general guideline was set up to help field supervisors and field researchers/enumerators on specific data collection specifications and procedures, as well as to ensure a standard way of collecting the data.

Specific data collection specifications and procedures. In each module, you will find specific instructions on what we want to collect and how to collect the data properly. For instance, for this survey, our target respondent is the person who mainly prepares food for the family in the house. For the other modules, e.g. Gender, we are interested to interview the primary and secondary decision-makers in the household. If the person who mainly prepares food in the house is the spouse of the primary decision-maker, invite her husband in the Gender module.

Another example is the grade conversions attached for those born prior to 1981. Use this to convert the "old" grade levels to the current levels.

For the consumption module (Section B), we want you to be detailed in explaining the recipes as well as with the ingredients used. Do not only state "pork" but also specify what type of cut it was, which part, and bone in or not. This is to help the field supervisor and survey coordinator in converting the quantities to its gram/mL weight equivalence.

Check the completed questionnaire. Thoroughly review the questionnaire before you leave the household so that you do not miss out any information.

B. Consent

Read to the respondent the Participant Information Sheet and the Consent Form, which contain detailed information about the project, its collaborating institutions, and his/her rights during this interview.

Inform the respondent that s/he:

- has the option not to be interviewed as participation in this survey is entirely voluntary;
- has the right to stop the interview at any time or answer questions if they feel umcomfortable, and withdraw participation;
- has the right to inform the enumerator that they do not wish to be re-visited;
- will remain anonymous at all times;

Once they verbally consent to participate, please ask them to sign the consent form and give them the copy of the Participant Information Sheet.

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C. Survey questionnaire: Explanation on the questionnaire descriptors and specific instruction

The whole questionnaire is divided into the following sections:

Screener question. This information is to help field researchers/enumerators keep track of the balance between vegetable and non-vegetable households in the sample.

Cover page. This covers information on the Household ID number codes, enumerator code, name of household head, name of respondent (main decision-maker in food preparation), mobile number of respondent, name of village, GPS coordinates, and various checks for enumerator verification like interview date, date of field check, date of data entry start and finish.

A. Household characteristics. This covers information about the household members' gender, ethnicity, age, education level, marital status, main occupations and anthropometric measurements.

B. Consumption module. This covers information on the data day, main market days, food recipes and their ingredients, and the portion sizes consumed by the household in the past 24 hours (24-hour food recall); usual food prepared by the household during special occasions and festivals; questions on whether the quantity of food eaten is considered usual or otherwise; and the Household Food Insecurity Access Scale.

C. Food choice and dietary beliefs. This covers information on the motives that determine food choice, as well as their dietary beliefs related with the concept of hot and cold food.

D. Gender dimensions of household decision-making process. This covers information on the different roles husband and wife (primary and secondary decision-makers) play in the household following the Abbreviated-Women's Empowerment on Agriculture Index (A-WEAI) parameters, as well as in other specific activities related with, i.e. production (for those into agriculture), control of resources and income, consumption, child rearing, health, education, access to training/workshop/extension services, membership to organization, and access to credit.

E. Micronutrient supplementation, breastfeeding practices and maternal knowledge about nutrition information. This covers information specifically for children under 5 years old and the mother's micronutrient supplementation. Specific questions relate with vitamin A supplement intake of the mother and children under 5 years old; deworming and iron or iron-folate tablet intake during and after pregnancy; breastfeeding practice for children under 2 years; use of iodized salt; and maternal knowledge on certain nutrition information like feeding infants with meat, fish, eggs and other animal-source food, with green leafy vegetables, etc.

F. Health indicators, access to clean water and sanitation, handwashing practices, and lifestyle. This covers information on the disease incidence in the household from the most serious one like diabetes, high blood pressure, heart disease, cancer, polio, malaria, typhoid, to simple ailments like diarrhoea, fever, cough, runny and stuffy nose – who among the household members is suffering from what, and what kind of changes have been implemented to manage these ailments. Other questions on health relate with access to the nearest health clinic and if they have visited it in the last 6 months, as well as change in the overall health status of household members in the last 5 years.

On access to clean water, information include the main source of water used for drinking, cooking and handwashing, and what they do to make the water safer to drink.

On access to clean toilet and waste disposal, information include the kind of toilet the household members use and if they share it with other household members and the public, as well as the waste disposal of the youngest child in the household.

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On handwashing practices, information include handwashing practices on certain activities like before preparing or eating food, before treating a wound or looking after someone sick, etc.

On lifestyle and smoking status, information include questions on how many hours per day adults and children devote to watching TV/videos, on the internet or looking at their smartphone/tablet for entertainment, how many hours per day adults and children do exercise, and who smokes in the household.

G. Other household characteristics and assets. This covers information on other household characteristics like household classification as poor by the commune in the last 6 years; main type of lighting and fuel used by the household; type of material the house is made of, ownership status of the house, value of the house if rented; distance, average travel time and common modes of transport used to the nearest road types and markets.

H. Household expenditure. This covers information on the different expenditure items spent by the household in the last production year, who spent on which item, payment frequency, average amount spent on each time, and total expenditure.

I. Household income. This covers information on the various income sources of all household members engaged in some form of economic activity(ies) in the past 12 months.

J. Farm characteristics (for households engaged in any agricultural activity). This covers information on the farm characteristics – land area by plot, distance and travel time from the plot to the house, land use and water source, and main crops cultivated; type and number of aquaculture (if engaged in aquaculture); type and number of livestock and other animals and aquaculture in the farm (if into animal husbandry); and number of years of experience in vegetable cultivation.

K. Crop output and disposal. This covers information on the list of crops grown and harvested in the last cropping cycle, total production, production distribution (sold, consumed, given as gifts, lost or spoilt in the farm, postharvest loss), marketing information (main buyer, selection criteria for crops/animals sold, average selling price and total sale value).

Disposal of livestock and other animals. This covers information on the list of livestock and other animals in the farm and the different quantities and total value of those sold, consumed, given as gifts, and disposed of for other purposes.

L. Vegetable input expenditures. This covers information on the different inputs used in vegetable cultivation such as items used for planting/trellising, nutrient management, pest management, irrigation, other inputs, and overhead costs.

M. Economic shocks. This covers information on the unexpected events that affected the family in the last 5 years – month and year of occurrence, current condition after the shock, value of loss, coping strategy, duration of impact of the event, and ranking of the top 3 worst shocks experienced by the household.

Annex 1: Food list

Target respondents for each module

Module	Target respondent	Remark
A. Characteristics of household members	Person who normally prepares meals.	
B. Consumption module	Person who normally prepares meals.	For the 24-hour food recall, other household members older than 8 years can also join to give information about their own food intake in B22 – B26. Information on food intake by infants and children less than 8 years will be answered by the mother, if she is not the main person who normally prepares meals.
C. Food choice and dietary beliefs	Person who normally prepares meals.	Invite the mother of children in the house to respond to questions C56 – C67 if she is not the main person who normally prepares meals.
D. Abbreviated-Women's Empowerment on Agriculture Index (A-WEAI); and Gender dimensions on household decision-making processes	Primary and secondary decision-makers in any social or economic activities in the house. It should be one male and one female aged 18 years and over. Refer to A6.	If the person who normally prepares meals is the primary or secondary decision-maker in the household, continue the interview. Interview the spouse afterwards. If the respondent is neither the primary nor the secondary decision-maker, interview the household members identified in A6 as primary and secondary decision-makers. If only one adult member and the rest of the household members are below 18 years, place "88888" for the secondary respondent.
E. Micronutrient supplementation, breastfeeding practices, maternal knowledge about nutrition information	For E1 – E22, respondent is the mother with child(ren) under 5 years. If no child under 5 years in the house, interview again the person who normally prepares meals.	
F. Health indicators, access to clean water and sanitation, handwashing practices and lifestyle	Person who normally prepares meals.	

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G. Other household characteristics	Person who normally prepares meals.	
H. Household expenditure sources in the last 12 months	Person who normally prepares meals.	
I. Household income sources in the last 12 months	Person who normally prepares meals.	
J. Farm characteristics	Person who normally prepares meals if s/he knows about the agricultural production activities; otherwise, interview the primary (or secondary) decision-maker from A6.	
K. Crop output and disposal in the last 12 months [May 2015-April 2016]	Person who normally prepares meals if s/he knows about the agricultural production activities; otherwise, interview the primary (or secondary) decision-maker from A6.	
L. Vegetable input expenditures in the last 12 months [May 2015-April 2016]	Person who normally prepares meals if s/he knows about the agricultural production activities; otherwise, interview the primary (or secondary) decision-maker from A6.	
M. Economic shocks	Person who normally prepares meals if s/he knows about the agricultural production activities; otherwise, interview the primary (or secondary) decision-maker from A6.	

Questionnaire descriptors

Screener questions. This information is to help field researchers/enumerators keep track of the balance between the number of vegetable and non-vegetable households in the sample. This eliminates the probability of wasted time interviewing a wrong household if, for instance, the number of non-vegetable households had been attained in a particular village.

Name of district:	
Name of commune:	
Name of village:	
Have you been growing any agricultural crops in the last 3 years?	0 no 1 yes
Did you sell any agricultural crop in the last cropping season?	0 no 1 yes
Did you grow vegetables in the last cropping season?	0 no 1 yes
Did you sell vegetables in the last cropping season?	0 no 1 yes

Cover page. This covers information on the Household ID number codes, enumerator code, name of household head, name of respondent (main decision-maker in food preparation), mobile number of respondent, name of village, GPS coordinates, and various checks for enumerator verification like interview date, date of field check, start and completion date of data entry.

Before filling out the information in the cover page, inform the respondent about the purpose of this survey by reading out this information.

Hello, my name is _____. I work at the _____ in Hanoi and we are doing a survey on rural household consumption patterns in Lao Cai province. The survey aims to improve our understanding of the relationship between vegetable production and diet quality. In this regard, we would like to interview you and/or your spouse on this. You are one of the 510 households in the province selected to participate. The individual results are confidential and only summary results will be included in the report. We estimate the entire interview to take 3-4 hours of your time. If you agree to participate, please sign the consent form and we will begin the interview.

Now, we would like to know who is responsible for preparing food for all family members in this household. We would like to interview this person.

After telling them about this, give them a copy of the Participant Information Sheet and the Consent Form. Ask them to read it carefully. For those who cannot read, read it for them. Inform them about:

Use of data: The data collected as part of this survey are for research purposes ONLY. Household-level data will not be shared with non-research organisations. Only summary results will be included in the published report.

Once they agree to participate and have given back the signed Consent Form, click the "Signed and continue" button. Upload it online so the field supervisor can tally the number for vegetable and non-vegetable households in real-time. After doing that, you can now commence the interview.

If the household refuses to participate, click the "Refused" button. Upload it online so the field supervisor can tally the number for vegetable and non-vegetable households in real-time. Go to the next household in your sample list.

	Household ID number	This is the household identity code assigned to each household following the format: province-district-commune-HH ID LC-0x-xxx-xxx The HH ID code will be assigned by the field leaders at the end of each survey day. This is to make sure that each household ID code is unique for each household.
	Enumerator code	This is the name of the enumerator. The assignment of the enumerator code to every enumerator will be done by the field supervisor during the training of enumerators.
	Name of head of the family	The household head is defined as the household member who makes most of the social and economic decisions in the house.

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	Name of the respondent	The main respondent will be the household member who normally prepares the family meals as the aim of this PhD research is looking at the relationship between diet quality and vegetable cultivation. Refer to next table for the target respondent in each module.
	Address/location	This is the complete address of the household in the commune.
	Mobile number	Mobile number of the respondent, if available; otherwise, this can be the mobile number of the household head if respondent and household head are different.
	Name of village	This is the name of the village where the respondent resides.
	GPS coordinates: Latitude Longitude Elevation (meters)	These are the GPS coordinates of the house of the respondent from the tablet or smartphone app. Write the latitude and longitude coordinates, and the elevation (altitude) in meters. In getting the latitude, longitude and elevation, wait for one (1) minute before writing down the coordinates and elevation in the questionnaire. This is because the app needs to calibrate the correct reading for a few seconds. Once the readings stop fluctuating, write down the values including the accuracy levels (e.g. +/- 100m in parenthesis) after the longitude. Do this also for elevation. For instance: Latitude: -34.9229 Longitude: 138.6101 (+/- 1414m) Elevation: 56m (+/- 38m)
	Interview	Name of enumerator who did the interview with the respondent, and the interview date (day/month/year)
	Field check*	Name of the staff who checked the questionnaire after the interview in the field and the date of checking (day/month/year)
	Check office*	Name of the staff who checked the questionnaire in the office and the date of checking (day/month/year)
	Data entry – start*	Name of the staff who started the data encoding and the starting date (day/month/year)
	Data entry – finish*	Name of the staff who finished the data encoding and the completion date (day/month/year)

Note: The shaded part will be automatically generated when using the tablet in the field.
* Will no longer be applicable in the tablet format.

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Section A: Characteristics of household members.

This covers information about the household members' gender, ethnicity, age, education level, marital status, main and secondary occupations, pregnancy and breastfeeding status, and anthropometric measurements.

A1	Household member code	This is the unique code assigned to each household member.
	Please list the FULL names of members of this household. [List in order of male household head, female household head, other male adult, other female adult, children from oldest (and their spouse) to youngest, then grandchildren (if any), and non-family members (if any)]	This is a complete list of all family and non-family members living in the household at the time of the interview. A household is defined as a group of people who lives and eats together most of the time. Each member must live with the others at least 6 months of the year or 4 days of the week. Write down the complete names of all household members in the order of: (1) male household head; (2) spouse; (3) children from eldest to youngest (and the spouse); (4) grandchildren (if any); and (5) non-family members (if any).
A2	Is the [name] male or female?	
A3	Ethnicity	This is the name of the ethnic minority group the household member belongs. They are categorised as *Kinh, Tay, Thai, Muong, Kho Me*, etc. Refer to the codes in the questionnaire for a complete list.
A4	Ethnic subgroup	This refers to the subgroups under each ethnic minority grouping. For instance, *Tay* ethnic minority has *Tho, Ngan, Phen, Thu Lao* and *Pa Di* subgroups. Refer to the codes in the questionnaire.
A5	What is the relationship between household member and the household head?	This question aims to know how each household member is related with the household head. Examples of relationships are the following: spouse, son or daughter, grandchild, parent or in-law, and others. Refer to the codes in the questionnaire.
A6	Identify the principal decision-makers within the household, both social and economic decisions.	This is to identify who among the household members are the main decision-makers in any social or economic activities within the household. It is coded as principal/primary and secondary. In general, it is usually the household head/husband (primary) and the spouse/wife (secondary). However, it can also be another member as long as there is one male and one female aged 18 years and older (for instance, a mother could be living with her adult son or a father with his adult daughter). In another case, the household head may be an elderly parent living with an adult son/daughter

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		and the adult son/daughter may be the primary or secondary respondent.
		It may also be that there is only a primary female respondent and there is no adult male present in the house. In cases where the primary male adult is absent from the house due to migration (gone for work), and has been or is expected to be away for more than 3 months out of the next/previous 6 months, the primary female adult is considered the sole decision-maker. The same can be said about the husband whose wife has also gone off for work elsewhere, with no other adult female member in the house.
A7	How old is [name]? [age at last birthday]	This refers to the age (in years) at the last birthday of each household member when the interview was done. For children below 1 year, please convert the number of months to year by dividing the number of months by 12 months (e.g. 3 mo. /12 mo. = 0.25 year).
A8	Year(s) of education [refer to next page for conversion]	Number of years each household member has attended school up to the highest diploma obtained. For adults who did not attend school, write "0". Refer to the attached Grade conversion table.
A9	What is the marital status of [name]? [Select first correct response]	This indicates whether a household member is single, married, separated/divorced, widowed, living together, etc. Refer to the codes in the questionnaire.
A10	What is the main activity of [name]?	This can be defined as the primary occupation that takes up most of the time of the household member during the time of the interview. The income obtained from this main economic activity should be recorded in the income section. Refer to the codes in the questionnaire.
A11	On, average, how many hours a week does [name] work in this activity? (Hr/wk.)	This is the average number of hours a week the household member devotes to the primary occupation.
A12	What is the secondary activity of [name]?	There are instances when a household member has multiple jobs aside from their primary occupation. This question aims to know if there are other types of economic activities each household member is also engaged in aside from the primary occupation. These additional income sources should also be recorded in the income section (Section I). If no secondary job, leave as blank. Refer to the codes in the questionnaire.
A13	Is anyone in the household pregnant or breastfeeding?	We want to know if there are some women in the household who are currently pregnant or breastfeeding. This is because pregnant women and children are considered vulnerable groups in the fight against undernutrition. The problem of

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		undernutrition for children begins during pregnancy.

	Anthropometric measurements[2]	Take the anthropometric measurements AFTER the interview is finished.
		
		Prior to taking the physical measurements, explain to the participants that you will be taking the following measurements of all household members:
		
		  a. height
		  b. weight
		  c. mid-upper arm circumference
		  d. waist
		  e. hip
		
		It is preferable to have female field researchers or enumerators do this as female respondents may not be comfortable when getting the waist and hip measurements.

A14	Height (cm)	We are also interested in getting the height (in centimetres), weight (in kilograms), mid-upper arm circumference (in centimetres), waist (in centimetres) and hip measurements (in centimetres) to link with the consumption data and see if there is any relationship between these variables.
		
		For adults, the height and the weight will be used to compute for their body mass index [BMI= (weight in kg) / (height in centimetres)^2]; waist and hip will be used to compute for the waist-to-hip ratio (WHR = W ÷ H).
		
		For children, the height and weight will be converted into z-scores, and will be evaluated based on the 2006 WHO child growth standards to identify severe acute undernutrition.
		
		To get the height measurements, first, all adults and children who can stand by themselves will be measured in centimetres using a tape measure.
		
		  a. First, ask them to remove their shoes, slippers or sandals, and any head gear (cap, hat, hair brows, ribbons, etc.) before taking their height measurements.
		  b. Place the tape measure on a flat vertical wall with a flat even floor.
		  c. Ask them to stand with his/her back to the tape measure on the wall. Feet should be together; heels against the back board; knees straight; the back of the head, back,

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[2] Detailed information on how to correctly record anthropometric measurements were taken from:

a. Height, weight, waist and hip measurements for adults - WHO STEPwise Approach to Surveillance (STEPS) (2008) Section 3 Guide to Physical Measurements, pp. 3-3-1 to 3-3-14, http://www.who.int/chp/steps/manual/en/index3.html;
b. Height and weight for infants, MUAC - National Health and Nutrition Examination Survey (NHANES) Anthropometry Procedures Manual (2007) (including photos) published by CDC, pp. 3-1 to 3-16, www.cdc.gov/nchs/data/nhanes/nhanes_07_08/manual_an.pdf

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		buttocks, calves and heels should be touching the upright, feet together. d. Ask the participant to hold the head in a position where s/he can look straight at a spot, head high, on the opposite wall (no tilting). e. Make sure eyes are the same level as the ears. f. Ask the participant to breathe in and stand tall. Place the ruler perpendicular to the tape measure and slide down to the head so that the hair (if present) is pressed flat. g. Record the height measurement in centimetres. For infants and toddlers of up 3 years who cannot stand on their own, a. Place them in a lying down position facing upwards on an infantometer, if available. b. Adults and children with illness or injury and are unable to stand will be measured in a similar fashion but not on an infantometer. c. When in this position, have both legs outstretched with their feet resting on a hard piece of wood or on the wall before taking any measurement. d. If the participant is having difficulty to have both feet outstretched, one leg would also suffice.
A15	Weight (kg)	To measure weight, use the digital weight scale provided to you and get the value in kilograms. Place the scale on a flat even surface. Do not place it on carpet or sloping floor. If impossible to find a flat even surface (house is on a compacted soil or mud floor), ask for a wooden flat board. First, all adults and children who can stand by themselves will be weighed in kilograms using the digital weight scale. a. Ask them to remove any heavy piece of clothing, items in their pockets, and shoes, slippers or sandals before taking their weights. b. Ask them to place both feet on the scale, stand still, face forward, and arms on the side. c. Record the weight in kilograms. For infants and toddlers who cannot stand by themselves on the weighing scale, they will be weighed with the help of an adult. a. The adult and infant will be weighed at the same time. b. Then, the adult's previous weight will be deducted to get the infant's weight. c. Infants should only wear diapers and/or thin clothing, if possible.

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A16	MUAC (cm)	Before taking the mid-upper arm circumference (MUAC),
		a. Get the arm length of the right arm of the participant. Ask the respondent to bend the right arm 90° at the elbow and the right palm facing up. Refer to the succeeding photos for the proper position (Exhibit 3-4 to Exhibit 3-7).
		b. Locate the end of the spine of the right scapula by following the scapula out to the arm until it makes a sharp V-turn to the front of the body. Mark this spot.
		c. Then hold the zero end of the tape measure at this mark and extend it down to the tip (bony part) of the elbow. The tape measure must be centred on the posterior surface of the arm.
		d. Once the position is correct, get the results and mark the midpoint.
		In the midpoint, get the mid-upper arm circumference (refer to Exhibit 3-7 and 3-8). Use the tape measure provided in taking MUAC measurements.
		a. The tape measure is wrapped around the midpoint of the participant's arm.
		b. Get the arm measurements three times, then write the average in A15.
A17	Waist (cm)	Use the tape measure provided in taking waist measurements of household members from 2 years old and above. This measurement should be taken without clothing, that is, directly over the skin. If it is not possible, the measurement may be taken over light clothing. Thick or bulky clothing should be removed.
		a. Standing to the side of the participant, locate the last palpable rib and the top of the hip bone. You may ask the participant to help you locate these in their bodies (refer to photo Exhibit 3-9 and 3-10).
		b. Ask the participant to wrap around the tape measure around themselves and position the tape measure at the midpoint of the last palpable rib and the top of the hip bone. Make sure to wrap the tape around the same spot on the opposite side. Check that the tape is horizontal across the back and front of the participant and as parallel with the floor as possible.
		c. Ask the participant to stand with their feet together with weight evenly distributed across both feet, hold arms in a relaxed position at the sides, breath normally for a few breaths before making a normal expiration.

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		d. Make sure that the tape measure is snug but not too tight to cause any compression of the skin. e. Record the measurement of the waist circumference. f. Repeat the entire process again, and record the second measurement. If the difference is within 1 cm, get the average. If the difference between the two is >1 cm, the two measurements should be repeated. Note: During the analysis, we will code it to the nearest 0.0 or 0.1 cm. Example: If the exact measurement is 87.74 cm, code the item 87.7 cm.
A18	Hip (cm)	Use the tape measure provided in taking hip measurements of household members from 2 years old and above. This measurement should be taken over light clothing. Thick or bulky clothing should be removed. a. Stand to the side of the participant, and ask them to wrap the tape measure around themselves. b. Position the tape measure around the maximum circumference of the buttocks. c. Ask the participant to stand with their feet together with weight evenly distributed over both feet, arms relaxed at the sides. d. Check that the tape measure is horizontal all around the body and snug without constricting. e. Record the hip circumference. Repeat the entire process again, and record the second measurement. If the difference is within 1 cm, get the average. If the difference between the two is >1 cm, the two measurements should be repeated. Note: During the analysis, we will code it to the nearest 0.0 or 0.1 cm.

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Exhibit 3-4.
Marking spine extending from acromion process

Exhibit 3-5.
Correct tape placement for upper arm length

Exhibit 3-6.
Incorrect tape placement for upper arm length

Exhibit 3-7.
Marking upper arm length midpoint

Source: NHANES (2008), p. 3-13.

Figure 1. How to get the midpoint in the right arm for the mid-upper arm circumference measurement

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Exhibit 3-9
Abdominal (waist) circumference mark

Exhibit 3-10. Measuring tape position for abdominal (waist) circumference
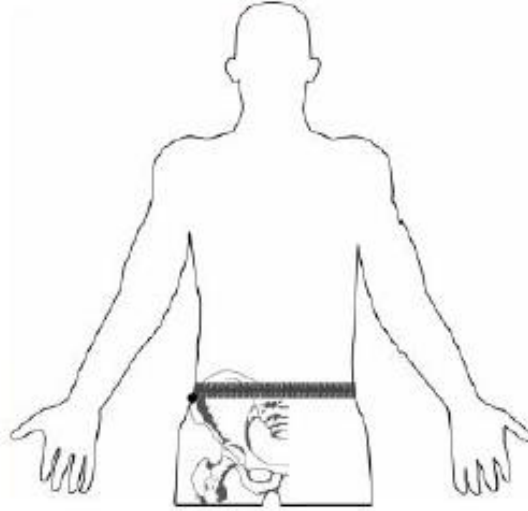
Source: NHANES (2008), p. 3-16.

Figure 2. How to take waist measurements

Section B: Consumption module.

This module solicits detailed information about everything the respondent and all household members had to eat and drink from midnight to midnight the previous day or over the past 24-hour period, and the usual food they prepare during special occasions. This module is divided into 5 parts: cover page, 24-hour food recall, recipes of home-cooked food items, usual food prepared during special occasions, and the Household Food Insecurity Access Scale (HFIAS).

The cover page contains several household identifiers, the data day, market days and actual market visits of the household to buy food items. Again, before starting the interview for this module, read the instruction to the respondent. The target respondent in this module is the person who normally prepares food in the family. Other household members present may also be invited to participate so they could answer the portion sizes they consumed in each meal by themselves. Emphasize to the respondent the need to get detailed information for all food and drinks (including drinking water and baby food, if applicable) consumed in the previous day, as well as the portion sizes of each household member, including infants and children.

> *Instruction: This part of the interview is to ask you [THE MAIN PERSON WHO PREPARES FOOD] what your entire household members ate or drink yesterday. If the other household members are available, we would like to invite them as well so they can answer the amount of food they consumed.*
>
> *Please recall and tell us all food items including drinks (water, vegetable soup, tea, soft drinks, other beverages and alcohol) and any type of condiment (fish sauce, vinegar, pepper, salt, ketchup, chili or any other spices). Also include the food intake by infants and young children - milk and other milk substitutes and any other soft food taken. Try to be as detailed as you can.*

The cover page of the consumption module includes the following information:

B1	Please tick which day the information for the 24-hour food recall refers to	This is the data day for which the 24-hour food recall module was based on. Based on the results of the Observational Study done in July-August 2015, it was decided that the data days of the 24-hour food recall will be Wednesday, Friday and either Saturday or Sunday depending on the main market day of the commune/district.
	HH ID no	
B2	Date of interview (dd/mm/yyyy)	
B3	Name of respondent	
B4	Name of village	
B5	Name of commune	
B6	Name of district	
B7	Phone/Mobile number	
B8	GPS coordinates	a. Latitude b. Longitude c. Elevation (meters)

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B9	When is the main market day(s) in your location? [Tick all that applies]	This is the main market day in the village (or in the commune or district if there is no village market). The type of market we are referring here pertains to supermarket, wet market or traditional market where people gather to buy food. It does not include small stores located near the household. Multiple response is allowed.
B10	Tick what day(s) you normally go to market* to buy food. Place 88888 if NA.	If the household does not visit any market and buys only at a small store near their house, write "88888" to mean "not applicable". Multiple response is allowed.

The second part is the 24-hour food recall which solicits detailed information about everything the respondent and all household members had to eat and drink from midnight to midnight the previous day or over the past 24-hour period. The 24-hour recall segment is from columns B11 – B40 and is divided into three parts:

- Total amount of food servings prior to consumption (B11 – B21). This refers to the total serving size of all prepared recipes/mixed dishes and acquired (bought or given by others) individual food items before most (if not all) household members ate or drank them. Information sought are the cooking method for each food item, quantity of total servings and the household members who shared the meal. Normally, the mother or the father would bring out serving dishes of rice or mixed dishes in large containers before all household members get their individual portions. This is what is required in these columns, e.g. 5 cups of hot steamed white rice served on a big bowl, or boiled cabbage served on a big bowl, or 1.5 litres of soft drink.

- Portion sizes (edible portions only) eaten by each household member (B22 – B31). This refers to the edible portions eaten by each household member, including infants and children. Similar with the total amount of servings, information sought pertains to the portion size eaten by each household member, as well as some validation questions on whether the meal is considered a usual meal by the household member or otherwise, and if the household member is on special diet. Take note that the portion sizes indicated here for all household members who shared the meal must not exceed the total amount of food servings in B17 (or its gram/mL-equivalent in B20).

- Recipes of food cooked at home (B32 – B40). The list of recipes only includes those that were prepared and cooked at home, as indicated in B14 – B15. If B15=1, recipes of mixed dishes in B14 are copied in B32. Then, the list of ingredients are listed in B33 in descending order based on the quantity used per recipe. Aside from these information, where the food item came from, who bought it, quantity of raw ingredient used, price per unit and total cost of raw ingredient are also included.

Let us begin with the first two parts: (a) Total amount of food servings prior to consumption (B11 – B21) and (b) the Portion sizes (edible portions only) eaten by each household member (B22 – B27).

(a) Total amount of food servings

B11	Start time (6:30am) [Begin from the earliest time they ate to the latest]	This is the time the respondent and other household members start eating the particular meal or food.

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B12	End time (e.g. 8:30am)	This is the time the respondent and other household members finished eating the particular meal or food.
B13	Occasion	Ask the respondent what s/he calls this occasion. Then, find the nearest match in the codes provided at the end of this section in the questionnaire. If none in the codes matches with what the respondent said, select "99" and write it down.
B14	Write complete recipe names. For individual items (e.g. mango, cake, etc.), see codes in Annex 1. For commercial products, include brand name (e.g. Nestea iced-tea lemon flavour).	Write the name of the recipe or individual item in each row. In this part, you need to write down the complete name of the recipe or dish eaten by the household. For instance, "boiled cabbage with pork meat and tomato." For individual food items like mango or banana, find the corresponding code in Annex 1 (Food List) and write it down in this column. To make use of the limited time wisely, first, write down all individual food items mentioned by the respondent in the paper questionnaire. Replace them with the corresponding codes from Annex 1 at the end of the interview. Commercial products are not listed in the Annex and should be written down as is, including the brand name if possible.
B15	Was this prepared at home?	This is to know if the recipes and/or individual food items listed were prepared at home, bought outside or given by a neighbour. This question is connected with column B32. For those recipes prepared at home, we would like to know the ingredients used.
B16	Cooking method	How the recipes/mixed dishes and individual food items were prepared: ready-made ingredient like those commercial products bought at the store; eaten as raw like some fresh fruit and vegetables; steamed; and others. Refer to the codes in the questionnaire.

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B17	Quantity of total serving [before eating or drinking]	This is the number of serving dishes brought to the dining table or bought by individual household member(s) prior to eating or drinking.
		For dishes prepared and cooked at home, this refers to the number of serving dishes taken out to the dining table. For instance, if the mother brought one (1) big bowl of rice and two (2) big plates of fried fish, you will write in this column these numbers to refer to the quantity of total serving.
		Another example is a commercial product bought in a shop. For instance, the son bought 2 cakes and 1 bottle of Pepsi soft drink from a nearby store. Under this column, you will write these numbers to refer to the quantity of total serving.
B18	Unit of measure	This is the unit of measure for the quantities of total servings in B17. The categories here are the household measures used as serving dishes or the containers of commercial products prior to cooking or consumption. Refer to the codes in the questionnaire.
		To use the two examples above, for the 1 big bowl of rice, 2 big plates of fried fish, 2 cakes and 1 bottle of Pepsi product, you will write under this column: "9" for big bowl of rice, "12" for big plate of fried fish, "13" for piece of cake and "16" for bottle of soft drink. Select "99" if none matches the local household measure and write it down.
B19	Conversion factor[3] per unit of measure	This is the conversion factor used to estimate the gram-or-millilitre-equivalents of each food item listed in B13. For instance,
		1 big bowl of steamed white rice = 4 cups of steamed white rice
		1 cup = 250g
		1 big bowl = 4 cups X 250g = 1,000g (this is the conversion factor of 1 big bowl into grams)
		This will be imputed later on by the field supervisor and the survey coordinator after getting all data by commune or by district.
B20	Weight of total serving [before eating] (in g or mL)	This is the gram-or-millilitre-equivalent of the total quantity of serving. Using the example above,
		B17 X B19 [or quantity of total serving X conversion factor into grams/mL] = 1 big bowl X 1,000g = 1,000g
B21	Write all HH members who shared this food.	Write down all household members who shared this meal together in the space provided. Use the Household Member code in A1.

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[3] Refer to Gibson, R.S., and E.L. Ferguson. "An interactive 24-hour recall for assessing the adequacy of iron and zinc intakes in developing countries." Washington, DC and Cali: International Food Price Research Institute (IFPRI) and International Centre for Tropical Agriculture (CIAT).

(b) Portion sizes (edible portions only) eaten by each household members

B22	Place eaten	Location of where the food was consumed: home, office or school cafeteria, etc. Refer to the codes in the questionnaire.
B23	Portion size	This is the number of portion servings eaten by the household member using the local household measures (e.g. bowl, plate, glass, cup/mug) and utensils (e.g. tablespoon).
		For instance, if the mother ate 1 small bowl of rice and half a small bowl of boiled cabbage, under this column, you write these numbers to refer to the number of portion serving eaten.
B24	Unit of measure	This refers to the local household measures (e.g. bowl, plate, glass, cup/mug) and utensils (e.g. tablespoon) used by the household member when eating. Refer to the codes in the questionnaire.
		Using the above example, you write under this column "7" to refer to "small bowl" for both rice and boiled cabbage under the mother's entry.
		Then, write under the Notes section the different diameters of the local household measures to help the field supervisor and survey coordinator derive the conversion factors for the correct household containers.
B25	Conversion factor per unit of measure	Leave this as blank as this will be filled out by the field supervisor and survey coordinator. Note: This should only include the edible portion of the food – minus the banana skin, or the mango bone or the chicken bone.
B26	Weight of eaten food* Note: *For any food item that contains inedible portion (e.g. banana skin, mango stone, chicken or fish bones), only weigh the edible portion only. * (in g or mL)	For any food item that contains inedible portion (e.g. banana skin or mango stone or chicken bone), only weigh the edible portion and write the value here.
B27	Who is the respondent giving this information? (refer to HH code in A1)	If the person providing this information for the other household members is not the main respondent who prepares the food for all household members, write down who it is from the household member code in A1.

The suggested line of questioning in these two parts is by occasion.

- Step 1: Accomplish B11 – B14. Write all food and drinks (including drinking water) consumed by occasion, with each row representing one specific food item or mixed recipe.

- Begin by asking about the time a food, a drink, or a meal was consumed. For each time, ask about the name of the occasion. Then, list all food items (mixed recipes, individual food items including water, baby food) eaten in this occasion.

- Step 2: Collect information for B15 – B20. Once all food items and drinks consumed are listed in the first occasion, start asking information of the total servings.

   - First occasion (e.g. breakfast). Begin with the first item listed in the first occasion. Ask about where it was prepared (B15), the cooking method (B16), the quantity of total serving (B17) and the unit of measure (B18), and the household members who shared the meal with the respondent (B21). Leave B19 – B20 blank as this is the responsibility of the field supervisor and survey coordinator.

   - Then, proceed in asking about the portion sizes (edible portions only) eaten by each household member who were identified sharing the meal with the respondent (B21). Before filling in the table, identify who is giving the information for the portion sizes eaten by the household members (B27). If other household members are currently in the house, invite them to join the interview to answer their portion sizes; otherwise, the respondent may also answer it on their behalf, with the other family members helping the respondent to remember the types and amounts of food and beverages consumed. It may be time-consuming but this is preferable to increase accuracy of the dietary details of each family member. After these had been settled, for the first food item in the first occasion, determine how this was apportioned to the household members who shared the meal beginning with the first identified household member. Fill in information on where it was consumed (B22, take note that this will be the same by occasion), portion size eaten by this household member (B23) and the unit of measure (B24). Continue getting information for the other identified household members, until all information for all household members who shared the meal have been collected. Then, go to the second item in the first occasion and do the same process for all food items listed in the first occasion.

- Step 3: Repeat Steps 1 and 2 for the next eating occasion.

   - Second occasion (e.g. lunch). Again, begin with the first item in the second occasion. Follow the same process from above until B21. At this stage, it is possible that the list of household members sharing the meal in the house may or may not be the same as in the first occasion because other members may have left for school or work. They may have packed food from the house or bought them elsewhere. Take note of this when identifying household members in B21, and make sure that the food bought elsewhere (whether from the restaurant/café, bar/tavern, etc.) is/are included in the list of food items in B14. Also, take note of where information are placed for specific household member for B22-B27. Check who is assigned as the first identified household member, second, third and so on and so forth. For instance, HH members 1 and 3 (these numbers represent the order in which household members are listed in the "HH member code" on the second row under the "Portion sizes (edible portions only) eaten by each household member") are left at home to share meals in the second occasion, while HH members 2 and 4 ate at work, and HH member 5 ate at school. In this case, start with HH members 1 and 3 who ate at home (=1 in B22) and shared the meal. Fill in B22 – B27 under HH member 1 and 3. Continue completing information on the next food item they shared in the second occasion. Then, for HH members 2 and 4 who packed food from the house and ate them at work, select code "2" for "packed food to office or school" and fill in the other information on portion sizes from B22 – B27. Do the same for the remaining household member.

   - Third occasion (e.g. afternoon snack). Let us demonstrate this using an example. For instance, the eldest son bought some food (e.g. orange fruit drink and a cake) and ate them as an afternoon snack (3:30PM – 3:45PM) in the school. Make sure that these are included in the list of food items under B14 in the first instance. Place the total serving quantity under B17 – B20 as: for the orange juice, it is "1 bottle (350mL)" and for the cake, it is "1 piece". Under B21, ask if he shared it with his classmate or a

friend. If no, write only the eldest son's HH ID code from A1 in B21. Then, go to his assigned column (second row under the "Portion sizes (edible portions only) eaten by each household member") to fill in B22 – B27. Ask the question "*Did you finish the entire bottle of orange juice and the cake?*" If yes, then copy what was written in B17 – B19. If no, then write how much was consumed only, e.g. ½ bottle and/or ½ cake.

- o Proceed onto the next occasion, and do the same process of getting information for every food item in that occasion. Do these until you reach the last food item in the list.

- o **IMPORTANT**: In filling out information for all commercial products bought from any shop in B17 – B19, get the complete information – brand name, product description and net weight.

- o **IMPORTANT**: For all local household items used for serving food (serving bowl, serving plate, pitcher for water or any drinks, cookwares if used as serving dishes) or for eating (Vietnamese households commonly use a small bowl to eat food) mentioned in the 24-h food recall, get the dimension in centimetres. Write down the dimensions (diameter, length, width and height) of the different household containers in the Notes page. Also, take a picture of these local household containers and utensils using a ruler as scale. This will help the field supervisor and survey coordinator in deriving its conversion factor (gram-mL-equivalents) for mixed dishes served or eaten on local household items.

B28	For the food eaten yesterday, was the amount eaten about usual, less than usual or more than usual? (see code)	This question aims to know if the consumption from the previous day is the household's usual consumption, more than usual or less than usual.
B29	If B28=1, what is the main reason?	If the consumption is less than usual, the respondent provides the main reason. Refer to the codes in the questionnaire. The respondent is only allowed to select one main reason.
B30	If B28=2, what is the main reason?	If the consumption is more than usual, the respondent provides the main reason. Refer to the codes in the questionnaire. Again, the respondent is only allowed to select one main reason.
B31	How could you describe your current dietary habit?	This aims to determine if the respondent is in a diet program. Refer to the codes in the questionnaire.

Recipes of food cooked at home (B32 – B40)

After getting information on the total servings and individual portion sizes consumed by the household members, we will now get the list of ingredients used by the respondent in preparing and cooking the mixed dishes/recipes identified in column B14.

To fill these portions, do it by recipe.

1. List all ingredients used for the first recipe (ingredient 1, ingredient 2, ingredient 3, etc.) and fill B33.
2. Then, for each ingredient, ask questions B34 – B40.

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3. Go to the next recipe and do steps 1 and 2, until you reach the last home-cooked recipe in B14.

B32	[If B15 = 1] List down the home-cooked food indicated in B14.	Refer back to B14 and check which mixed dishes were prepared at home. Then, transfer them one at a time to B32.
B33	List all ingredients** used per recipe in descending order of quantity per recipe. Indicate brand name if possible. [***See code in Annex 1]	The list of all ingredients per mixed dish should be recorded in descending order of quantity used. Include the brand name and the net weight per container, if possible. For individual food items like mango or banana, find the corresponding code in Annex 1 (Food List) and write it down in this column. To make use of the limited time wisely, first, write down all individual food items mentioned by the respondent in the paper questionnaire. Replace them with the corresponding codes from Annex 1 at the end of the interview. Commercial products are not listed in the Annex and should be written down as is, including the brand name, if possible.
B34	Where did you get this?	From where the ingredient was sourced: home, own garden/farm, market (specify), etc.
B35	If purchased, who bought it?	This is to know who brought it to the house.
B36	Quantity of raw ingredient in recipe	This is the amount of raw ingredient used in the recipe.
B37	Unit of measure	This is the unit of measure used, e.g. sachet, gram, millilitre, etc. Refer to the codes in the questionnaire.
B38	Weight per unit of measure*	This is the weight equivalent in gram or millilitre from the unit of measure identified in B36 – B37. *Again, this weight equivalent should only be for the edible portions.
B39	Price per g or mL	This is the price per gram or millilitre. The survey coordinator will calculate this. If, for instance, a. The father bought 1 bottle of orange juice (=350 mL) for 10,000 VND, the price per g/mL = 10,000 VND/ 350mL = 28.51 VND/mL. b. If the father bought 1 kg of tofu for 25,000 VND/kg, the price per gram is 25,000 VND/1,000g = 25 VND/gram.

B40	Total cost [B36 X B38 X B39]	This is the total cost for the food ingredient used by multiplying the quantity X weight in g/mL X price/g or mL.
		Using the example above, the total cost for
		a. 1 bottle of orange juice would be 10,000 VND, or
		b. 1 kg tofu would be 25,000 VND.

Recipes during special occasions (B41 – B49)

Aside from the list of food consumed in the previous day, we are also interested in getting the other mixed dishes prepared by the household during special occasions and festivals that they celebrate in the last 12 months. And similar with the previous section, we plan to know the total servings (columns B43 – B49) of these home-cooked dishes. These food data will be included in the derivation of the average daily intake, and thus the number of people normally joining the celebration (adults and children) is also required.

B41	Name of occasion	This is the name of the occasion or festivity commonly celebrated in the household.
B42	Month being celebrated (start from the most recent month)	Month when they celebrated this occasion or festivity.
B43	What are the food recipes and drinks (including alcoholic drinks) your household normally prepares during this occasion? Please be detailed about the name of the recipe. Follow instruction in B14.	In this part, you need to write down the complete name of the recipe or dish eaten by the household. For instance, "boiled cabbage with pork meat and tomato."
B44	Quantity of total serving	This is the total number of serving dishes brought to the dining table prior to eating or drinking. Refer to B17 for more information.
B45	Unit of measure	This is the unit of measure for the quantities of total servings in B44. The categories here are the household measures used as serving dishes or the containers of commercial products prior to cooking or consumption. Refer to the codes in the questionnaire.
B46	Weight of total serving (in g or mL)	This is the weight equivalent in gram or millilitre from the unit of measure identified in B44 – B45.
B47	Who cooked? [Multiple response]	This is the person or group of persons responsible in preparing the mixed dish.
B48	How many people shared this meal? No. of adult(s)	This is the number of adults who shared the meal.
B49	No. of children	This is the number of children who shared the meal.

After knowing what the household ate in the previous day and what they commonly prepare during special occasions and festivals, we want to determine if the household is having some problems on how they access food in the last 30 days looking at the following aspects: anxiety/uncertainty about

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food access, quality and quantity of food. To measure this, we replicate the Household Food Insecurity Access Scale (HFIAS) 9-item generic questions.

The Household Food Insecurity Access Scale (HFIAS) (B50 – B67)

The HFIAS[4] is the internationally agreed-upon indicators to measure the access component of household food insecurity. This was developed by USAID and measures several domains like anxiety, quality and quantity of food, and hunger.

Instruction: Now, I am going to ask you about the food eaten in your household in the past 4 weeks.I am going to read you several statements. Please tell me either yes or no, and if yes, how often does it happen.

B50	In the past 4 weeks, did you worry that your household would not have enough food?	These statements are answerable by yes and no. If no, proceed to the next item.
B51	If 『yes』 , was it ..? 1. … rarely (1-2 times) 2. … sometimes (3-10 times) 3. … often (> 10 times)	If <u>yes</u>, a related question ("*was it …?*" which has the same meaning with "*How often did this happen?*)" follows asking the respondent about the frequency of experience of the event:
B52	In the past 4 weeks, were you or any household member not able to eat the <u>kinds of foods you preferred</u> because of a lack of resources?	
B53	If 『yes』 , was it ..? 1. … rarely (1-2 times) 2. … sometimes (3-10 times) 3. … often (> 10 times)	1= … rarely, 2= … sometimes or 3= …often).
B54	In the past 4 weeks, did you or any household member have to eat a <u>limited variety of foods</u> due to a lack of resources?	
B55	If 『yes』 , was it ..? 1. … rarely (1-2 times) 2. … sometimes (3-10 times) 3. … often (> 10 times)	
B56	In the past 4 weeks, did you or any household member have to eat some <u>foods that you really did not want to eat</u> because of a lack of resources to obtain other types of food?	
B57	If 『yes』 , was it ..? 1. … rarely (1-2 times) 2. … sometimes (3-10 times) 3. … often (> 10 times)	
B58	In the past 4 weeks, did you or any household member have to <u>eat a smaller meal</u> than you felt you needed because there was not enough food?	

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[4] Coates, Jennifer, Anne Swindale and Paula Bilinsky. 2007. *Household Food Insecurity Access Scale (HFIAS) for Measurement of Household Food Access: Indicator Guide (v.3)*. Washington, D.C.: FHI 360/FANTA. Accessed from http://www.fantaproject.org/monitoring-and-evaluation/household-food-insecurity-access-scale-hfias

B59	If 『yes』, was it ..?
	
	  1. ... rarely (1-2 times)
	  2. ... sometimes (3-10 times)
	  3. ... often (> 10 times)	

B60	In the past 4 weeks, did you or any household member have to <u>eat fewer meals</u> in a day because there was not enough food?	

B61	If 『yes』, was it ..?
	
	  1. ... rarely (1-2 times)
	  2. ... sometimes (3-10 times)
	  3. ... often (> 10 times)	

B62	In the past 4 weeks, was there ever <u>no food to eat of any kind</u> in your household because of lack of resources to get food?	

B63	If 『yes』, was it ..?
	
	  1. ... rarely (1-2 times)
	  2. ... sometimes (3-10 times)
	  3. ... often (> 10 times)	

B64	In the past 4 weeks, did you or any household member <u>go to sleep at night hungry</u> because there was not enough food?	

B65	If 『yes』, was it ..?
	
	  1. ... rarely (1-2 times)
	  2. ... sometimes (3-10 times)
	  3. ... often (> 10 times)	

B66	In the past 4 weeks, did you or any household member <u>go a whole day and night without eating</u> anything because there was not enough food?	

B67	If 『yes』, was it ..?
	
	  1. ... rarely (1-2 times)
	  2. ... sometimes (3-10 times)
	  3. ... often (> 10 times)	

After knowing about the intra-household's consumption patterns, we now move to the factors that may affect their consumption. These are:

- food choices and dietary beliefs;
- the effect of gender on the decision-making process from the perspectives of the principal and secondary decision-makers in the household;
- micronutrient supplementation, breastfeeding practices, use of iodized salt and maternal knowledge on nutritional information;
- health status, access to clean water, clean toilet, handwashing practices, and lifestyle and smoking status;
- income and expenditure;
- for farming households, the type and number of crops and animals in the farm, the level of commercialization of the farm operation, farm income and expenditures; and
- economic shocks experienced by the household in the last 5 years.

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Section C: Food choice and dietary beliefs.

This covers information on the motives that determine food choice as well as their dietary beliefs related with the concept of hot-cold phenomenon. A consumer's food choices involve a complex interaction, one that relates to health, cost, convenience, taste, among others. The Food Choice Questionnaire developed by Steptoe, Pollard and Wardle (1995) is adapted since it is a multidimensional measure of motives related to food choice that looks at health, mood, convenience, sensory appeal, natural content, price, weight control, and familiarity. Other factors were added like availability, food safety, political motive, religion, ethnicity, feeling of satiation and nutrition knowledge.

The hot-cold classification is one of the beliefs in Vietnam that originated from traditional Vietnamese medicine. It looks at the relationship between food classified as hot and cold, and how it maintains or restores one's physical health. The key element is on the balance of food with each other and not about temperature or taste. These beliefs and practices had been handed down to the women by their mothers, mothers-in-law or grandmothers. To understand these concepts further, questions on whether the household classifies their food according to hot-cold; their interpretation of these concepts and specific examples for each type; the use of food to treat certain maladies; and specific questions for mothers on temporary food preference and avoidance during and after pregnancy and reasons for such behaviours, are also included.

Before commencing the interview for this module, read the instruction to the respondent:

I will read you several statements and you tell me whether you find each one important or not important by selecting a number in the scale I will show you.

Then, read each item and ask the respondent if s/he finds each statement important or not important when selecting food to eat on a typical day. Show them the scale and let them point to the number.

C1-C47	It is important to me that the food I eat on a typical day	Scale:
		0 = not at all important
	... is easy to prepare	...
	... can be cooked very simply	...
	... takes no time to prepare	...
	... can be bought in shops close to where I live or work	10 = very important
	... is easily available in shops	
	... is readily available in my farm or garden	
	... contains no additives and preservatives	
	... contains natural ingredients	
	... contains no artificial ingredients	
	... is free from any pesticide residue or toxic chemicals	
	... is free from heavy metals	
	... comes from a country I approve politically	
	... has the country of origin clearly marked	
	... is low in calories	
	... helps me control my weight	
	... is low in fat	
	... tastes good	

	... smells nice	
	... has a pleasant texture	
	... looks nice	
	... is not expensive	
	... is good value for money	
	... is cheap	
	... is in harmony with my religious views	
	... is not forbidden in my religion	
	... is familiar	
	... is like the food I ate when I was a child	
	... is what I usually eat	
	... is favoured by other household members	
	... is similar with what my neighbours cook	
	... is similar with what my ethnic group cooks	
	... is high in fibre and roughage	
	... is nutritious	
	... contains a lot of vitamins and minerals	
	... keeps me healthy	
	... is high in protein	
	... is good for my skin/teeth/hair/nails, etc.	
	... cheers me up	
	... helps me cope with stress	
	... keeps me awake/alert	
	... helps me relax	
	... makes me feel good	
	... helps me to cope with life	
	... makes me feel full or satiated	
	... is a balanced meal of rice and meat and/or vegetables	
	... is a balanced meal of meat and vegetables	
	... is a balance of hot, cold and neutral food	
C48	Do you classify your food as "hot", "cold" and "neutral"?	This is to know if the household classifies their food in these categories. If no, proceed to C51.
C49-C50	If 『yes』, what is your interpretation of each classification, and what are some common examples under each (Place "999" if don't know or "88888" if not applicable)?	If yes, we want to know how each household defines the hot-cold categories, and the type of food items they classify in each group.

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C51	Do you use food to treat a malady?	This is to know if they use food to treat illnesses. If no, proceed to C56.
C52-C55	If 「yes」, list down the common food treatments for each given malady (For respondents who don't classify according to "hot", "cold", "neutral", ask them how they classify and write down their responses in the Classification column; otherwise, place "88888" if not applicable).	If yes, for each malady indicated, the respondent provides examples of these food items his/her household uses to treat each malady, how the food is classified ("hot", "cold", "neutral" or other), and provide the main reason for using each food as treatment.
C56-C61	[FOR THE MOTHER ONLY] During pregnancy, ... (See classification code above. Place "999" if don't know or "88888" if not applicable.)	Note to enumerator: If the main person who prepares the food in the household is not the Mother, invite the Mother to join you for the following questions. The mother provides a list of food items that she eats and avoids during the pregnancy period, and the main reasons why. The classification refers to hot, cold, neutral or other.
C62-C67	[FOR THE MOTHER ONLY] After childbirth, ... (See classification code above. Place "999" if don't know or "88888" if not applicable.)	The mother provides a list of food items that she eats and avoids after childbirth and the main reasons why. Similarly, the classification refers to hot, cold, neutral or other.

Section D: The Abbreviated-Women's Empowerment on Agriculture Index (A-WEAI) and the Gender dimensions of household decision-making process.

This covers information on the different roles husband and wife (or the primary and secondary decision-makers) play in the household following the Abbreviated-Women's Empowerment on Agriculture Index (A-WEAI) parameters, as well as in other specific activities related with, i.e. production (for those into agriculture), control of resources and income, consumption, child rearing, health, education, access to training/workshop/extension services, membership to organization, and access to credit.

It is important to understand the gender roles since "women play a critical and potentially transformative role in agricultural growth in developing countries, but they face persistent obstacles and economic constraints limiting further inclusion in agriculture. The Abbreviated-Women's Empowerment in Agriculture Index (A-WEAI) measures the empowerment, agency, and inclusion of women in the agriculture sector in an effort to identify ways to overcome those obstacles and

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constraints" (IFPRI, 2012)[5]. To do this, their roles and extent of engagement in agriculture as well as women empowerment compared to men's will be looked at using five domains: (a) decisions about agricultural production, (b) access to and decision-making power over productive resources, (c) control over use of money, (d) leadership in the community, and (e) time use.

In addition, we added questions on who decides for specific activities related with agricultural production for those engaged in these activities (e.g. what varieties to use, what price to sell the harvested crop, etc.); control of resources and income (e.g. who manages the income from sale of horticultural crops, whom to sell land, etc.); consumption (e.g. what food items to buy, what meals to cook on special occasions, etc.); child rearing (e.g. who looks after the children at home, what brand of milk to buy, etc.); health (e.g. when to visit the clinic or hospital when sick, who takes care of the sick person in the family); education (e.g. where children should go for higher education, etc.); access to training/workshop/extension services (e.g. who attends training and/or workshop related with agricultural production, who decides who will attend these training/workshop, who keeps the pamphlets/flyers received from these training/workshop, etc.); and credit (e.g. who borrows money for agricultural activities, who borrows money for health and/or education-related reasons, etc.).

This module is split into two: one for the primary and the other for the secondary decision-makers in the household identified in A6. Before starting this module, inform the primary and secondary respondents that they have to be interviewed separately. This is critical to avoid the dominant respondent from influencing the answers of the spouse (in most cases, the primary and secondary respondents are normally the husband and wife or the household head and his spouse. See notes below taken from the Instructional Guide[5] on A-WEAI.). If, however, one of the respondents do not speak the Vietnamese dialect, inform the field supervisor and survey coordinator. Make a schedule for another visit on a later date with the household together with a translator.

Notes to enumerator:

- *The primary and secondary member are usually the husband and wife; however, they can also be another member as long as there is one male and one female aged 18 years old and over (for instance, a mother could be living with her adult son or father with an adult daughter).*

- *In general, the primary decision-maker is also the head of the household but this may not always be the case (i.e. elderly parent living with adult son/daughter and the adult son/daughter may be the primary or secondary respondent).*

- *It may also be the case that there is only a primary female respondent and there is no adult male present in the household. In cases whereby the primary male adult is absent from the house due to migration (has gone for work), and has been or is expected to be away for more than 3 months out of the next/previous 6 months, the primary female adult is considered the primary decision maker.*

[5] International Food Policy Research Institute (IFPRI). (2012). *Women's empowerment in agriculture index* [Brochure]. Washington, D.C.: IFPRI, Oxford Poverty and Human Development Initiative (OPHI) and USAID's Feed the Future.
[6] Malapit, Hazel J.; Kovarik, Chiara; Sproule, Kathryn; Meinzen-Dick, Ruth Suseela; and Quisumbing, Agnes R. 2015. Instructional guide on the abbreviated Women's Empowerment in Agriculture Index (A-WEAI). Washington, D.C.: International Food Policy Research Institute (IFPRI). http://ebrary.ifpri.org/cdm/ref/collection/p15738coll2/id/129719

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(a) Role in Household Decision-making around Production and Income Generation.

These are questions on participation in certain types of work activities and other household spending habits, and who makes decisions on them.

D1	Did you yourself participate in [ACTIVITY] in the past 12 months (MAY 2015-APR 2016)? The list of activities are as follows: A. Food crop farming: These are crops that are grown primarily for household food consumption. B. Cash crop farming: These are crops that are grown for sale in the market. C. Livestock raising D. Non-farm economic activities: This would include things like running a small business, self-employment, buy-and-sell. E. Wage and salary employment (including pensions of retirees or gifts from relatives/friends): This could be work that is paid for in cash or in-kind, including both agriculture and other wage work. F. Aquaculture (fishing or fishpond culture) G. Major household expenditures (such as bicycles, land, etc.) H. Minor household expenditures (such as food for daily consumption or other household needs)	Essentially, this is to know what activities listed s/he participated in the past 12 months (D1), who made the decisions on these activities (see code for D2, multiple response is allowed); if s/he was involved in making decisions, how big was his/her involvement in making those decisions (see code for D3, e.g. input into few decisions, input in some decisions, input in most or all decisions); the extent of making personal decisions if they want to (see code for D4, e.g. not at all, small extent, medium extent, high extent); and input on how to spend income received from these activities (see code for D5, e.g. input in few decisions, input into some decisions, input into most or all decisions). If the respondent participated in an activity, ask questions D2-D5; otherwise, write "88888" (not applicable) in D2-D5. The examples provided per item are limited. It is in the field researcher's discretion as to where and how to categorise the answers given by the respondent. For instance, if the respondent said they bought a car last year, it should be included in G. Also, take note of items G (Major household expenditures) and H (Minor household expenditures). During the last 12 months, it is likely that the household has spent on these items so D2-D4 should not be left blank for all households.
D2	If 「yes」, when decisions are made regarding [ACTIVITY], who is it that normally makes the decision? [Tick all that applies] *If response is SELF ONLY, go to D5*	
D3	How much input did you have in making decisions about [ACTIVITY]?	
D4	To what extent do you feel you can make your own personal decisions regarding [ACTIVITY] if you want(ed) to? Select one.	
D5	How much input did you have in decisions on the use of income generated from [ACTIVITY]?	

(b) Access to productive capital.

D6	Does anyone in your household currently have any [item]? The list of productive capital are as follows:	These are household assets that could be used to generate income.

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	A. Agricultural land (pieces/plots) B. Large livestock (cattle, water buffalo, horse, etc.) C. Small livestock (goats, pigs, etc.) D. Chickens, ducks, turkeys, pigeons E. Fish pond or fishing equipment F. Farm equipment (non-mechanised; hand tools, animal-drawn plough, etc.) G. Farm equipment (mechanised: tractor-plough, power tiller, treadle pump, etc.) H. Nonfarm business equipment (any equipment used in the nonfarm business) I. House or other structures J. Large consumer durables (refrigerator, TV, sofa, etc.) K. Small consumer durables (radio, cookware, etc.) L. Mobile phones M. Other land not used for agricultural purposes (pieces/plots, residential or commercial) N. Means of transportation (bicycle, motorcycle, car, etc.)	In this portion, we want to know if the household owns any of these productive capital. And if yes, is it owned solely by the respondent, or owned jointly by the primary and secondary decision-makers. Refer to codes in the questionnaire. If the household owns a productive asset, ask question D7; otherwise, write "88888" (not applicable) in D7 and go to the next item. The examples provided per item are limited. It is in the field researcher's discretion as to where and how to categorise the answers given by the respondent. For instance, if the respondent said they own a dog, it should be included in C. To help on these, below are some other examples for specific groups: Non-mechanised farm tools: hoe, spade, shovel, machete, sickle, scythe, bow saw, etc. Consumer durables are consumer products that do not have to be bought regularly because they last for several years. We are splitting them into large and small items. Other examples of large consumer durables are water tank, washing machine, water purifier, and other large appliances and furniture. Other small consumer durables are jewelleries, kitchen appliances like rice cooker, DVD player, etc.
D7	Do you own any of the item?	

(c) Access to credit.

D8	Would you or anyone in your household be able to take a loan or borrow cash/in-kind from [SOURCE] if you wanted to? The list of lending sources are as follows: A Non-government organization (NGO) B Formal lender (bank/financial institution, e.g. Agribank, VBSP) C Informal lender (private moneylenders and traders and friends charging interest) D Friends/relatives (charging zero interest) E Union (Farmers'/Women's Union, People's Credit Funds)	These are the household's experiences with borrowing money or other items in the past 12 months. For these series of questions, we want to know: if they can borrow easily if they want to (D8); if someone in the household has borrowed in the last 12 months (D9, cash, in-kind, both); who decides to borrow in most cases (D10, see code similar with D2, multiple response allowed); and who decides what to do with the borrowed money/item in most cases (D11, multiple response allowed). Refer to the codes in the questionnaire

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	F Informal savings and credit groups (SCGs)	
D9	Has anyone in your household taken any loans or borrowed cash/in-kind from [SOURCE] in the past 12 months? Select one.	
D10	Who makes the decision to borrow from [SOURCE] most of the time? [Tick all that applies]	
D11	Who makes the decision about what to do with the money/item borrowed from [SOURCE] most of the time? [Tick all that applies]	

(d) Group membership.

D12	Is there a [GROUP] in your community? The type of groups listed are as follows: A. Agricultural/Livestock/Fisheries producer's group (including marketing group) B. Water user's group C. Forest user's group D. Credit or microfinance group E. Mutual help or insurance group F. Trade and business association group G. Civic groups (improving community) or charitable group H. Religious group I. Other [women's/men's] group (e.g. commune VWU or veteran's group, or others only if it does not fit into one of the other categories J. Other (specify)	These are about groups present in the community, either formal or informal and customary groups, and if the respondent is actively involvement as a member if any of them.
D13	Are you an active member of this [GROUP]?	

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(e) Time allocation (typical day).

These are about the detailed activities done by the respondent in the last complete 24 hours (starting yesterday morning at 4AM, finishing 3:59AM of the current day) of a typical work day, and not one of those cultural or religious days, or when they visited the commune clinic to get medicines for the sick children or other household member. The time intervals are marked in 15-min intervals and one activity can be marked for each time period by drawing a line through that activity.

Read the instruction to the respondent. Afterwards, begin by asking what time s/he woke up this morning, and ask him/her what s/he did afterwards. DO NOT PROMPT. Let the respondent narrate the events freely from beginning of his/her activity to the last one before sleeping. It is likely that many respondents do not have time in minutes and hours "in their heads" as we do where our days are structured around a 24-hour time period. This time spans allocated to activities will be more of an approximation, especially because there is rounding, than a strict 15-minute interval. Once you have a full accounting from early morning of previous day to early morning of current day, begin prompt by asking those items s/he did not mention, e.g. personal care like spending time in the toilet washing face, brushing teeth and other personal stuffs; travelling (commuting or walking to destination), etc. until the whole 1,440 minutes (24 hours) have been filled.

Now, I would like to ask you about how you spent your time during the past 24 hours. This should be a typical workday, and not one of your cultural or religious days, or when you went to the commune clinic to get medicines for the sick children or household member. We will begin from yesterday morning, and continue through to this morning. This will be a detailed accounting. I'm interested in everything you do (i.e. resting, eating, personal care, and work inside and outside the home, caring for children, cooking, shopping, socializing, etc.), even if it does not take much of your time. If yesterday was not a typical day, use the previous day instead or the most recent typical workday.

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5. Time Allocation

5. Phân bổ thời gian

Note to enumerator: Please record a log of the activities of the individual in the last complete 24 hours (starting yesterday morning at 4AM, finishing 3:59AM of the current day). The time intervals are marked in 15-min intervals and one activity can be marked for each time period by drawing a line through that activity.

Ghi chú với điều tra viên: Ghi lại các hoạt động của từng cá nhân trong vòng 24 tiếng đồng hồ qua (bắt đầu từ 4 giờ sáng ngày hôm qua, kết thúc lúc 3 giờ 59 phút sáng của ngày hiện tại). Khoảng thời gian được đánh dấu là 15 phút một khoảng và một hoạt động có thể được đánh dấu cho từng khoảng thời gian bằng cách kẻ một đường thẳng đi qua hoạt động đó.

Now, I would like to ask you about how you spent your time during the past 24 hours. We will begin from yesterday morning, and continue through to this morning. This will be a detailed accounting. I'm interested in everything you do (i.e. resting, eating, personal care, work inside and outside the home, caring for children, cooking, shopping, socializing, etc.), even if it does not take much of your time.

Bây giờ tôi muốn hỏi ông/ bà đã làm gì trong 24 tiếng đồng hồ qua. Chúng ta sẽ bắt đầu từ sáng ngày hôm qua, và tiếp tục đến sáng ngày hôm nay. Điều này sẽ rất chi tiết. Tôi quan tâm đến tất cả những việc Ông/ bà làm (ví dụ nghỉ ngơi, chăm sóc bản thân, làm việc trong hoặc ngoài nhà, chăm sóc trẻ nhỏ, nấu ăn, đi chợ, hoạt động xã hội...), cho dù hoạt động đó không tốn nhiều thời gian của ông/ bà.

Activity (Hoạt động)	Night / Đêm		Morning / Sáng		Day / Ngày									
D14	4	5	6	7	8	9	10	11	12	13	14	15
A. Sleeping and resting												
A. Ngủ và nghỉ ngơi												
B. Eating and drinking												
B. Ăn uống												
C. Personal care												
C. Vệ sinh cá nhân												
D. School (also homework)												
D. Đi học (và làm bài tập về nhà)												
E. Work as employed												
E. Đi làm												
F. Own business work												
F. Tự kinh doanh												
G. Farming/livestock/fishing												
G. Làm ruộng/ chăn nuôi/ đánh cá												
J. Shopping/getting service (incl. health services)												
J. Đi chợ/ sử dụng các dịch vụ (bao gồm chăm sóc sức khoẻ)												
K. Weaving, sewing, textile care												
K. Dệt, may, sửa quần áo												
L. Cooking												
L. Nấu ăn												
M. Domestic work (incl. fetching wood and water)												
M. Việc trong nhà (bao gồm lấy củi và xách nước)												
N. Care for children/adults/elderly												
N. Chăm sóc trẻ nhỏ/ người lớn/ người già												
P. Travelling and commuting												
P. Đi chơi và đi lại												
Q. Watching TV/listening to radio/reading												
Q. Xem TV/ nghe đài/ đọc sách báo												
T. Exercising												
T. Tập thể dục												
U. Social activities and hobbies												
U. Các hoạt động xã hội và sở thích												
W. Religious activities												
W. Các hoạt động tôn giáo												
X. Other (specify) _____												
X. Khác (ghi rõ) _____												

Activity (Hoạt động)	Evening / Tối		Night / Đêm									
D14	16	17	18	19	20	21	22	23	24	1	2	3
A. Sleeping and resting												
A. Ngủ và nghỉ ngơi												
B. Eating and drinking												
B. Ăn uống												
C. Personal care												
C. Vệ sinh cá nhân												
D. School (also homework)												
D. Đi học (và làm bài tập về nhà)												
E. Work as employed												
E. Đi làm												
F. Own business work												
F. Tự kinh doanh												
G. Farming/livestock/fishing												
G. Làm ruộng/ chăn nuôi/ đánh cá												
J. Shopping/getting service (incl. health services)												
J. Đi chợ/ sử dụng các dịch vụ (bao gồm chăm sóc sức khoẻ)												
K. Weaving, sewing, textile care												
K. Dệt, may, sửa quần áo												
L. Cooking												
L. Nấu ăn												
M. Domestic work (incl. fetching wood and water)												
M. Việc trong nhà (bao gồm lấy củi và xách nước)												
N. Care for children/adults/elderly												
N. Chăm sóc trẻ nhỏ/ người lớn/ người già												
P. Travelling and commuting												
P. Đi chơi và đi lại												
Q. Watching TV/listening to radio/reading												
Q. Xem TV/ nghe đài/ đọc sách báo												
T. Exercising												
T. Tập thể dục												
U. Social activities and hobbies												
U. Các hoạt động xã hội và sở thích												
W. Religious activities												
W. Các hoạt động tôn giáo												
X. Other (specify) _____												
X. Khác (ghi rõ) _____												

Gender dimensions of household decision-making processes.

At this point, we are going to ask the primary and secondary respondents who decides on specific activities in the household. These questions are NOT about who does each activity.

Please take note that items 1-30 are agricultural production-related. For households that are not engaged in any agricultural production or activity, write "0" (no) in item 1 and proceed to item 31.

*Note: *Agricultural production/activity refers to cultivation of crops and rearing of animals regardless of whether they are consumed at home or for sale.*

For questions D16 items 02-70, use the codes self only, spouse only, both husband and wife, other household member, other non-household member. Refer to the questionnaire.

Group	Item	Item
1. Production activities	01	Was any member of your household been engaged in any agricultural production* or activity (SEE NOTE ABOVE) in the last 12 months?
		If 「yes」, who normally decides on …. ?
	02	… what crops to grow?
	03	… what varieties to use?
	04	… when to plant?
	05	… what crop establishment method to adopt?
	06	… which land preparation to use?
	07	… what fertilizer/pesticide/herbicide to apply?
	08	… who collects and prepares the animal manure?
	09	… when to do weeding?
	10	… when to hire labour for agricultural activities?
	11	… who to hire and the number of labour to hire for agricultural activities?
	12	… when to harvest and do threshing?
	13	… whether to sell or consume the harvested crop?
	14	… the quantity of output to sell and consume?
	15	… how to store seeds?
	16	… where and whom to sell the harvested crop?
	17	… at what price to sell the harvested crop?
	18	… how to pack and transport the harvested crop?
	19	… who gathers animal feed for the livestock and other farm animals?
	20	… whether to kill and sell or consume farm animals?
	21	… at what price to sell the farm animal?
	22	… whether or not to adopt a new agricultural technology in the farm?
2. Control of resources and income	23	… how much money to spend on farm inputs?
	24	… who manages the lease/purchase of additional land?
	25	… who manages the lease/purchase of farm machinery?
	26	… who manages the lease/purchase of farm equipment?
	27	… who manages the income on sale of staples and fruit crops?

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Group	Item	Item
	28	... who manages the income on sale of horticultural crops?
	29	... who manages the income on sale of livestock?
	30	... who manages the income on sale of fish and other aquaculture?
	31	... who manages the income on sale of land?
	32	... who manages the income from non-farm business(es), e.g. trading?
	33	... who manages the overall household income?
	34	... whom to sell some land?
	35	... whom to lease some land?
	36	... at what price to sell the land?
	37	... at what price to lease the land?
	38	... when to repair the house and its parts?
3. Consumption	39	... what food items to buy?
	40	... how much money to spend on food?
	41	... what meals to cook on an ordinary day?
	42	... what meals to cook during days when money is low?
	43	... what meals to cook on special occasions (festivals, birthdays, Tet holiday, etc.)?
	44	... who allocates food to each household member every meal?
	45	... who stores leftover food for the next meal?
	46	... who packs meals for the children to bring to school?
4. Child rearing	47	... who looks after the children at home?
	48	... what type of food to prepare for children under 5 years old ?
	49	... what brand of milk to buy?
	50	... what type of milk to buy, e.g. soya, low-fat, etc.?
	51	... what milk substitutes to prepare or buy, e.g. rice-water, water only, etc.?
	52	... when to feed children below 5 years old?
	53	... how many children to raise in the family?
5. Health	54	... when to visit the clinic or hospital when sick?
	55	... who accompanies the sick when visiting the clinic or hospital?
	56	... who takes care of the sick person in the family?
6. Education	57	... where children should go for higher education?
	58	... who buys school supplies for the children?
	59	... who brings the children to and picks them up from school?
7. Access to training/worksh op/extension services	60	... who attends training and/or workshop related with agricultural production?
	61	... who attends training and/or workshop related with child rearing, vaccinations and other health-related topics?
	62	... who decides who will attend other types of training/workshop?
	63	... who keeps the pamphlets/flyers received from these training/workshops?

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Group	Item	Item
	64	... who meets with extension workers?
8. Credit	65	... who borrows money for agricultural activities?
	66	... who borrows money for health and/or education-related reasons?
	67	... who borrows money for personal reasons, when income is not enough?
	68	... how much to borrow?
	69	... where to borrow?
	70	... who manages the money after borrowing?

Section E. Micronutrient supplementation, breastfeeding practices and maternal knowledge about nutrition information.

This covers information of children under 5 years old and the mother's micronutrient supplementation. Specific questions relate with vitamin A supplement intake of the mother and children under 5 years old, deworming and iron or iron-folate tablet intake during and after pregnancy, breastfeeding practice for children under 2 years, use of iodized salt, and the maternal knowledge on certain nutrition knowledge information like feeding infants with meat, fish, eggs and other animal-source food, with green leafy vegetables, etc. This module was adapted from the National Institution of Nutrition (NIN)'s National Nutrition Surveillance 2013 (Mother and child under 5) questionnaire[7].

If, for instance, the household does not have any children under 5 years, proceed to E5 and inquire about the mother's micronutrient supplementation during her last pregnancy. Continue asking the relevant questions, i.e. E23-E27 (maternal knowledge about nutrition information, the use of iodised salt, and multivitamin intake of household members).

E1	Do you have any child(ren) under 5 years old?	This will be automatically determined in the tablet as HH respondents are linked in A1 and A7. If no children under 5 years, proceed to E5.
	If 『yes』, I would like to ask you about your child(ren)'s micronutrient supplementation. Again, this part only refers to children under 5 years old. Write their names in E2 - E4.	
	Children's Micronutrient Supplementation	
E2-E4	Name 1-3:	Write the household ID code of children under 5 years (refer to A1).
	Did [name] have the following... within the last 6 months?	These questions are repeated for each child identified. Answer questions E2 A-E to E4 A-E (if there are 3 children below 5 years). Please take note that the

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[7] http://viendinhduong.vn/FileUpload/Documents/Nutrition%20Profile%202013/E04n2013_questionaire.pdf

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		period for these questions is <u>the last 6 months only</u>.
A	.... get vitamin A from CHC when child was malnourished/ diarrhoea/ measles/ fever/ cough?	These questions are about getting vitamin A in different occasions <u>in the last 6 months</u>.
B	... consume vitamin A from Micronutrient Day?	
C	... consume vitamin A from other source?	• Getting vitamin A when suffering from malnourishment, etc. • Getting vitamin A during Micronutrient Day • Getting vitamin A from other source. Write "999" if do not know.
D	Did [name] get dewormed within the last 6 months?	
E	Do [name] have night blindness symptoms* within the last 6 months?	Explain about the night blindness symptom if the respondent does not know. Night blindness is when you experience difficulty seeing in the dark – at night or in dimly lit places.
F	Who told you about <u>Micronutrient Day/Vitamin A day</u>? [Tick all that applies]	Micronutrient Day is an activity conducted twice a year at commune health clinics (CHC) in Vietnam with the support of UNICEF. It includes "vitamin A supplementation for all children aged 6-36 months at the national level and for all children up to 59 months in the most disadvantaged provinces and districts... Micronutrient Days also include growth monitoring for children, and iron and folic acid supplementation for pregnant women."[8] For this part, we want to know who informed them about it: health staff, via invitation letter, relative,

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[8] Bisin, S. (2014, October 22). Micronutrient Days fight Viet Nam's 'hidden hunger'. UNICEF Newsline: At a glance: Viet Nam. Retrieved from http://www.unicef.org/health/vietnam_62201.html

		neighbour, TV/radio, or other sources. Refer to the codes in the questionnaire. Multiple response is allowed.
	Mother's Micronutrient Supplementation	E5-E13: These only refer to the mother's condition. Similar with our questions for children under 5 years, we also want to know about the mother's micronutrient supplementation in several periods.
E5	Did you take vitamin A after the delivery of your youngest child?	
E6	Did you get dewormed during the last 6 months?	
E7	Do you ever have a night blindness symptom during the last pregnancy?	
E8	Did you consume iron or iron-folate tablets in the last 6 months? *[If no/don't know, go to E10]*	
E9	If 『yes』, how many months did you consume?	
E10	Did you consume iron or iron-folate tablets at any time from 3 months prior to pregnancy to 3 months after delivery of the youngest child? *[If no/don't know, go to E14]*	
E11	If 『yes』, when did you consume the iron or iron-folate tablets during your pregnancy? [Ask each period. Tick all that applies]	We want to know the period when they took the iron or iron-folate tables during pregnancy: 3 months before pregnancy, during pregnancy, 3 months after delivery of the youngest child.
E12	If 『yes』, how many months of each period did you consume at <u>least 20 days</u>? [Ask for each 3-month time period. Please fill "0" if none]	After the mother has indicated the period stated above, we want to know which trimester specifically during the pregnancy period: 1st trimester, 2nd trimester, or 3rd trimester. The frequency minimum of 20 days per period.
E13	How did you acquire these iron or iron-folate tablets? [Tick all that applies]	We want to know how they acquired these iron or iron-folate tablets – bought, given for free,

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		received as gift, or other means. Refer to the codes in the questionnaire. Multiple response is allowed.
	Young child breast feeding, complementary food and drinks	This only refers to youngest child under 2 years.
E14	Do you have a child under 2 years old?	This will be automatically determined in the tablet as HH respondents are linked in A1 and A7. If no child under 2 years, proceed to E23.
E15	Name of the <u>youngest who is under 2 years old</u>:	If there is a child under 2 years old, the youngest will be indicated here from A2, and all questions from E16-E22 are only about this <u>youngest child under 2 years</u>.
E16	<u>How long after birth</u> was [name] breastfed for the first time (or put the child to the breast)? *[If > 24 hours, circle 3 and record no. of days]*	For this, we are interested about the period the child was breastfed the very first time immediately after birth: was it ≤1 hour after childbirth, was it ≤ 24 hours, or was it > 24 hours? If >24 hours after childbirth, please write the number of days instead.
E17	What was [name] given to drink during the first three days after birth? The choices are: 0. none other than breast milk 1. plain water 2. sugar/glucose water 3. honey 4. infant formula 5. other milk (not breast milk) 6. fruit juice/coco milk/herbal 7. clear broth (rice, bones, meat) 8. sugar-salt-water solution/ORS or syrup 99. other (specify)	Read each option to the respondent. Multiple response is allowed.

E18	Did you squeeze out any colostrum before putting [name] to the breast?	Colostrum is the very first milk produced during pregnancy. It can appear as a clear fluid or with a yellowish or orange colour.
E19	Are you still breastfeeding [name]?	
E20	How many times did you breastfeed yesterday from the time you woke up to the time you went to bed? [Including breastfeeding expressed breast milk. If answer is not numeric, probe for approximate answer]	Number of breastfeeding in the daytime.
E21	How many times did you breastfeed yesterday from the time you went to sleep to the time you woke up? [Including breastfeeding expressed breast milk. If answer is not numeric, probe for approximate answer]	Number of breastfeeding in the night time.
E22	When [name] is breastfeeding, do you give a little from each breast or empty one breast first before moving to second one?	
	Maternal knowledge about nutrition information	In this portion, we want to know the mother's knowledge about nutrition and their main source of information.
E23	Did you ever meet with the following health staff within the last month? [Tick all that applies]	The health staffs we are referring to here are the Vietnam Health Worker (VHW)/Nutrition volunteer, Women's Union, Commune Health Clinic (CHC) staff, health staff in the hospital, health staff from the private health sector, or others. Refer to the codes in the questionnaire. Multiple response is allowed.
E24	During the last 3 months, did you hear, see or have been counselled on any of the following .... ?	Note to enumerator: Read each item one at a time. If NO, write "0". If YES, indicate main source only.
A	Infants should be breastfed immediately after birth.	The sources are:
B	Nursing more leads to more breast milk.	1. nutrition meeting group 2. health staff
C	Infants should be exclusively breastfed for up to 6 months.	3. TV 4. radio/loudspeaker 5. newspaper/magazine

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D	Other than breastmilk, infant under 6 months should not be given any water.	6. internet/mobile/tablet 7. poster/leaflet 99. other (specify) 999. don't know/don't remember
E	Continue to BF up to 24 months or beyond.	
F	Ban on advertising of breastmilk substitutes for children under 2 years.	
G	Feed infants meat, fish, eggs, and other animal source food.	
H	Feed infants green leafy vegetables (spinach, jute, watercress, kangkong).	
I	Wash hands with soap before preparing food and before feeding the child.	
J	Monitor a child's growth (height and weight).	
K	Women should consume iron tablets before and during pregnancy to prevent anaemia.	
L	Extend paid maternity leave from 4 to 6 months.	
M	Using iodized salt in the meals.	
	Use of iodine salt	
E25	Does your family use iodized salt or soup powder (ex. *Bột canh Thiên Hương*) for cooking or flavouring?	
	Use of multivitamins and other food supplements	
E26	Do you or other household members take any multivitamins, minerals and other food supplements?	
E27	If 『yes』 , please provide examples and identify whom among the household member is taking them.	First is to list down all multivitamins in the household, and then identify who is taking each multivitamin by using the unique HH member code from A1. Multiple household member is allowed for each multivitamin.

Section F: Health indicators, access to clean water and sanitation, handwashing practices, and lifestyle

This covers information on the disease incidence in the household from the most serious ones like diabetes, high blood pressure, heart disease, cancer, polio, malaria, typhoid, to simple ailments like diarrhoea, fever, cough, runny and stuffy nose. It also covers who among the household members is suffering from what, and the changes have been implemented to manage these ailments. Other questions on health relate with access to the nearest health clinic and if they have visited it in the last 6 months, as well as change in the overall health status of household members in the last 5 years.

This section also includes information on the household's access to clean water, clean toilet, handwashing practices and their lifestyle and smoking status. In particular, we are also interested to know the main source of water used for drinking, cooking and handwashing, and what they do to make the water safer to drink. For the household's access to clean toilet and waste disposal, questions on the kind of toilet the household members use and if they share it with other household members and the public, as well as the waste disposal of the youngest child in the household are included. On handwashing practices, we want to know if they wash their hands on certain activities like before preparing or eating food, before treating a wound or looking after someone sick, etc. Last but not the least, on lifestyle and smoking status, information include questions on how many hours per day adults and children devote to watching TV/videos, on the internet or looking at their smartphone/tablet for entertainment, how many hours per day adults and children do exercise, and who smokes in the household.

		On disease incidence and access to health clinic	
F1-F2	Is anyone in your household currently suffering from [illness]? 1. overweight? 2. underweight? 3. diabetes? 4. high blood pressure? 5. heart disease? 6. cancer? 7. pneumonia? 8. measles? 9. malaria? 10. typhoid? 11. hepatitis A and/or B? 99. other (specify)	In this portion, we want to know if any household member is suffering from any serious illness – past or present. If household members are all healthy and have not had any serious illness in the past up to present, write "0" for all illnesses and proceed to F8.
F3	If 「yes」 , which household member was it? [Refer to HH member code in A1]	Ask this for each illness. Multiple HH member allowed for each illness.
F4	What year was the household member(s) first diagnosed?	Ask this for each illness and for each HH member listed.
F5-F7	What did this household member(s) do to control the [disease]?	Ask for each illness and for each HH member listed. No prompting, classify up to 3 responses per illness per household member.
F8-F12	Have you or any household member experienced … in the last 2 weeks? …severe diarrhea? …fever?	In this portion, we want to know if any household member is suffering from any mild illness in

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		...cough? ...runny, stuffy nose? ...shortness of breath?	the last 2 weeks. If yes, use the codes: 0. none of us 1. all of us 2. only children 3. only adults
F13	How close is the <u>nearest</u> health centre/clinic (meters)?	Proximity of a health centre or clinic to the residence.
F14	Have you visited it in the last 6 months?	If no, proceed to F16.
F15	If 〖yes〗, for what purpose/reason? [Tick all that applies]	Multiple response is allowed.
F16	If 〖no〗, why did you not visit it in the last 6 months? [Tick all that applies.]	Multiple response is allowed.
F17	How has the health status of household members changed in the last 5 years?	
F18	[If F17 = 1 or 2] What is the primary reason for the change in the health status of household members?	Only answer this part if F17=1 or F17=2.
	On access to clean water	
F19	What is the main source of drinking water for members of the household? [See code]	Refer to the codes in the questionnaire. Some definitions[9] of the codes in the footnote.

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[9] World Health Organization, United Nations Children's Fund. Core questions on drinking-water and sanitation for household surveys; Geneva: WHO, UNICEF; 2006. Available from: http://www.who.int/water_sanitation_health/monitoring/oms_brochure_core_questionsfinal24608.pdf (pp.8-9)

Piped water into dwelling, also called a household connection, is defined as a water service pipe connected with in-house plumbing to one or more taps (e.g. in the kitchen and bathroom).

Piped water to yard/plot, also called a yard connection, is defined as a piped water connection to a tap placed in the yard or plot outside the house.

Public tap or standpipe is a public water point from which people can collect water. A standpipe is also known as a public fountain or public tap. Public standpipes can have one or more taps and are typically made of brickwork, masonry or concrete.

Tubewell or borehole is a deep hole that has been driven, bored or drilled, with the purpose of reaching groundwater supplies. Boreholes/tubewells are constructed with casing, or pipes, which prevent the small diameter hole from caving in and protects the water source from infiltration by run-off water. Water is delivered from a tubewell or borehole through a pump, which may be powered by human, animal, wind, electric, diesel or solar means. Boreholes/tubewells are usually protected by a platform around the well, which leads spilled water away from the borehole and prevents infiltration of run-off water at the well head.

Protected dug well is a dug well that is protected from runoff water by a well lining or casing that is raised above ground level and a platform that diverts spilled water away from the well. A protected dug well is also covered, so that bird droppings and animals cannot fall into the well.

Protected spring. The spring is typically protected from runoff, bird droppings and animals by a "spring box", which is constructed of brick, masonry, or concrete and is built around the spring so that water flows directly out of the box into a pipe or cistern, without being exposed to outside pollution.

		In these areas, oftentimes water is sourced from the mountain. Households are connected to the water source using a soft PVC pipe that directly goes straight to their houses. In this case, ask about the water source – is it from a surface water source (from a river, dam, lake, pond, stream, canal, irrigation channels), protected spring, unprotected spring, etc.
F20	What is the main source of water used by your household for other purposes like cooking and handwashing? [See code]	Use the codes from F19.
F21	Do you treat your water in any way to make it safer to drink?	If no, proceed to F23.
F22	If 『yes』, what do you usually do to the water to make it safer to drink? [Tick all that applies]	Refer to the codes in the questionnaire. Multiple response is allowed.
	On access to clean toilet and waste disposal	
F23	What kind of toilet facility do members of your household usually use? [See code] (Note to enumerator: If flush or pour flush, probe: Where does it flush?)	Refer to the codes in the questionnaire. Some definitions[10] of the codes in the footnote.

Rainwater refers to rain that is collected or harvested from surfaces (by roof or ground catchment) and stored in a container, tank or cistern until used.

Unprotected spring. This is a spring that is subject to runoff, bird droppings, or the entry of animals. Unprotected springs typically do not have a "spring box".

Unprotected dug well. This is a dug well for which one of the following conditions is true: 1) the well is not protected from runoff water; or 2) the well is not protected from bird droppings and animals. If at least one of these conditions is true, the well is unprotected.

Cart with small tank/drum. This refers to water sold by a provider who transports water into a community. The types of transportation used include donkey carts, motorized vehicles and other means.

Tanker-truck. The water is trucked into a community and sold from the water truck.

Surface water is water located above ground and includes rivers, dams, lakes, ponds, streams, canals, and irrigation channels.

Bottled water is considered to be improved only when the household uses drinking-water from an improved source for cooking and personal hygiene; where this information is not available, bottled water is classified on a case-by-case basis.

[10] World Health Organization, United Nations Children's Fund. Core questions on drinking-water and sanitation for household surveys; Geneva: WHO, UNICEF; 2006. Available from: http://www.who.int/water_sanitation_health/monitoring/oms_brochure_core_questionsfinal24608.pdf (pp.12-13)

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F24	Do you share this toilet facility with other households?	If no, proceed to F26.
F25	If 『yes』, how many other households share this toilet?	
F26	Can any member of the public use this toilet?	
F27	The last time [NAME OF YOUNGEST CHILD] passed stools, what was done to dispose of the stools?	
	On Hand-washing Practices	

Flush toilet uses a cistern or holding tank for flushing water, and a water seal (which is a U-shaped pipe below the seat or squatting pan) that prevents the passage of flies and odours. A pour flush toilet uses a water seal, but unlike a flush toilet, a pour flush toilet uses water poured by hand for flushing (no cistern is used).

Piped sewer system is a system of sewer pipes, also called sewerage, that is designed to collect human excreta (faeces and urine) and wastewater and remove them from the household environment. Sewerage systems consist of facilities for collection, pumping, treating and disposing of human excreta and wastewater.

Septic tank is an excreta collection device consisting of a water-tight settling tank, which is normally located underground, away from the house or toilet. The treated effluent of a septic tank usually seeps into the ground through a leaching pit. It can also be discharged into a sewerage system.

Flush/pour flush to pit latrine refers to a system that flushes excreta to a hole in the ground or leaching pit (protected, covered).

Ventilated improved pit latrine (VIP) is a dry pit latrine ventilated by a pipe that extends above the latrine roof. The open end of the vent pipe is covered with gauze mesh or fly-proof netting and the inside of the superstructure is kept dark.

Pit latrine with slab is a dry pit latrine whereby the pit is fully covered by a slab or platform that is fitted either with a squatting hole or with seat. The platform should be solid and can be made of any type of material (concrete, logs with earth or mud, cement, etc.) as long as it adequately covers the pit without exposing the pit content other than through the squatting hole or seat.

Composting toilet is a dry toilet into which carbon-rich material (vegetable wastes, straw, grass, sawdust, ash) are added to the excreta and special conditions maintained to produce inoffensive compost. A composting latrine may or may not have a urine separation device.

Special case. A response of "flush/pour flush to unknown place/not sure/DK where" is taken to indicate that the household sanitation facility is improved, as respondents might not know if their toilet is connected to a sewer or septic tank.

Flush/pour flush to elsewhere refers to excreta being deposited in or nearby the household environment (not into a pit, septic tank, or sewer). Excreta may be flushed to the street, yard/plot, open sewer, a ditch, a drainage way or other location.

Pit latrine without slab uses a hole in the ground for excreta collection and does not have a squatting slab, platform or seat. An open pit is a rudimentary hole.

Bucket refers to the use of a bucket or other container for the retention of faeces (and sometimes urine and anal cleaning material), which are periodically removed for treatment, disposal, or use as fertilizer.

Hanging toilet or hanging latrine is a toilet built over the sea, a river, or other body of water, into which excreta drops directly.

Shared sanitation refers to sanitation facilities although of an improved kind, but shared between two or more households and all public facilities.

No facilities, bush, or field includes defecation in the bush or field or ditch; excreta deposited on the ground and covered with a layer of earth (cat method); excreta wrapped and thrown into garbage; and defecation into surface water (drainage channel, beach, river, stream or sea).

F28-F37	Is hand washing practiced in your household ...	Place "88888" for items not applicable.
	... before preparing or eating food?	
	... before treating a wound or looking after someone sick?	
	... after going to toilet?	
	... after blowing your nose, covering your cough or sneezing?	
	... after handling uncooked food like meat?	
	... after touching sores or cuts?	
	... after changing a diaper?	
	... after play with or cleaning an animal?	
	... after gardening or working in the farm?	
	... after handling garbage?	
	On Lifestyle and Smoking Status	
F38	On average, how many hours per day do the ADULTS (18 & over) in your household spend watching TV/videos, on the internet, and looking at smartphone/ tablet for entertainment?	
F39	On average, how many hours per day do the CHILDREN (5-17yrs) in your household spend watching TV/videos, on the internet, and looking at smartphone/ tablet for entertainment? Note: If no children, code as 88888 - not applicable.	
F40	On average, how many hours per week does each ADULT in the household do exercise (e.g. sports, bike riding)?	
F41	On average, how many hours per week does each CHILD in the household do exercise (e.g. sports, bike riding, physical education at school, playing outside? Code 88888 if no child.	
F42	Who smokes cigarettes among the household members?	List all smokers. [See code in A1 corresponding to each household member listed.]

Section G. Other household characteristics and assets.

This covers information on the other household characteristics like classification of the household as poor by the commune in the last 5 years; the main type of lighting and fuel used by the household; type of material the house is made of, ownership status of the house, value of the house if rented; distance, average travel time and common modes of transport used to the nearest road types and markets.

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G1	Is your household in the list of poor households in the commune this year (2016)?	In the first three questions, we want to know if their living conditions improved in the last 5 years (2011-present).
G2	Were you in the list of poor households in the commune 3 years ago (2013)?	
G3	Were you in the list of poor households in the commune 5 years ago (2011)?	
G4	What is the main type of lighting used by your household?	
G5	What type of fuel is normally used by your household for cooking? [Tick all that applies.]	Multiple response is allowed.
G6	What is the type of the house?	Solid houses: These are houses made of solid materials.
		Semi-solid houses: These include houses made of plywood/ wooden frame walls, and tile/metal/shingle roofs, etc., or are built with equivalent materials.
		Wood frame with cottage roof (or dried-leaves roof houses): These include houses with wood frames (wood poles completely supporting the roof), with limited use of over 15 years, and with roofs made of thatch/bamboo/oil-paper, etc.
		Temporary: These are houses that do not belong to one of the three groups above. This type of house has simple structure and is constructed with coarse materials. The wall of this type of house is usually made of clay/leaves etc. (not built walls, or wood frames) and the roof is usually made of thatch/bamboo/oil-paper etc.
		Note: If a household's residence is a structure

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			made up of different types (e.g. part of it is a solid house, another part is semi-solid, etc.), then designate the house type according to the part with the largest area.
G7	What is the ownership status of your house?		
G8	How much rent do you pay per month? (in million VND per month) [999 don't know; 88888 if not applicable]		If renting, we want to know how much they pay monthly.
G9	How much would it cost to rent housing like this in this neighbourhood? (in million VND per month) [999 don't know; 88888 if not applicable]		If they own the house or using it for free, we want to know how much it would cost to rent the same house in the neighbourhood.
G10	Distance (in meters) from your house to the nearest .... 1. ..dirt road? 2. ..asphalt or concrete or sealed road? 3. ..gravel road? 4. ..agriculture office? 5. ..village market? 6. ..commune market? 7. ..district market? 8. ..city market?		We want to know the distance from the gate along the perimeter of the house to the nearest [item] in meters.
G11	Regular mode of transport used to get there [See code]		Here, we want to know their common mode of transport used to reach the nearest [item] in G10...
G12	Average time (in minutes) one-way to get there		... and how long it takes to get there one-way in minutes.

Section H: Non-farm expenditure sources in the last 12 months

This covers information on the different expenditure items spent by the household in the last production year, who spent on which item, payment frequency, average amount spent on each time, and total expenditure.

	We would like to ask you about your non-farm expenses for the past 12 months (Place "0" if none or "88888" if not applicable).	

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H1	In the last 12 months, did any member of this household spend anything related to [expenditure item]? [Do not leave any blank. Indicate "0" if "no".]	Read each item, and provide explanation if necessary. See definitions of some items in the footnote.
	01 Household electrical equipment[11] a/	
	02 Housing maintenance and minor renovation[12] b/	
	03 Utilities (electricity, water, internet, gas, kerosene)	
	04 Telephone (fixed line, mobile recharge, public phones)	
	05 Non-electrical items (body products, cleaning supplies, cosmetics, tissue, etc.)[13] c/	
	06 Health expenditures (hospital, clinic, doctor, medicine, etc.)	
	07 Health insurance[14] d/	
	08 Education expenditures (school fees, English classes, tutor, books, uniforms, etc.)	
	09 Transportation (bus fare, petrol, etc.)	
	10 Domestic employees (housekeeper, driver, etc.)	
	11 Clothing (including shoes)	
	12 Tobacco (cigarettes, cigars, leaves, etc.)	
	13 Celebrations and ceremonies (paper money, food offerings, payment to *Thay Cuong*)	
	14 Other leisure spending (sports, movies, internet, magazines, etc.)	
	15 Non-farm business expenditures (taxes, bank payments, office equipment, office supplies, etc.)	
	16 Other non-food consumption spending (e.g. gifts, life insurance)	
	17 Food and non-alcoholic beverages (at home and away-from-home)	
	18 Alcoholic beverages	
H2	If 『yes』, how many times did you and/or other members of this household spend on [expenditure item] in the last 12 months?	

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[11] a/ Examples of household electrical equipment are:
(1) kitchen equipment like microwave, toaster, air pot, refrigerator, etc.;
(2) cleaning equipment like vacuum cleaner, etc.;
(3) personal items like electric razor, hair dryer, hair flat iron, ironing board, iron, powered toothbrush, etc.

[12] b/ It refers to any housing repair (replacement of broken or damaged items like leaky faucets, broken windows, patching holes on walls) and/or home maintenance (cleaning rain gutters, drains, landscaping, etc.).

[13] c/ Examples of non-electrical items are:
(1) kitchen items like sponge, plates, cups, chopsticks, etc.;
(2) cleaning supplies (broom, dustpan, dustbin, kitchen towels, etc.);
(3) personal items (for body like shampoo, conditioner, toothpaste, body lotion, tissue papers, cosmetics; and other household items like laundry powder, etc.).

[14] d/ Private health insurance like Bao Viet, Petro Vietnam Insurance, Bao Minh and PJICO.

H3	What was the payment frequency for this [expenditure item]?	
H4	On the average, how much did your household spend each time for [expenditure item]? Ask minimum and maximum to calculate average.	
H5	Total expenditure (H2 X H4)	

Section I: Household income sources in the last 12 months

This covers information on the various income sources of all household members engaged in some form of economic activity(ies) in the past 12 months.

	We would like to ask you about your income sources for the past 12 months *(Place "0" if none or "88888" if not applicable).*	
I1-I2	In the last 12 months, did any member of this household receive income from [item]? [Do not leave any blank. Indicate "0" if "no".] Farm and Non-farm business 01 Rice trading 02 Maize trading 03 Fruit trading 04 Vegetable trading 05 Livestock and/or aquaculture trading 06 Other trading 07 Grain milling business 08 Food processing business 09 Non-food trading (e.g. clothes, construction materials, etc.) 10 Transport operations 99 Other business Farm labour 11 Agricultural wage labour[15] a/ Non-farm wage	Read each item, and provide explanation if necessary. See notes for some items in the footnote.

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[15] a/ If an individual is sometimes paid in cash and in kind (e.g. payment includes lunch/dinner), ask the respondent the daily wage rate without meals and the daily wage with meals, and use the difference to indicate wage paid in kind. Then aggregate all agricultural wage labour income.

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	12 Non-agricultural employment[16] b/	
	Others	
	13 Sale of productive assets (e.g. land, farm implements, etc.)[17] c/	
	14 Sale or lease of durable assets (e.g. jewelleries, appliances, motorbike, etc.)[18] d/	
	15 Pension payment to retirees in the household	
	16 Remittances from other family members living outside the household	
	17 Rental income from leasing land or property	
	18 Assistance programs (government/NGO)[19] e/	
	19 Alms from relatives/neighbours/friends[20] f/	
	99 Other income sources	
I3	If 「yes」 , how many times did the household member(s) receive income from [activity] in the last 12 months?	
I4	What was the income frequency for this [activity]?	
I5	On the average, how much gross revenue did the household member(s) receive for each time?[21] g/	
I6	Total income (I3 X I5)	

Section J: Farm characteristics (for households engaged in any agricultural activity).

This covers information on the farm characteristics – distance and travel time from the plot to the house, land area, land use and water source, and main crops cultivated; type and number of aquaculture (if engaged in aquaculture); type and number of livestock and other animals and aquaculture in the farm (if into animal husbandry); and number of years of experience in vegetable cultivation.

	Land area used and leased by the household in the last 12 months (as of April 30, 2016)	
J1	How many plots do you have?	

[16] b/ This refers to Codes 21-26 in Employment categories in Section A: Household Characteristics.

[17] c/ Productive assets are assets that bring income to the household like farm machineries, farm equipment and land.

[18] d/ Durable assets are assets that can be used for longer periods like household items (home appliances, consumer electronics, and furniture), toys, etc.

[19] e/ One example is the financial subsidy (e.g. 300,000 VND) given by the government to poor households during the Tet celebration.

[20] f/ For instance, money received from relatives/friends/neighbours when a family member died, etc.

[21] g/ If the respondent could not estimate the average values, ask for the minimum and maximum values and then compute the average from there.

	By plot, provide information on the following:	From J2-J12, we are asking these questions for each plot.
J2	Distance of the house to the plot [no] (in meters)	
J3	Ave. time (one-way) to go to plot [no] (in minutes)	
J4	Land area (*sao*)	
J5	Land use for the last 12 months (see code)	
J6	Water source (see code)	
J7	Ownership status (see code)	
J8-J12	Top 5 main crops grown (see code)	
	Conversion: 1 *sao* = _____ sq.m.	
	Aquaculture	
J13	Do you have aquaculture?	
J14-J15	If 「yes」, Number of cages/rafts (unit) per type of fish/marine animal (as of April 30, 2016) 1. fish 2. shrimp 99. other (specify)	Note: Put "0" if none.
J16	Capacity per cage/raft (cu.m.) per type of fish/marine animal (as of April 30, 2016) 1. fish 2. shrimp 99. other (specify)	
	Animal husbandry	
J17	Do you have animals in the farm?	

J18-J20	If 「yes」, what animals do you have in the farm (as of April 30, 2016)?
	
	No. of heads (adult)
	1. buffalo
	2. cow
	  a. dairy/milking
	  b. beef (meat or draught)
	3. pig
		Note: Put "0" if none. If cannot approximate total number of heads, indicate the range e.g. 20-30 and get the median [median(20,30) =25].

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	4. chicken	
	5. duck	
	6. goose	
	7. goat	
	8. horse	
	9. dog	
	99. other (specify)	
	No. of heads (young)	
	1. buffalo	
	2. cow	
	a. dairy/milking	
	b. beef (of all ages)	
	3. pig	
	4. chicken	
	5. duck	
	6. goose	
	7. goat	
	8. horse	
	9. dog	
	99. other (specify)	
	Experience in vegetable cultivation	
J21	Since when have you been farming and making decisions by yourself? (year)	We want to know how many years the respondent is an independent farmer.
J22	If into vegetable cultivation, when did your household start growing vegetables? (year)	

Section K: Crop output and disposal in the last cropping cycle

This covers information on the list of crops grown and harvested in the last cropping cycle, total production, production distribution (sold, consumed, given as gifts, lost or spoilt in the farm, postharvest loss), marketing information (main buyer, selection criteria for crops/animals sold, average selling price and total sale value).

    Instruction: List all crops you have and provide the total production in the last cropping cycle. How did you dispose them? (Place "0" if none or "88888" if not applicable).

K1	List of crops* [See code in Annex 1]	Note: *List all crops (including medicinal

		plants) grown even those in the forest area. Do not include crops that were used for wood or timber.
K2	Date harvest	
K3	Total production (kg)	
	Production distribution	The total of K4-K8 should not exceed the value in K3.

If the respondent cannot provide estimates for each crop, aggregate by group (staples, vegetables, fruit). |
K4	Sold	
K5	Home consumption	
K6	Given as gift, offering or used for seed storage where applicable	
K7	Lost or spoilt in the farm	
K8	Postharvest losses	
	Marketing	
K9	Main buyer (see code)	
K10	How did you select which to sell? (see code) [Multiple response allowed]	
K11	Ave. price (in '000 VND/kg)	
K12	Value [K3 X K9] (in '000 VND)	

Disposal of livestock and other animals. This covers information on the list of livestock and other animals in the farm and the different quantities and total value of those sold, consumed, given as gifts, and disposed of for other purposes.

	From the list of livestock and other animals in the previous page, how did you dispose them for the last 6 months?	
K13	List of livestock and other animals [Link with J20 or J21]

<u>Livestock and other animals:</u>
1. buffalo | |

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	2. cow
	   a. dairy/milking
	   b. beef (of all ages)
	3. pig
	4. chicken
	5. duck
	6. goose
	7. goat
	8. horse
	9. dog
	99. other (specify)
	
	Animal by-products:
	1. poultry eggs (chickens, ducks, etc.)
	2. fresh milk
	99. others (specify)
	
	Aquaculture:
	1. fish
	2. shrimp
	99. others (specify)	

	Disposal	
K14	Quantity sold. If none, write "0".	
K15	Unit (kg or no)	
K16a	Price per unit (in '000 VND)	
K16	Value (in '000 VND)	This is a calculation of K16a X K14.
K17	Quantity home consumed. If none, write "0".	
K18	Unit (kg or no)	
K19	Value (in '000 VND)	If the household cannot estimate the value of home consumed, use the price information in K16a and multiply with the quantity in K17.
K20	Quantity given as gift, bartered, used as payment for wage. If none, write "0".	
K21	Unit (kg or no)	

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K22	Value (in '000 VND)	If the household cannot estimate the value of gift/bartered, use the price information in K16a and multiply with the quantity in K20.
K23	Quantity used for other purposes. If none, write "0".	
K24	Unit (kg or no)	
K25	Value (in '000 VND)	If the household cannot estimate the value of those used for other purposes, use the price information in K16a and multiply with the quantity in K23.
K26	Total value [K16+K19+K22+K25] (in '000 VND)	

Section L: Vegetable input expenditures in the last cropping cycle

This covers information on the different inputs used in vegetable cultivation like items used for planting/trellising, nutrient management, pest management, irrigation, other inputs, and overhead costs.

	Now, we would like to collect information for all inputs you purchased for your vegetable production in the last cropping cycle (Place "0" if none or "88888" if NA).	
L1-L2	Did your HH spend on [ITEM] in the last cropping cycle? Planting/ Trellising: 01 Seed 02 Seedling/sapling 03 Seedling tray 04 Bamboo stakes 05 Wire 06 Mulch 07 Other Nutrient management: 08 Animal manure/compost 09 Inorganic fertilizer 10 Foliar fertilizer (organic and/or inorganic) Pest and disease management:	Read each item, and provide explanation and/or examples if necessary.

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	11 Insecticide	
	12 Fungicide	
	13 Herbicide	
	14 Organic/bio pesticide	
	15 Insect traps, pheromone traps, etc.	
	Irrigation:	
	16 Sprinkler, drip irrigation, etc.	
	17 Irrigation fee	
	18 PVC pipe, etc.	
	Other inputs:	
	19 Cost of other structures (e.g. protected cropping, etc.)	
	20 Sacks	
	21 Fuel	
	22 Electricity (e.g. for sprinkler, water pump, incubation)	
	23 Rental charges for farm implements (tractors, power tillers, animals used for land preparation and other activities)	
	Overhead costs:	
	24 Land rent	
	25 Land tax	
	26 Interest charges	
	99 Other (specify) (1)	
	99 Other (specify) (2)	
	99 Other (specify) (3)	
L3	If 『yes』, quantity bought	999 don't know 88888 not applicable
L4	Unit of measure (see code)	
L5	Price per unit (in '000 VND/unit)	
L6	In total, how much did you spend for [item] in the last cropping cycle? [L3 X L5] (in '000 VND)	

Section M: Economic events/Shocks

This covers information on the unexpected events that affected the family in the last 5 years – from the month and year of occurrence, to the household's current condition after the shock, value of

loss, coping strategy(ies), duration of impact of the event, and ranking of the top 3 worst shocks experienced by the household. This module was adapted from the Bangladesh Integrated Household Survey (BIHS) 2011-2012 questionnaire[22].

Before starting the interview, read the instruction and emphasise that the recall period is from 2011-2016 only (5-year period).

Recall period: 5 years (2011-2016)
Note to enumerator: Households sometimes have good and bad surprises. First ask about any bad surprises or things that hurt the household financially.

M1	Which shocks did you experience in the last 5 years (2011-2016)?	Read each item.
	01 Death of main earner	
	02 Death of other household members in the family	
	03 Loss of income due to illness or injury of household member	
	04 Medical expenses due to illness or injury	
	05 Loss of a regular job of a household member	
	06 Lost home due to river erosion	
	07 Eviction from previous residence for any other reason	
	08 Divorce or abandonment	
	09 Major loss of crops due to flood	
	10 Major loss of crops due to other reasons (drought, storms, pests, diseases, etc.)	
	11 Loss of livestock due to flood	
	12 Loss of livestock due to death	
	13 Loss of livestock due to theft	
	14 Loss of productive assets due to flood	
	15 Loss of productive assets due to other reasons (theft, fire, river erosion, storms, etc.)	
	16 Loss or destruction of other consumption assets (personal) due to floods	
	17 Loss of consumption assets (personal) due to factors other than floods	
	18 Costs of wedding	
	19 Division of father's property	
	20 Failure or bankruptcy of business	
	21 Extortion	
	22 Family member put in prison	

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[22] https://dataverse.harvard.edu/file.xhtml?fileId=2435038&version=4.2. Reproduced with permission from the International Food Policy Research Institute www.ifpri.org. The full dataset from which this module is taken can be found online at https://hdl.handle.net/1902.1/21266.

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	23 Household member arrested by police	
	24 Paid a big bribe	
	25 Cost of court case	
	26 Losses due to court case	
	27 Reparations for victim of crime committed by household member	
	28 Strikes or political unrest	
	29 Cut-off or decrease of regular remittances to household	
	30 Withdrawal of NGO assistance	
	31 Increase in food prices	
	32 Increase in prices of inputs	
	99 Other (specify)	
M2	If 「yes」, how many times did it occur in your household in the last 5 years (2011-2016)?	We are interested to know the number of occurrences it happened in the last 5 years (2011-2016).
	The last time it happened ...	M3-M10 only refer to the last economic shock experienced.
M3 M4	When did it happen? ... Month (e.g. if July, write "07") ... Year (e.g. 2016)	The month and the year when the last economic shock happened.
M5	What is your current condition after the shock?	We want to know if their condition stayed the same, worsened, or became better.
M6	What was the value of the total loss?	
M7-M9	What did you do to cope with its effect?	No prompting. Classify up to 3 coping strategies.
M10	How long did the impact of the event last?	
M11	Please rank the worst 3 shocks.	From the list of economic shocks, ask the respondent to rank the top 3 worst shocks they have experienced in the last 5 years.

This is the end of the interview. Please remember to take the anthropometric measurements of all household members during this time; otherwise, if all household members are not present at the time of the interview, schedule another appointment (preferably in the weekend) when all household members are at home.

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A-6 Survey Questionnaire (paper version)

The paper-based survey questionnaire has 13 modules (or sections) excluding the Screener and Cover pages.

Module	Description (page nos.)
Screener	
Cover	
Sec A	Household characteristics (pp. 4-5)
Sec B	Consumption (pp. 7-20)
	24-hour food recall (pp. 8, 17-18)
	Food Consumption Tables (pp. 9-16)
	Household Food Insecurity Access Scale (p. 20)
Sec C	Food Choice and Dietary Beliefs (pp. 21-22)
Sec D	Gender (pp. 23-34)
	Modified Abbreviated-Women's Empowerment in Agriculture (pp. 23-26, 29-32)
	Gender Dimensions of Household Decision-making Processes (pp. 27-28, 33-34)
Sec E	Micronutrient Supplementation, Breastfeeding Practices and Maternal Knowledge about Nutrition Information (pp. 35-36)
Sec F	Health Indicators, Access to Clean Water and Sanitation, Handwashing Practices, and Lifestyle (pp. 37-39)
Sec G	Other Household Characteristics and Assets (p. 40)
Sec H	Non-farm Expenditure Sources in the Last 12 months (p. 41)
Sec I	Household Income Sources in the Last 12 months (p. 42)
Sec J	Farm Characteristics (pp. 43-44)
Sec K	Crop and Animal Output and Disposal in the Last Cropping Cycle (pp. 45-46)
Sec L	Vegetable Input Expenditures in the Last Cropping Cycle (p. 47)
Sec M	Economic Events/Shocks (pp. 48-50)

Note to enumerator: This is a short screener questionnaire. Use this before interviewing the household to determine if you are having a balanced number of households engaged in farming and otherwise.

Name of district: Quận/ Huyện:	
Name of commune: Xã/ Phường:	
Name of village: Làng/ Thôn/ Bản:	
Have you been growing any agricultural crops in the past 3 years?	**0**. no (không) **1**. yes (có)
Did you sell any agricultural crop in the last cropping season?	**0**. no (không) **1**. yes (có)
Did you grow vegetables in the last cropping season?	**0**. no (không) **1**. yes (có)
Did you sell vegetables in the last cropping season?	**0**. no (không) **1**. yes (có)

GLOBAL FOOD STUDIES · THE UNIVERSITY of ADELAIDE

SURVEY OF RURAL HOUSEHOLDS IN LAO CAI PROVINCE, VIETNAM
ĐIỀU TRA HỘ NÔNG DÂN TỈNH LÀO CAI, VIỆT NAM

MDRI · Mekong Development Research Institute

JULY/AUGUST 2016
THÁNG BẢY/THÁNG TÁM 2016

Conducted by: Global Food Studies, The University of Adelaide & Mekong Development Research Institute
Thực hiện bởi: Trung tâm Nghiên cứu Lương thực Toàn cầu, Trường Đại học Adelaide & Viện Nghiên cứu Phát triển Mekong (MDRI)

--- CONFIDENTIAL ---
'--- BẢO MẬT ---

Objective: The purpose of this survey is to understand the relationship between vegetable production and diet quality of households.
Mục tiêu: Mục đích của cuộc điều tra là để tìm hiểu mối liên hệ giữa sản xuất rau và chất lượng khẩu phần ăn của hộ gia đình

Use of data: The data collected as part of this survey are for research purposes ONLY.
Household-level data will not be shared with non-research organizations.
Only summary results will be included in the published report.
Sử dụng số liệu: Số liệu được thu thập một phần của cuộc điều tra này chỉ được sử dụng DUY NHẤT cho mục đích nghiên cứu.
Dữ liệu về nông hộ sẽ không được chia sẻ cho các tổ chức phi nghiên cứu.
Chỉ có phần tóm tắt kết quả được công bố trong các báo cáo.

Household ID number (Mã số nhận dạng hộ)

LC	0					
Prov Tỉnh	District Huyện		Commune Xã		Household number Mã số hộ	

Lao Cai
1. Bắc Hà
2. Sa Pa
3. Mường Khương
4. Si Ma Cai

[Codes on back cover]
[Mã xem ở phần sau]

Enumerator code
[Codes on back of cover]
Mã số người điều tra
[Mã xem ở phần sau]

1. Name of head of family (Họ và tên của chủ hộ)
2. Name of respondent (Họ và tên của người trả lời phỏng vấn)
3. Address/location (Địa chỉ liên hệ)
4. Mobile number (Số điện thoại)
5. Name of village (Tên của thôn/ bản)
6. GPS Coordinates (Toạ độ GPS)
   a. Latitude (Vĩ độ)
   b. Longitude (Kinh độ)
   c. Elevation (meters) (Độ cao [mét])

Hello, my name is _____. I work at Mekong Development Research Institute in Hanoi and we are doing a survey on rural household consumption patterns in Lao Cai province. The survey aims to improve our understanding of the relationship between vegetable production and diet quality. You are one of the 510 households in the province selected to participate. The individual results are confidential and are only used for research purposes. We estimate the entire interview to take 3-4 hours of your time. If you agree to participate, please sign the consent form and we will begin the interview.

Firstly, we would like to know **who is responsible for preparing food for all family members in** this household. **We would like to interview this person.**

Xin chào, tên tôi là _____. Tôi đang làm việc tại Viện Nghiên cứu Phát triển Mekong ở Hà Nội và chúng tôi đang tiến hành điều tra khảo sát về tiêu dùng nông hộ trên địa bàn tỉnh Lào Cai. Cuộc điều tra này nhằm nâng cao sự hiểu biết về mối liên hệ giữa tự sản xuất rau và chất lượng dinh dưỡng khẩu phần ăn. Hộ Ông/ Bà là một trong số 510 hộ trên địa bàn tỉnh được lựa chọn tham gia khảo sát này. Các thông tin cá nhân được đảm bảo giữ kín và chỉ phục vụ mục đích nghiên cứu. Chúng tôi dự kiến cuộc phỏng vấn sẽ kéo dài trong vòng 3-4 tiếng đồng hồ. Nếu Ông/ Bà đồng ý tham gia, xin vui lòng ký vào đơn đồng ý tham gia chương trình nghiên cứu. Sau đây, chúng tôi xin bắt đầu cuộc phỏng vấn.

Trước tiên, chúng tôi muốn được biết ai là người chịu trách nhiệm chuẩn bị các bữa ăn trong gia đình Ông/ Ba. Chúng tôi sẽ tiến hành phỏng vấn người đó.

	Date Thời gian			Name	Sign
	Day Ngày	Month Tháng	Year Năm	Họ và tên	Chữ ký
Interview (Phỏng vấn)					
Field check (Kiểm tra thực địa)					
Check office (Giám sát điều tra)					
Data Entry - Start (Ngày bắt đầu nhập số liệu)					
Data Entry - Finish (Ngày kết thúc nhập số liệu)					

Version: 25 JULY 2016
Bản: Ngày 25 tháng 7 năm 2016

Australian Government
Australian Centre for
International Agricultural Research

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Back of cover page
Mặt sau trang bìa

Commune codes Mã của các xã								Enumerator codes Mã của Điều tra viên	
Bắc Hà		Sa Pa		Mường Khương		Si Ma Cai			
Code Mã	Commune Xã	Code Mã	Commune Xã	Code Mã	Commune Xã	Code Mã	Commune Xã	Code Mã	Enumerator name Điều tra viên
001	Thị trấn Bắc Hà	051	Thị trấn Sa Pa	101	Xã Pha Long	151	Xã Nàn Sán	501	
002	Xã Lùng Cải	052	Xã Bản Khoang	102	Xã Tả Ngải Chồ	152	Xã Thào Chư Phìn	502	
003	Xã Bản Già	053	Xã Tả Giàng Phình	103	Xã Tung Chung Phố	153	Xã Bản Mế	503	
004	Xã Lùng Phình	054	Xã Trung Chải	104	Thị trấn Mường Khương	154	Xã Si Ma Cai	504	
005	Xã Tả Van Chư	055	Xã Tả Phìn	105	Xã Dìn Chin	155	Xã Sán Chải	505	
006	Xã Tả Củ Tỷ	056	Xã Sa Pả	106	Xã Tả Gia Khâu	156	Xã Mản Thẩn	506	
007	Xã Thải Giàng Phố	057	Xã San Sả Hồ	107	Xã Nậm Chảy	157	Xã Lùng Sui	507	
008	Xã Lầu Thí Ngài	058	Xã Bản Phùng	108	Xã Nấm Lư	158	Xã Cán Cấu	508	
009	Xã Hoàng Thu Phố	059	Xã Hầu Thào	109	Xã Lùng Khấu Nhin	159	Xã Sín Chéng	509	
010	Xã Bản Phố	060	Xã Lao Chải	110	Xã Thanh Bình	160	Xã Cán Hồ	510	
011	Xã Bản Liền	061	Xã Thanh Kim	111	Xã Cao Sơn	161	Xã Quan Thần Sán	511	
012	Xã Tà Chải	062	Xã Suối Thầu	112	Xã Lùng Vai	162	Xã Lử Thẩn	512	
013	Xã Na Hối	063	Xã Sử Pán	113	Xã Bản Lầu	163	Xã Nàn Xín	513	
014	Xã Cốc Ly	064	Xã Tả Van	114	Xã La Pan Tẩn			514	
015	Xã Nậm Mòn	065	Xã Thanh Phú	115	Xã Tả Thàng			515	
016	Xã Nậm Đét	066	Xã Bản Hồ	116	Xã Bản Sen			516	
017	Xã Nậm Khánh	067	Xã Nậm Sài					517	
018	Xã Bảo Nhai	068	Xã Nậm Cang					518	
019	Xã Nậm Lúc							519	
020	Xã Cốc Lầu							520	
021	Xã Bản Cái								

Commune's code

A. CHARACTERISTICS OF HOUSEHOLD MEMBERS
A. ĐẶC ĐIỂM CỦA CÁC THÀNH VIÊN TRONG HỘ

Household member code	Please list the FULL names of members of this household. [List in order of male household head, female household head, other male adult, other female adult, children from oldest (and their spouse) to youngest, then grandchildren (if any), and non-family members (if any)]	Is [name] a male or female?	Ethnicity [See ethnicity codes in Annex 1]	Ethnic subgroup [Select the subgroup from the ethnicity code in Annex 1]	What is the relationship between [name] and the head of the household? See codes below	Is [name] the secondary decision-maker within the household, both social and economic decisions (at the absence of household head)	Date of birth [name]?	Which is the highest level of education achieved by [name]? See codes below	Which is the highest grade [name] has completed?	What is the marital status of [name]? See codes below	What is the main activity that [name] spends most of his/her time? [See activity codes in Annex 1, next page]	On average, how many hours a week does [name] work in this activity?	What is the secondary activity of [name]? [See activity codes next page]	Is anyone in the household pregnant or breastfeeding? [fill in each row]	Record height, weight, waist, hip and mid-upper arm circumference (MUAC) of each household member.				
Mã số của các thành viên trong hộ	Hãy liệt kê họ và tên ĐẦY ĐỦ của các thành viên trong hộ. [Liệt kê theo thứ tự của nam chủ hộ, nữ chủ hộ, nam giới trưởng thành, nữ giới trưởng thành, con cái từ lớn tuổi nhất (và vợ/ chồng) đến nhỏ tuổi nhất, cháu nội/ngoại (nếu có), và các thành viên khác (nếu có)]	Giới tính của [Thành viên]	Dân tộc [Xem mã của dân tộc ở phụ lục 1]	Nhóm dân tộc [Chọn nhóm dân tộc từ mã của các dân tộc ở phụ lục 1]	Mối quan hệ giữa [Thành viên] và chủ hộ	[Thành viên] có vai trò quan trọng thứ mấy trong việc đưa ra các quyết định chính về kinh tế và xã hội	Ngày sinh [Thành viên]?	Trình độ giáo dục cao nhất đã đạt được của [Thành viên] là gì?	[Thành viên] đã học hết lớp mấy?	Tình trạng hôn nhân của [Thành viên]?	Hiện nay, công việc chiếm nhiều thời gian nhất của [Thành viên] là gì? [Xem phụ lục bảng mã nghề]	Trung bình một tuần, [thành viên] dành bao nhiêu giờ để làm công việc này?	Hiện nay, công việc chiếm nhiều thời gian thứ hai của [Thành viên] là gì? [Xem phụ lục bảng mã nghề]	[Thành viên] này có đang mang bầu/ cho con bú không? [điền vào từng dòng]	Ghi lại chiều cao, cân nặng, vòng eo, vòng hông và chu vi vòng cánh tay (MUAC) của từng thành viên trong hộ				
															Height / Chiều cao	Weight / Cân nặng	MUAC / MUAC	Waist / Vòng eo	Hip / Vòng hông
		1. male [Nam] 2. female [Nữ]							Grade Lớp			Hour(s) Giờ			cm	kg	cm	cm	cm
A1		A2	A3	A4	A5	A6	A7a	A8	A8a	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18
1																			
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

Definition: The household is defined as a group of people who live and eat together most of the time. Each member must live with others at least 6 months of the year or 4 days out of the week. The head of the household is defined as the member who makes most of the economic decisions.

Định nghĩa: Hộ gia đình được định nghĩa là một nhóm người sống và ăn cùng nhau hầu hết thời gian. Mỗi thành viên phải sống với những người khác ít nhất 6 tháng trong năm hoặc 4 ngày trong tuần. Chủ hộ được định nghĩa là người quyết định kinh tế trong hộ.

a/ For children under 1 year old, please convert number of months to year by dividing it by 12 months, e.g. 3 month/12 month = 0.25 year.
a/ Với trẻ em dưới 1 tuổi, vui lòng chia số tháng cho 12 tháng, ví dụ 3 tháng/ 12 tháng = 0.25 năm.

Note to enumerator: Take the anthropometric measurements after the questionnaire is completed. For MUAC, get the arm measurements three times, then write the average in A15.
Ghi chú với Điều tra viên: Tiến hành đo nhân trắc sau khi hoàn thành bảng hỏi. Với chu vi vòng cánh tay (MUAC), đo ba lần và lấy giá trị trung bình ở cột A15.

Codes for A5 (Mã cho A5)	Codes for A8 (Mã cho A8)	Codes for A9 (Mã cho A9)	Codes for A13 (Mã cho A13)
1. head [chủ hộ]	0. have not attended school [không biết đọc]	1. single [Độc thân]	0. none [không có]
2. spouse [vợ/ chồng chủ hộ]	1. nursery/kindergarten [trường mẫu giáo]	2. married [Đã kết hôn]	1. yes, pregnant [có người mang bầu]
3. son/ daughter [con trai/Con gái]	2. primary school not completed [chưa hoàn thành tiểu học]	3. separated/ divorced [ly thân/ Ly dị]	2. yes, breastfeeding [có người cho con bú]
4. son-/ daughter-in-law [con dâu/ Con rể]	3. primary school [Tiểu học]	4. widowed [goá chồng/ vợ]	3. yes, both [có cả hai]
5. grandchild [cháu nội/ ngoại]	4. lower secondary school [Trung học cơ sở]	5. living together [sống chung trước hôn nhân]	
6. parent/in-law [bố mẹ Vợ/ Chồng]	5. upper secondary school [Trung học phổ thông]	99. other (specify) [khác (ghi rõ)]	
7. other related (specify) [họ hàng (ghi rõ)]	6. vocational/Professional college [Trung cấp nghề/Trung cấp chuyên nghiệp]		
8. other unrelated (specify) [không có mối quan hệ họ hàng (ghi rõ)]	7. university/College [Đại học/Cao đẳng]		
9. domestic employee [người làm thuê trong nhà]	8. postgraduate [Sau đại học]		
99. other (specify) [khác (Ghi rõ)]			

Back of Section A (Mặt sau của Phần A)

	Codes for A10 and A12 (Mã cho A10 và A12)		
11	Farmer [Nông dân]	31	Housework (housewife or other family member) [Làm việc nhà, nội trợ (vợ hoặc thành viên khác trong nhà)]
12	Farm labourer (other farm) [Lao động nông nghiệp (làm thuê)]	32	Student (including university) [Học sinh, sinh viên]
13	Farm labourer (own farm) [Lao động nông nghiệp (tại hộ)]	33	Retiree [Người về hưu]
15	Self-employed commerce (e.g. trader, shop-keeper, vendor) [Tự kinh doanh (ví dụ: thương lái, chủ cửa hàng, bán rong)]	34	Not working [Không có nghề nghiệp]
16	Self-employed service (e.g. barber, repairman, electrician, plumber, driver with vehicle) [Dịch vụ (ví dụ: thợ cắt tóc, thợ sửa đồ, thợ điện, nước, lái xe có phương tiện)]	99	Other (please specify) [Khác (ghi rõ)]
17	Self-employed manufacturing (e.g. metalwork, carpenter, food processing) [Làm nghề (ví dụ: thợ kim hoàn, thợ mộc, chế biến thực phẩm)]		
21	Employee, professional active (e.g. doctor, nurse, teacher) [Viên chức, chuyên môn (ví dụ: bác sỹ, y tá, giáo viên)]		
22	Employee, professional less active (e.g. manager, executive, administrator) [Công chức, quản lý (ví dụ: giám đốc, nhà quản lý, điều hành)]		
23	Employee, semi-skilled active (e.g. policeman, sales, food service, teller) [Nhân viên, nghề có tính hoạt động (ví dụ: cảnh sát, nhân viên kinh doanh, giao dịch viên)]		
24	Employee, semi-skilled less active (e.g. secretary, book-keeper, receptionist, driver) [Nhân viên, nghề có tính ít hoạt động (ví dụ: thư ký, thủ quỹ, lễ tân, lái xe)]		
25	Employee, labourers (construction, cleaner, factory worker, security guard) [Công nhân viên (ví dụ: thợ xây, lao công, công nhân, bảo vệ)]		
26	Domestic employee (maid, nanny, gardener, housekeeper) [Người làm thuê trong nhà (ví dụ: người giúp việc, người trông trẻ, người làm vườn, quản gia)]		

Definitions: Self-employed means the person is paid for each product or service sold/provided.
Định nghĩa: Đối với người làm kinh doanh, dịch vụ, làm nghề là những người nhận được tiền cho mỗi sản phẩm hoặc dịch vụ của họ
Salaried employees and farm labourers are paid by the length of time they worked (day, month, or year).
Công nhân, viên chức, người lao động nông nghiệp được trả theo thời gian làm việc (theo ngày, tháng, hoặc năm).

	Codes for A3 [List of subgroups for A4 are in the parenthesis] Mã cho A3 [Các nhóm dân tộc cho A4 ở trong ngoặc]		
1	Kinh	19	Cơ Tu
2	Tày [Thổ, Ngạn, Phén, Thu Lao và Pa Dí]	20	Giáy
3	Thái [Ngành Đen (Tay Đăm), Ngành trắng (Tay Đón hoặc Khao)]	21	Tà Ôi [Tà Ôi, Pa Cô, Pa Hy]
4	Mường [Ao Tá (Âu Tá), Mọi Bi]	22	Giẻ Triêng [Giẻ (Giẻ), Triêng (T'riêng), Ve, Bnoong (Mnoong) Nhóm Giẻ đông hơn cả]
5	Khơ Me	23	Cho Ro
6	Hoa [Quảng Đông, Quảng Tây, Hải Nam, Triều Châu, Phúc Kiến, Sang Phang, Xìa Phống, Thoòng Nhần, Minh Hương, Hẹ]	24	Xinh Mun [Xinh, Mun Dạ, Xinh Mun Nghet]
7	Nùng [Nùng Giang, Nùng Xuông, Nùng An, Nùng Inh, Nùng Lòi, Nùng Cháo, Nùng Phàn Slình, Nùng Quy Rịn, Nùng Dín]	25	Hà Nhì [Hà Nhì, Cổ Chồ, Hà Nhì La Mí, Hà Nhì đen]
8	Mông [Mông Trắng, Mông Hoa, Mông Đỏ, Mông Đen, Mông Xanh, Na Mẻo]	26	Lào [Lào Bốc (Lào Cạn) và Lào Nọi (Lào Nhỏ)]
9	Dao [Dao Đỏ (Dao Cóc Ngáng, Dao sừng, Dao Dụ lạy, Dao Đại bản), Dao Quần chẹt (Dao Sơn đầu, Dao Tam đảo, Dao Nga hoàng, Dụ Cùn), Dao Lô gang (Dao Thanh phán, Dao Cóc Mùn), Dao Tiền (Dao Đeo tiền, Dao Tiểu bản), Dao Quần trắng (Dao Họ), Dao Thanh Y, Dao Làn Tẻn (Dao Tuyến, Dao áo dài)]	27	La Chí
10	Ba Na [Rơ Ngao, Rơ Lơng (hay Y Lăng), Tơ Lô, Gơ Lar Krem]	28	Kháng [Kháng Dẩng, Kháng Hoặc, Kháng Dón, Kháng Súa, Ma Háng, Bư Háng, Ma Háng Bèng, Bư Háng Cọi]
11	Sán Chay [Cao Lan và Sán Chỉ]	29	Phù Lá [Phù Lá Lão - Bồ Khô Pạ, Phù Lá Đen, Phù Lá Hán]
12	Xơ Đăng [Xơ Teng, Tơ Đrá, Mnâm, Ca Dong, Ha Lăng, Tà Trĩ, Châu]	30	La Hủ [La Hủ na (đen), La Hủ sư (vàng) và La Hủ phung (trắng)]
13	Sán Dìu	31	La Ha [La Ha cạn (Khlá Phlao), La Ha nước (La Ha củng)]
14	Hre	32	Lu [ở Việt nam chỉ có nhóm Lự Đen (Lử Đăm) ở xã Bản Hon, huyện Phong Thổ, Sìn Hồ (Lai Châu), phân biệt nhóm Lự Trắng (Lử Khao) ở Síp Song Pản Na (Trung Quốc)]
15	Mnông [Mnông Gar, Mnông Nông, Mnông Chil, Mnông Kuênh, Mnông Rlăm, Mnông Preh, Mnông Prâng, Mnông Đip, Mnông Bhiêt, Mnông Sitô, Mnông Bu Đăng, Mnông Bu Nor, Mnông Bu Đêh]	33	Lô Lô [Lô Lô hoa và Lô Lô đen]
16	Tho [Keo, Mọn, Cuối, Họ, Đan Lai, Ly Hà, Tày Poọng]	34	Bố Y [Bố Y và Tu Dí]
17	Khơ Mú	35	Pù Péo
18	Bru Vân Kiều [Vân Kiều, Trì, Khua, Ma Coong]		

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General education system for conversion Hệ thống giáo dục phổ thông cho quy đổi		System under the French time Dưới thời Pháp thuộc	From 1945-1954 Liberated region Vùng giải phóng 1945-1950	From 1945-1954 Liberated region Vùng giải phóng 1950-1954	Temporarily occupied region Vùng tạm thời bị chiếm đóng	Complementary education (CE) system Hệ thống giáo dục bổ sung (CE)	Educational system in Hệ thống giáo dục Prior to 1981 Trước 1981	Educational system From Quang Binh northward Phía bắc từ Quảng Bình trở ra 1981-1986	From Quang Binh northward 1986-1989
Level / Trình độ	Grade / Lớp								
Primary school Tiểu học	1	Grade 5 Lớp 5			Grade 5 primary school Lớp 5 tiểu học		Pre-school Lớp vỡ lòng	Grade 1 Lớp 1	Grade 1 Lớp 1
	2	Grade 4 Lớp 4	Grade 4 Lớp 4	Grade 1 Lớp 1	Grade 4 primary school Lớp 4 tiểu học	Grade 1 CE Lớp 1 CE	Grade 1 Lớp 1	Grade 2 Lớp 2	Grade 2 Lớp 2
	3		Grade 3 Lớp 3	Grade 2 Lớp 2	Grade 3 primary school Lớp 3 tiểu học	Grade 2 CE Lớp 2 CE	Grade 2 Lớp 2	Grade 3 Lớp 3	Grade 3 Lớp 3
	4	Intermediate 1 (Moyen 1) Intermediate 2 (Moyen 2) Lớp nhì nhất niên (Moyen 1) Lớp nhì nhị niên 2 (Moyen 2)	Grade 2 Lớp 2	Grade 3 Lớp 3	Grade 2 primary school Lớp 2 tiểu học	Grade 3 CE Lớp 3 CE	Grade 3 Lớp 3	Grade 4 Lớp 4	Grade 4 Lớp 4
	5	Upper Intermediate (Superieur) Certificate (Certificat) Lớp nhất (Superieur) Sơ học yếu lược (Certificat)	Grade 1 Lớp 1	Grade 4 Lớp 4	Grade 1 primary school Lớp 1 tiểu học	Grade 4 CE Lớp 4 CE	Grade 4 Lớp 4	Grade 5 Lớp 5	Grade 5 Lớp 5
Lower secondary school Trung học cơ sở	6	First Year Năm thứ nhất trung học	First Year Năm thứ nhất		7th class Secondary school Lớp đệ thất trung học	Grade 5 CE Lớp 5 CE			Grade 6 Lớp 6
	7	Second Year Năm thứ nhì trung học	Second Year Năm thứ hai	Grade 5 Lớp 5	6th class Secondary school Lớp đệ lục trung học	Grade 6 CE Lớp 6 CE	Grade 5 Lớp 5	Grade 6 Lớp 6	Grade 7 Lớp 7
	8	Third Year Năm thứ ba trung học	Third Year Năm thứ ba	Grade 6 Lớp 6	5th class Secondary school Lớp đệ ngũ trung học	Grade 7 CE Lớp 7 CE	Grade 6 Lớp 6	Grade 7 Lớp 7	Grade 8 Lớp 8
	9	Fourth Year-Diploma Năm thứ tư trung học	Fourth Year Năm thứ tư	Grade 7 Lớp 7	4th class Secondary school Lớp đệ tứ trung học	Grade 7B CE Lớp 7B CE	Grade 7 Lớp 7		
Upper secondary school Trung học phổ thông	10	First Year Năm thứ nhất	First Year specialisation Năm thứ nhất đặc biệt	Grade 8 Lớp 8	3rd class Lớp đệ tam	Grade 8 CE Lớp 8 CE	Grade 8 Lớp 8	Grade 10 Lớp 10	Grade 10 Lớp 10
	11	First part of secondary school degree Phần một trung học phổ thông	Second Year specialisation Năm thứ hai đặc biệt	Grade 9 Lớp 9	2nd class Baccalaureate 1 Lớp đệ nhị Tú tài I	Grade 9 CE Grade 10A CE Lớp 9 CE Lớp 10A CE	Grade 9 Lớp 9	Grade 11 Lớp 11	Grade 11 Lớp 11
	12	Second part of secondary school degree Phần hai trung học phổ thông	Third Year specialisation Năm thứ ba đặc biệt		1st class Baccalaureate II Lớp đệ nhất Tú tài II	Grade 10B CE Lớp 10B CE	Grade 10 Lớp 10	Grade 12 Lớp 12	Grade 12 Lớp 12

COVER PAGE OF THE CONSUMPTION MODULE (Section B)
PHẦN TIÊU DÙNG (Phần B)

B. 24-HOUR FOOD RECALL
B. GHI NHẬN KHẨU PHẦN ĂN 24H

Instruction: This part of the interview is to ask you [THE MAIN PERSON WHO PREPARES FOOD] what your entire household members ate or drink yesterday. If the other household members are available, we would like to invite them as well so they can answer the amount of food they consumed.
Hướng dẫn: Phần này chỉ dành riêng cho [NGƯỜI CHUẨN BỊ THỨC ĂN] ngày hôm qua.
Nếu các thành viên khác có mặt, chúng tôi cũng muốn được phỏng vấn họ để ghi lại lượng thực phẩm họ đã ăn.

Please recall and tell us all food items including drinks (water, vegetable soup, tea, soft drinks, other beverages and alcohol) and any type of condiment (fish sauce, vinegar, pepper, salt, ketchup, chili or any other spices). Also include the food intake by infants and young children - milk and other milk substitutes and any other soft food taken. Try to be as detailed as you can.
Hãy nhớ lại và cho chúng tôi biết những loại đồ ăn và đồ uống (nước, nước canh, chè, nước ngọt, đồ uống có cồn và các loại khác) và tất cả các loại gia vị (nước mắm, dấm, tiêu, muối, nước sốt, ớt, và các loại gia vị khác). Liệt kê cả lượng thức ăn của trẻ sơ sinh và trẻ nhỏ - Sữa và sản phẩm thay thế sữa và thức ăn mềm khác. Cố gắng thật chi tiết đến mức có thể

B1. Please tick which day the information for the 24h food recall refers to: ① Mon ② Tue ③ Wed ④ Thu ⑤ Fri ⑥ Sat ⑦ Sun
B1. Vui lòng đánh dấu vào ngày thực hiện việc ghi nhận khẩu phần ăn 24h: ① Thứ hai ② Thứ ba ③ Thứ tư ④ Thứ năm ⑤ Thứ sáu ⑥ Thứ bảy ⑦ Chủ nhật

For the enumerator:
Only fill this part in the second visit.
Với Điều tra viên:
Chỉ điền vào phần này trong lần truy cập thứ hai.

HH ID No

LC	0								

B2 Date of interview (dd/mm/yyyy): [Ngày phỏng vấn (ngày/tháng/năm)]
B3 Name of respondent: [Người được phỏng vấn]
B4 Name of village: [Thôn]
B5 Name of commune: [Xã]
B6 Name of district: [Huyện]
B7 Phone/Mobile number: [Số điện thoại/ di động]
B8 GPS Coordinates: [Toạ độ GPS]
   a. Latitude: [Vĩ độ]
   b. Longitude: [Kinh độ]
   c. Elevation (meters): [Độ cao (mét)]

Note: Only answer B9 - B10 during the first data day of recall.
Ghi chú: Chỉ trả lời B9-B10 vào ngày đầu tiên lấy số liệu ghi nhận khẩu phần ăn.

B10
Tick what day(s) you normally go to market* to buy food.
Đánh dấu vào ngày ông/bà thường đi chợ* để mua thức ăn.

B9 When is the main market day(s) in your location (commune, district)?
Ngày nào có phiên chợ chính trong khu vực (xã, huyện)?

[Tick all that applies]
[Đánh dấu vào các phương án đúng]

1. Monday [Thứ hai]	
2. Tuesday [Thứ ba]	
3. Wednesday [Thứ tư]	
4. Thursday [Thứ năm]	
5. Friday [Thứ sáu]	
6. Saturday [Thứ bảy]	
7. Sunday [Chủ nhật]	
88888. not applicable [không áp dụng]	

Note: * any type of market (supermarket, wet market, traditional market, etc.)
Ghi chú: * bất kỳ loại hình chợ (siêu thị, chợ cóc, chợ truyền thống…)

TOTAL AMOUNT OF FOOD SERVINGS								
TỔNG LƯỢNG THỨC ĂN TRONG BỮA								
Time [Begin from the earliest time they ate to the latest] Thời gian [Ghi thời điểm bắt đầu bữa ăn đến thời điểm kết thúc bữa ăn]		Occasion Bữa ăn	Write complete recipe names. For individual items (e.g. mango, cake, etc.), see codes in Annex 2. For commercial products, include brand name (e.g. Nestea iced-tea lemon flavour). Viết tên công thức bữa ăn. Với những món đơn (ví dụ: xoài, bánh,…), xem mã ở phần Phụ lục 2. Với các sản phẩm đóng gói, ghi lại nhãn hiệu trên bao bì (ví dụ: Nestea vị chanh đá).	Was this prepared at home? Thức ăn này được chuẩn bị ở đâu?	Cooking method Cách thức nấu ăn	Volume of total serving (edible part only) Thể tích/Khối lượng của toàn bộ khẩu phần ăn (chỉ tính phần ăn được)	Unit of measure Đơn vị	Write all HH members who shared this food. Ghi mã của thành viên hộ ăn loại thức ăn này. [Refer to HH code in A1] [Sử dụng Mã của thành viên trong phần A1]
Start [e.g. 6:30am] Bắt đầu [ví dụ: 6:30 sáng]	End [e.g. 8:30am] Kết thúc [ví dụ: 8:30 sáng]							
		1. breakfast [bữa sáng] 2. brunch [bữa lửng (giữa sáng và trưa)] 3. morning snack [bữa ăn vặt sáng] 4. lunch [bữa trưa] 5. afternoon snack [bữa ăn vặt chiều] 6. dinner [bữa tối] 7. late night meal [bữa khuya] 99. other (specify) [khác (ghi rõ)]		1. prepared at home (chuẩn bị ở nhà) 2. bought outside (Được mua ở ngoài) 3. given by neighbor (Được cho)	0. ready-made ingredient [thành phần làm sẵn] 1. fresh fruits/vegetables (raw) [rau/ Hoa quả tươi] 2. boiled and water retained (veg soup/rice porridge/congee/pho/vermicelli/noodles) [các món luộc hoặc nước canh (canh rau/ cháo/ súp/phở/bún/mỳ/miến, v.v…)] 3. steamed (cake, glutinous rice) [các món hấp (hấp, đồ, xôi)] 4. dried in hot pan with no fat/oil [các món rang không dùng dầu/mỡ] 6. cooked/fried immersed in fat/oil [các món chiên/rán nhiều dầu mỡ] 7. long cooked [các món ninh, om, hầm, kho] 8. grilled/cooked dry in oven or over fire [nướng trong lò/ trên bếp lửa (than, trui)] 9. pickled [ngâm/muối chua/ghém (dưa, cà, v.v.)] 10. fermented [lên men (mắm tôm, mắm tép, tương, rượu, v.v.)] 11. dried under the sun (ready to eat or cook) [sấy khô (loại ăn được ngay)(khoai, sắn khô, v.v…)] 12. smoked [xông khói, gác bếp, phơi] 13. mixed, salad [trộn (nộm, xé phay, v.v…)] 99. other (specify) [khác (ghi rõ)]		1. g [g] 2. mL [mL]	
B11	B12	B13	B14	B15	B16	B19	B20	B21
1								
2								
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23								
24								

ADD MORE PAGES IF NEEDED.

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FOOD LIST		
Code	English Name	Vietnamese Name
Cereals and products		
S1009	Bread, steamed	Bánh bao
S1010	Rice paper for rollers, raw	Bánh đa nem
S1011	Rice pudding	Bánh đúc
S1012	Bread, French-style	Bánh mỳ
N1023	Bread, wheat white	banh my (bot loai 1)
N1024	Bread, wheat 2	banh my (bot loai 2)
S1013	Rice-soup noodles, raw	Bánh phở
N1027	Wheat fritters, twisted fried	banh quay
N1019	Corn flakes	bong ngo
S1016	Rice flour, glutinous, raw	Bột gạo nếp
S1017	Rice flour, ordinary, raw	Bột gạo tẻ
N1021	Wheat flour 1	bot my loai 1
N1022	Wheat flour 2	bot my loai 2
S1019	Maize flour, yellow, raw	Bột ngô vàng
S1020	Rice noodles, raw	Bún
S1021	Rice, glutinous, all variety, young seed, raw	Cốm
N1009	Rice, cooked and dried	com say
N1003	Rice, parboiled	gao do (tam do)
S1005	Rice, brown or hulled, raw	Gạo lứt
S1001	Rice, glutinous, milled, raw	Gạo nếp cái
S1002	Rice, glutinous, milled, raw	Gạo nếp máy
S1003	Rice, home-pounded, under-milled, raw	Gạo tẻ giã
N1002	Rice, polished IR8	gao te IR8
S1004	Rice, ordinary polished, raw	Gạo tẻ máy
S1006	Foxtail millet, raw	Kê
N1028	Vermicelli from Bermuda tuber, raw	mien dong
S1022	Wheat noodles, raw	Mỳ sợi
N1017	Maize, fragments	ngo manh (tam)
N1015	Maize, glutinous, from the cob, cooked	ngo nep luoc
N1014	Maize, fresh, seeds	ngo tuoi (hat)
S1008	Maize, yellow, dried seeds, raw	Ngô vàng hạt khô
Starchy roots and tubers		
N2012	Bermuda flour extracted	bot dong loc
N2004	Sweet potato flour	bot khoai lang
N2010	Canna edulis Ker., flour extracted	bot khoai rieng (loc)
N2007	Potato flour, white extracted	bot khoai tay (loc)
N2018	Manihot, flour	bot san
N2021	Radix puerariae, flour	bot san day
N2023	Trapa bicornis L. (cu au)	cu au
N2025	Winged yam	cu cai
N2011	Bermuda tuber	cu dong
N2016	Bitter cassava	cu san
N2020	Radix puerariae (cu san day)	cu san day
N2024	Nymphaea stellata wild, dried shelled (cu sung kho - da b	cu sung kho (da bo vo)
N2022	Igname yam, Chinese	cu tu
S2008	Sweet potato, pale raw	Khoai lang
N2003	Sweet potato, pale, dried	khoai lang kho
N2002	Sweet potato, yellow variety	khoai lang nghe
N2014	Chinese yam, spiny yam	khoai mon
N2015	Colocasia esculenta (Khoai nuoc)	khoai nuoc
N2009	Canna edulis Ker. (Khoai rieng)	khoai rieng
S2013	Taro tuber, raw	Khoai sọ
N2005	Potato, white, raw	khoai tay
N2006	Potato, white, dried	khoai tay kho
N2008	Potato, crisp fried	khoai tay lat chien
S2015	Vermicelli from Bermuda tuber, raw	Miến dong
N2017	Bitter cassava, dried	san kho
N2019	Tapioca, pearls E.P.	tran chau san
Nuts and beans		
S3021	Soybean flour, defatted	Bột đậu tương đã loại béo (đậu nành)
N3010	Soybean flour, roasted	bot dau tuong rang chin
S3023	Mungo bean flour	Bột đậu xanh
N3021	Peanut flour	bot lac
N3001	Coconut, mature kernel	cui dua gia
N3002	Coconut, immature kernel, raw	cui dua non
N3003	Phaseolus vulgaris (dau cove hat)	dau cove (hat)
N3005	Black bean seed, dried	dau den
S3004	Black bean seed, dried	Đậu đen (hạt)
N3004	Cowpea, whole seeds, dried, all varieties	dau dua (hat)
S3006	Pea seed, garden and field, dried	Đậu Hà lan (hạt)

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	FOOD LIST	
Code	English Name	Vietnamese Name
S3025	Tofu, raw	Đậu phụ
N3014	Curd tofu, concentrated	dau phu chuc
N3013	Curd tofu, fried	dau phu nuong
S3008	Kidney bean seed, whole, dried	Đậu trắng hạt (Đậu Tây)
N3008	Bird egg bean	dau trung cuoc
S3007	Soybean seed, yellow, dried	Đậu tương (đậu nành)
S3010	Mungo bean seed, dried	Đậu xanh (đậu tắt)
N3023	Pumpkin seeds, fried	hat bi do rang
N3026	Chesnut, Chinese whole	hat de to
N3025	Black seed	hat den
N3029	Cashew nut, common, dried roasted with oil	hat dieu kho, chien dau
N3024	Watermelon seeds, whole fried	hat dua do rang (dua hau)
S3017	Peanut seeds, dried	Lạc hạt
N3027	Palm fruit, fresh	qua co tuoi
N3028	Hodgsonia fruit	qua dai hai tuoi
N3017	Milk flour from roasted soybeans	sua bot dau nanh
S3032	Soybean milk	Sữa đậu nành
N3016	Soybean milk (100g soybean/L)	sua dau nanh (100g dau/L)
N3015	Tofu, light syrup (160g tofu, 65mL syrup)	tao pho (cai 160g, nuoc duong 65mL)
S3020	Sesame oriental seeds, whole, dried black or white	Vừng (đen, trắng)
Combined Vegetables, fruit-types, fresh and dried (plus Dua Moi & Nam, Men & Wild Vegetables)		
N4001	Calabash/ bottlegourd	bau
S4002	Ashgourd waxgourd, winter melon, raw	Bí đao (bí xanh)
N4004	Pumpkin, dried	bi do kho
S4003	Pumpkin squash, raw	Bí ngô
N4005	Eggplant, big, brinjal aubergine	ca bat
S4005	Tomato, raw	Cà chua
N4094	Tomato, salted	ca chua muoi
N4095	Eggplant, garden; brinjan; aubergine salted	ca muoi nen
N4007	Eggplant, small	ca phao
S4007	Carrot, raw	Cà rốt (củ đỏ, vàng)
N4009	Carrot, dried	ca rot kho
S4009	Aubergine, raw	Cà tím
S4010	Cabbage, common, raw	Cải bắp
N4013	Cabbage, red	cai bap do
N4012	Cabbage, dried	cai bap kho
S4013	Chrysanthemum, crown-daisy, raw	Cải cúc
N4016	Cress, sp.	cai soong
N4017	Chinese cabbage, unspecified	cai thia (cai trang)
S4016	Mustard greens, India, leaves and stems, raw	Cải xanh
S4017	Water dropwort; celery water, raw	Cần ta
S4018	Celery, Chinese, raw	Cần tây
S4019	Banana, dwarf, young fruit, raw	Chuối xanh
S4020	Red radish oriental, raw	Củ cải đỏ
N4022	Radish garden white, raw	cu cai trang
N4023	Radish white, dried	cu cai trang kho
S4023	Pachyrrhizus, raw	Củ đậu
N4026	Wild rice	cu nieng
S4029	Kidney beans, in pod, French bean; Navy been, raw	Đậu cô ve
S4030	Cowpeas, yard long, Chinese long bean, raw	Đậu đũa
N4032	Green peas; field pea; peas garden	dau ha lan
N4033	Winged bean goabean, Indies, asparagus pea (immature	dau rong (qua non)
N4024	Horseradish; dish-tree, drumstick leaves	doc cu cai (non)
N4027	Colocasia indica	doc mung
N4034	Papaya, unripe, raw	du du xanh
N4096	Cabbage Chinese salted	dua cai bap
N4097	mustard green, salted	dua cai be
S4113	Rape bird, salted, raw	Dua cải sen
N4028	Cucumber	dua chuot
N4099	Cucumber, salted	dua chuot muoi
N4029	Cucumber, large	dua gang
N4100	Mungbean sprouts, salted	dua gia (dau xanh)
S4034	Gac fruit, whole, raw	Gấc
N4037	Soybean sprouts	gia dau tuong
S4036	Mungbean sprouts, green gram, tiensin green bean, raw	Giá đậu xanh
N4101	Onion, salted (allium common garden)	hanh cu muoi
N4038	Onion, Welsh	hanh cu tuoi
S4038	Onion, Welsh, raw	Hành lá (hành hoa)
N4040	Onion, common, garden	hanh tay
S4041	Lotus seed, dried	Hạt sen khô
S4040	Lotus seed, raw	Hạt sen tươi

FOOD LIST		
Code	**English Name**	**Vietnamese Name**
S4042	Onion, fragrant, Chinese leek, raw	Hẹ lá
N4044	Banana, buds and flowers	hoa chuoi
S4044	Daylily, lemon flowers, raw Pergularia	Hoa lý
S4045	Carambola; Star fruit, raw	Khế
N4102	Onion shallot, scallion pickled	kieu muoi
N4118	*la lot*	la lot
N4119	*la mo long*	la mo long
N4120	cassava (leaves)	la san tuoi
N4047	Bamboo shoot unspecified	mang chua
N4049	Bamboo shoots, dried	mang kho
N4048	Asparagus, white	mang tay
N4050	Bamboo shoot, spring variety	mang tre
N4110	Brewer's yeast, dried enzyme	men bia kho
N4109	Baker's yeast compressed	men bia tuoi
S4121	Jew' ear, Judas' ear, dried, woodear, tender variety, raw	Mộc nhĩ
N4051	Gourd, sponge gourd	muop
S4055	Bitter gourd, balsampear, balsam-apple, bitter melon, raw	Mướp đắng
N4105	mushroom, Chinese dried	nam huong kho
N4104	mushroom, Chinese raw	nam huong tuoi
N4106	mushroom	nam mo (nam tay)
N4107	mushroom, straw	nam rom
N4108	mushroom cultivated	nam thuong tuoi
N4055	Corn, small variety immature, baby corn	ngo bao tu
N4054	Lotus, stem underground	ngo sen
N4103	Mix pickled from young jackfruit, mungbean leaves and sr	nhut (dua muoi nen tu qua mit non, la dau xanh non va ca phao gia)
N4053	Sponge gourd, rag (young flower)	nu muop
N4056	Chili pepper, peppers red	ot vang to
N4057	Chili pepper, green	ot xanh to
N4058	Tamarind fruit, pulp raw	qua me chua
S4066	Pumpkin leaves, raw	Rau bí
N4061	Seaweed, dried	rau cau kho
N4060	Seaweed, fresh	rau cau tuoi
S4070	Jute potherb, raw	Rau đay
N4062	Lettuce garden	rau diep
N4113	*rau giap ca, diep ca*	rau giap ca, diep ca
N4064	Amaranth, sp green	rau gien
S4072	Amaranth, spineless, raw	Rau giển cơm
S4073	Amaranth, sp. red, raw	Rau giển đỏ
S4074	Amaranth, sp white, raw	Rau giển trắng
N4067	Basil sweet leaves, raw	rau hung
S4076	Sweet potato leaves, raw	Rau khoai lang
N4068	Sweet marjoram	rau kinh gioi
N4115	*rau ma rung*	rau ma rung
N4114	Wort, Indian penny	rau ma, ma mo
S4080	Malabar nightshade, Vinespinach; Ceylon spinach, raw	Rau mổng tơi
N4071	Coriander	rau mui
S4082	Parsley, curley, raw	Rau mùi tầu
S4083	Kangkong, swamp cabbage, water spinach, water convol	Rau muống
N4074	Kangkong, dried	rau muong kho
S4085	Rice paddy herb, raw (Limnophila aromatica)	Rau ngô
S4086	Sauropus, sp. Leaves, raw	Rau ngót
N4076	Sauropus, dried	rau ngot kho
N4078	*rau ram*	rau ram
N4079	*rau rut*	rau rut
N4080	Lettuce, garden asparagus	rau sa lach
N4116	purslane, common	rau sam
N4081	Perfume pagoda wild plant	rau sang (chua Huong)
N4117	*rau tau bay*	rau tau bay
N4082	Mint leaves	rau thom
S4096	Kohlrabi, raw	Su hào
N4084	Kohlrabi, dried	su hao kho
N4086	Chayote, fruit raw	su su
S4099	Cauliflower, raw	Súp lơ trắng
N4087	Dill	thia la
S4102	Balm-mint, garden- balm, raw	Tía tô
S4103	Garlic bulbs, raw	Tỏi ta
N4090	Chinese leek, onion fragant	toi tay (ca la)
N4091	*tram den chin*	tram den chin
N4092	Chinese olive	tram xanh song, tram trang
N4093	*xuong song*	xuong song

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FOOD LIST		
Code	English Name	Vietnamese Name
Fruits and berries		
N5001	Pomelo	buoi
S5002	Orange, sweet	Cam
N5003	Lemon	chanh
N5006	Banana, dried	chuoi kho
S5006	Banana, common varieties (ripe)	Chuối tây
S5007	Banana, dwarf cavendish, ripe	Chuối tiểu
N5014	Peach	dao
N5007	Blackberry	dau gia
N5008	Strawberry	dau tay
S5017	Papaya, ripe	Đu đủ chín
N5009	Musk melon, Spanish melon, cantaloupe	dua bo
S5011	Watermelon	Dưa hấu
N5011	Honey dew melon	dua hong
N5013	Pineapple	dua tay
N5041	Ohia; Malaya roseapple	gioi
N5017	Wampee, Chinese; wampi	hong bi
N5018	Persimmon, kaki soft type, ripe	hong do
N5019	Persimmon, kaki hard type, ripe	hong ngam
N5020	Sapodilla	hong xiem
N5023	Pyrus pashia ham	mac cooc
N5024	Japanese plum	man
N5025	Jackfruit, mature	mit dai
N5027	Jackfruit, dried	mit kho
N5026	Jackfruit, honey	mit mat
N5028	Apricot, nectar	mo
N5029	Apricot, dried unsulfured	mo kho
N5030	Mango, common; Indian mango unripe	muom, queo
S5034	Sugarapple; sweetsop	Na
N5033	Longan	nhan
N5034	Longan, dried	nhan kho
S5037	Grape, European, sweet	Nho ngot
N5036	Grapefruit	nho ta (nho chua)
N5037	Silver berry	nhot
S5040	Guava, common	ổi
N5021	Pear	qua le
N5022	Pomegranate	qua luu
N5016	qua thanh long	qua thanh long
N5039	Mandarin	quat chin (ca vo)
S5047	Tangerine; orange, mandarin	Quit
N5042	Sandipus, ripe	sau chin
N5043	Jujube, common or Chinese; Chinese date	tao ta
S5051	Apple, common, domestica	Táo tây
N5045	Litchi; lychee	vai
S5053	Litchi, dried with shells	Vải khô
N5047	Star apple; caimito	vu sua
S5055	Mango, common; Indian mango ripe	Xoài chín
Oils and fats and butters		
N6001	Butter, unsalted	bo
S6012	Sesame oil	Dầu mè
N6002	Vegetable oil, pure cooking	dau thao moc
S6002	Vegetable oil, all types	Dầu thảo mộc (Lạc, cám...)
N6003	Lard, salted	mo lon muoi
S6004	Lard, liquid	Mỡ lợn nước
Meat, poultry game and its products		
S7063	Pate	Ba tê
N7005	Beef, kidney	bau duc bo
S7030	Pork, kidney, raw	Bầu dục lợn
N7033	Pork, skin	bi lon
S7078	Toad, meat powder	Bột cóc
S7064	Pork, minced fat meat, grilled	Chả lợn
N7047	Pork, cinammon mince grilled	cha que lon
S7032	Pork, leg without bone, raw	Chân giò lợn (bỏ xương)
N7078	Locust	chau chau
N7063	Pigeon, young bird, flesh, skin and giblets, raw	chim bo cau ra giang (da giet mo)
S7007	Pigeon, young bird, flesh, skin and giblets, raw	Thịt bồ câu ra ràng
N7006	Beef, stomach	da day bo (da sach)
N7034	Pork, stomach	da day lon (da sach)
N7048	Pork, ham	dam bong lon
N7007	Beef, head (no tongue, brain, ears)	dau bo (khong ke luoi, oc tai)
N7030	Pork, head	dau lon

FOOD LIST		
Code	English Name	Vietnamese Name
N7049	Blood mix-pudding with viscera in large intestine pork	doi lon
N7008	Beef, tail	duoi bo
S7038	Pork, tail, raw	Đuôi lợn
N7080	Toad	ech
N7064	Chicken, mature bird, grade 1	ga loai 1 (da giet mo)
N7065	Chicken, mature bird, grade 2	ga loai 2 (da giet mo)
N7066	Grouse, field chicken	ga rung (da giet mo)
N7068	Turkey, flesh and skin giblets, raw 1	ga tay loai 1 (da giet mo)
N7069	Turkey, flesh and skin giblets, raw 2	ga tay loai 2 (da giet mo)
S7014	Turkey, flesh and skin giblets, raw	Thịt gà tây
N7067	Chicken, young	ga to loai 2 (da giet mo)
N7009	Beef, liver	gan bo
N7010	Beef, tendon - leg	gan chan bo
S7040	Chicken, liver, raw	Gan gà
S7041	Pork, liver, raw	Gan lợn
S7042	Duck, liver, raw	Gan vịt
S7069	Pork, minced lean meat, steamed	Giò lụa
S7070	Pork, head meat steamed	Giò thủ lợn
S7071	Chinese sausage, dried	Lạp xưởng
S7047	Pork, small intestine, raw without fat	Lòng lợn (ruột non)
N7036	Pork, large intestine, raw	long lon da sach (ruot gia)
N7037	Pork, small intestine, raw without fat	long lon da sach (ruot non)
N7011	Beef, tongue	luoi bo
S7045	Pork, tongue, raw	Lưỡi lợn
N7071	Chicken, gizzard	me ga
N7053	Pork, mince fermented	nem chua
N7073	Goose, grade 1	ngong loai 1 (da giet mo)
N7074	Goose, grade 2	ngong loai 2 (da giet mo)
N7079	Silk worm	nhong
N7012	Beef, brain	oc bo
N7039	Pork, brain	oc lon
N7013	Beef, lung	phoi bo
N7040	Pork, lung, raw	phoi lon
S7074	Pork, shredded and salted	Ruốc thịt lợn
S7053	Pork, ribs without bone, raw	Sườn lợn
N7029	Pork, ribs without bone, raw	suon lon (khong ke xuong)
N7041	Pork, ears	tai lon
N7058	Buffalo, meat shoulder	thit bap trau
N7001	Veal, fat meat	thit be mo
N7002	Veal, lean meat	thit be nac
N7018	Beef, dried	thit bo kho
N7003	Beef, meat grade 1	thit bo loai 1
N7004	Beef, meat grade 2	thit bo loai 2
S7003	Beef, meat grade 1	Thịt bò loại I
S7004	Beef, meat grade 2	Thịt bò loại II
S7008	Dog, meat, raw	Thịt chó sẵn
N7019	Dog, meat	thit san cho
N7021	Mutton, meat grade 1	thit cuu loai 1
N7022	Mutton, meat grade 2	thit cuu loai 2
N7023	Goat, meat	thit de (nac)
S7013	Chicken, meat, average	Thịt gà ta
N7024	Deer, meat	thit huou
N7025	Pork, fat	thit lon mo
S7017	Pork, meat, lean, raw	Thịt lợn nạc
S7018	Pork, meat, medium fat, raw	Thịt lợn nửa nạc, nửa mỡ
N7026	Pork, meat, medium fat, raw	thit lon nua nac, nua mo (ba chi, san)
N7055	Horse, meat	thit ngua
N7062	Buffalo, meat dried	thit trau kho
N7059	Buffalo, meat neck	thit trau, co
N7060	Buffalo, meat leg	thit trau, dui
N7061	Buffalo, meat lean loin	thit trau, than
N7020	Dog, shoulder	thit vai cho
S7028	Duck, meat, average, raw	Thịt vịt
N7056	Rabbit, meat raw	tho nha
N7057	Rabbit, hare (field or wild)	tho rung
N7015	Beef, blood	tiet bo
N7042	Pork, blood boiled	tiet lon luoc
S7060	Pork, blood raw	Tiết lợn sống
N7014	Beef, heart	tim bo
S7056	Chicken, heart, raw	Tim gà
S7057	Pork, heart, raw	Tim lợn

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FOOD LIST

Code	English Name	Vietnamese Name
N7016	Beef, bone marrow	tuy xuong bo
S7062	Pork, bone marrow, raw	Tủy xương lợn
N7075	Duck, grade 1	vit loai 1 (da giet mo)
N7076	Duck, grade 2	vit loai 2 (da giet mo)
N7017	Beef, breast	vu bo
S7077	Pork sausage, grilled	Xúc xích
Fish, shrimp, carb, mollusk and products		
S8055	Shrimp, chips dried, oil fried	Bánh phồng tôm rán
N8033	Shrimp, chips dried raw	banh phong tom song
N8030	Fish flour bones included	bot ca
S8001	Goby, raw	Cá bống
S8003	Carp, raw	Cá chép
N8005	Pond, fish	ca diec
N8006	Mulet, harder	ca doi
S8012	Dried fish, all types	Cá khô(chim, thu, nụ, đé)
S8014	Carp, bighead, raw	Cá mè
S8016	Fish, fat raw	Cá mỡ
S8018	Fish, lean raw	Cá nạc
S8019	Flying fish, raw	Cá ngừ
S8020	Scad, raw	Cá nục
S8022	Snake head, raw	Cá quả
S8023	Perch, raw	Cá rô đồng
S8024	Tilapia, raw	Cá rô phi
S8029	Grass carp, raw	Cá trắm cỏ
S8030	Sheatfish raw	Cá trê
S8032	Mud carp, raw	Cá trôi
S8033	Crab, seawater raw	Cua bể
S8034	Crab, freshwater raw	Cua đồng
N8010	Crab, freshwater raw	cua dong (bo mai va yem)
N8013	Sea slug; sea cucumber	hai sam
N8014	Clam	hen
S8038	Eel, silver-spike raw	Lươn
N8027	Cuttlefish, dried (squid)	muc kho
N8016	Cuttlefish, raw (squid)	muc tuoi
N8017	Snail, medium-size, edible	oc buou
N8018	Snail, marble, edible	oc da
S8043	Snail, large edible, raw	ốc nhồi
S8044	Helix, raw	ốc vặn
N8012	Crab, small sea bickled, steamed	ram (muoi, do)
N8011	Crab, small sea	ram tuoi
N8031	Snake head, dried flour with fish sauce	ruoc ca qua
S8059	Shrimp, dried flour with fish sauce	Ruốc tôm
N8021	ruoi	ruoi
N8022	Oyster	so
N8023	Rice-shrimp, little	tep gao
S8050	Shrimp, little species, dried	Tép khô
S8051	Shrimp, seawater, raw	Tôm biển
S8052	Shrimp, field river raw	Tôm đồng
S8053	Shrimp, seawater, dried	Tôm khô
S8054	Mussel, freshwater raw	Trai
Eggs and products		
N9007	Egg powder	bot trung
S9002	Chicken, egg yolk raw	Lòng đỏ trứng gà
S9005	Duck, egg yolk raw	Lòng đỏ trứng vịt
N9003	Chicken, egg white	long trang trung ga
N9006	Fish roe	trung ca
S9007	Quail, egg raw	Trứng chim cút
S9001	Chicken, egg, raw whole	Trứng gà
N9001	Chicken, egg, raw whole	trung ga toan phan
S9004	Duck, egg raw	Trứng vịt
S9010	Duck, embryonated egg raw	Trứng vịt lộn
Milk and milk products		
N10012	Cream milk, 12% fat	mo sua 12% lipit
N10011	Cream milk, 18% fat	mo sua 18% lipit
N10010	Cream milk, 30% fat	mo sua 30% lipit
N10013	Cream milk, 9% fat	mo sua 9% lipit
S10009	Cheese, cheddar type whole fat	Phó mát
S10001	Cow milk, fresh fluid	Sữa bò tươi
S10007	Milk, skimmed powder	Sữa bột tách béo
S10006	Milk, dried, whole powder	Sữa bột toàn phần
S10004	Yogurt, full fat	Sữa chua

	FOOD LIST	
Code	English Name	Vietnamese Name
N10006	Yogurt, skimmed milk	sua chua vot beo
S10008	Milk, condensed sweetened	Sữa đặc có đường Việt Nam
N10003	Goat milk, whole	sua de tuoi
S10003	Breast milk, human fluid, whole	Sữa mẹ (sữa người)
N10004	Buffalo milk, fluid whole	sua trau tuoi
Canned products		
N11016	Mackerel, canned	ca thu hop
N11021	Herring, canned	ca trich (do hop)
N11001	Banana, canned sweetened	chuoi nuoc duong
N11014	Cucumber, canned	dua chuot (hop)
N11002	Pineapple, canned sweetened	dua nuoc duong
S11004	Peanut, oil fried	Lạc chao dầu
N11003	mac cooc nuoc duong	mac cooc nuoc duong
N11004	Plum, canned sweetened	man nuoc duong
N11009	Pumpkin, jam	mut bi ngo
N11010	Orange, marmalade, jellies	mut cam co vo
N11011	Banana, jam	mut chuoi
N11013	Papaya, jam	mut du du
N11012	Pineapple, jam	mut dua
N11005	Longan, canned sweetened	nhan nuoc duong
N11008	Pineapple, juice	nuoc dua
N11006	Mandarin, canned sweetened	quit nuoc duong
N11017	Beef, canned	thit bo hop
N11019	Chicken, canned	thit ga hop
N11020	Pork, canned	thit lon hop
N11018	Pork-beef, minced, canned	thit lon, bo xay hop
N11022	Duck, stewed meat	thit vit ham
N11007	Lychee, canned sweetened	vai nuoc duong
Sugars, preserves and confectionery		
N12005	Whole wheat rusk	banh bich cot
S12002	Biscuits, plain, all types	Bánh bích quy
N12007	Biscuits, small, fried	banh cha
N12008	Biscuits, small, fish figured	banh con ca
N12009	Mungbean, cake	banh dau xanh
S12006	Wafers, filled	Bánh kem xốp
N12010	Rice, cake, plain	banh khao chay
N12011	Cinnamon, waffle roll	banh que
N12024	Chocolate filled	banh socola
N12025	Chocolate sweet	banh thoi socola
S12011	Biscuit, small	Bánh trứng nhện
N12031	Mix instant food powder	bot boi duong man
N12030	Mix instant food powder (sweet)	bot boi duong ngot
N12027	Cocoa powder	bot cacao
N12028	Instant food powder (formula 1) high protein and lipid	bot dinh duong tre em cong thuc 1 (cao dam va lipit)
N12029	Instant food powder (formula 2)	bot dinh duong tre em cong thuc 2
S12013	Sugar, brown crude	Đường cát
S12014	Sugar, granulated	Đường kính
N12016	Sweets, toffee	keo bo cung
N12017	Sweets, coffee	keo ca phe
N12013	Sweets, caramel with citron, with orange aroma	keo cam chanh
N12014	Sweets, with coconut aroma	keo dua mem
N12018	Sweets, pineapple candy	keo dua mem
N12019	Peanut candy	keo lac
N12022	Menthol pastille	keo pastille (vien ngam bac ha)
N12023	Sweets, with chocolate	keo socola
N12015	Sweets, with milk	keo sua
N12021	Sesame candy	keo vung vien
N12003	Malt	mach nha
N12004	Honey	mat ong
N12020	Peanut sugar jam	mut lac
Soft drinks, beverages, alcoholic beverages		
N13004	Beer light (4.5% alcohol)	bia
N13009	Coca cola	coca cola
N13015	Vermouth sweet	coc-tain
N13016	Cognac	co-nhac
N13005	Orange, juice, fresh	nuoc cam tuoi
N13008	Coconut, water liquid from immature coconut	nuoc dua non tuoi
N13007	Tomato, juice	nuoc ep ca chua
N13010	Mineral water	nuoc khoang
N13006	Mandarin, juice, fresh	nuoc quit tuoi
N13003	Liquer orange, citron	ruou chanh, cam

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FOOD LIST		
Code	**English Name**	**Vietnamese Name**
N13012	White wine sweet	*ruou vang trang ngot*
N13014	Whisky liqueur	*ruou whisky*
Spices and sauces		
N14001	Cari powder (mix, turmeric, red pepper and other spices)	*cari bot*
N14005	Ginger root, dried	*gung kho*
N14004	Ginger root, fresh	*gung tuoi*
N14003	Black pepper, seeds	*hat tieu*
N14018	Soybean sauce liquid, high protein	*magi*
N14011	River shrimp (small) sour-sauce	*mam tep chua*
N14012	Shrimp sauce concentrate	*mam tom dac*
N14013	Shrimp sauce	*mam tom loang*
N14010	Salt, table	*muoi*
N14007	Turmeric, rhizome dried	*nghe kho*
N14006	Turmeric, rhizome fresh	*nghe tuoi*
N14014	Fish sauce (category super quality)	*nuoc mam ca (loai dac biet)*
N14015	Fish sauce liquid, category 1	*nuoc mam ca, loai 1*
N14017	Fish sauce dried	*nuoc mam co*
N14016	Fish sauce liquid, category 2	*nuoc mam, loai 2*
N14002	Red pepper, dried powder	*ot kho bot*
N14008	Alpinia root	*rieng*
N14020	Soybean sauce with glutinous rice	*tuong nep*
N14021	Soybean sauce with rice and maize	*tuong ngo*
N14009	Red pepper, sauce concentrate	*tuong ot*
N14019	Soybean sauce liquid	*xi dau*

Note: The food codes match the items found in the NIN FCT 1995 and in the SMILING D3.5-a database (2013).
The prefix 'N' and 'S' refer to the sources of information: N 'NIN 1995', S 'SMILING D3.5-a'.

Sources:
NIN. Food Products in Vietnam, Composition and Nutritive Value (1995).
NIN and Wageningen University. SMILING D3.5-a Food Composition Table for Vietnam (2013)

PORTION SIZES (EDIBLE PORTIONS ONLY) EATEN BY EACH HOUSEHOLD MEMBER
PHẦN THỨC ĂN (CHỈ TÍNH PHẦN ĂN ĐƯỢC) CỦA MỖI THÀNH VIÊN TRONG GIA ĐÌNH

B27 Who is the respondent giving this information (refer to HH code in A1)? _____ Ai là người trả lời thông tin này (tham khảo phần mã của hộ ở phần A1)?			B27 Who is the respondent giving this information (refer to HH code in A1)? _____ Ai là người trả lời thông tin này (tham khảo phần mã của hộ ở phần A1)?			B27 Who is the respondent giving this information (refer to HH code in A1)? _____ Ai là người trả lời thông tin này (tham khảo phần mã của hộ ở phần A1)?		
HH member 1 **Mã số của thành viên 1**			**HH member 2** **Mã số của thành viên 2**			**HH member 3** **Mã số của thành viên 3**		
Place eaten Nơi ăn	Volume of eaten food* Note: *For any food item that contains inedible portion (e.g. banana skin, mango stone, chicken or fish bones), weigh the edible portion only. Thể tích/Khối lượng của phần ăn được* Ghi chú: *Với loại thực phẩm có chứa phần không ăn được (ví dụ: vỏ chuối, hột xoài, xương gà hoặc xương cá), chỉ tính phần ăn được.	Unit Đơn vị	Place eaten Nơi ăn	Volume of eaten food* Note: *For any food item that contains inedible portion (e.g. banana skin, mango stone, chicken or fish bones), weigh the edible portion only. Thể tích/Khối lượng của phần ăn được* Ghi chú: *Với loại thực phẩm có chứa phần không ăn được (ví dụ: vỏ chuối, hột xoài, xương gà hoặc xương cá), chỉ tính phần ăn được.	Unit Đơn vị	Place eaten Nơi ăn	Volume of eaten food* Note: *For any food item that contains inedible portion (e.g. banana skin, mango stone, chicken or fish bones), weigh the edible portion only. Thể tích/Khối lượng của phần ăn được* Ghi chú: *Với loại thực phẩm có chứa phần không ăn được (ví dụ: vỏ chuối, hột xoài, xương gà hoặc xương cá), chỉ tính phần ăn được.	Unit Đơn vị
1. eaten at home [Ăn ở nhà] 2. packed food to office or school [Ăn ở ngoài, chuẩn bị từ nhà] 3. restaurant/coffee shop [Hàng/quán] 4. office/school cafeteria [Mua ở cơ quan/trường] 99. other (specify) [Khác (ghi rõ)]		1. g [g] 2. mL [mL]	1. eaten at home [Ăn ở nhà] 2. packed food to office or school [Ăn ở ngoài, chuẩn bị từ nhà] 3. restaurant/coffee shop [Hàng/quán] 4. office/school cafeteria [Mua ở cơ quan/trường] 99. other (specify) [Khác (ghi rõ)]		1. g [g] 2. mL [mL]	1. eaten at home [Ăn ở nhà] 2. packed food to office or school [Ăn ở ngoài, chuẩn bị từ nhà] 3. restaurant/coffee shop [Hàng/quán] 4. office/school cafeteria [Mua ở cơ quan/trường] 99. other (specify) [Khác (ghi rõ)]		1. g [g] 2. mL [mL]
B22	B25	B26	B22	B25	B26	B22	B25	B26
1								
2								
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Notes:		RECIPES OF FOOD COOKED AT HOME CÔNG THỨC NẤU ĂN TẠI NHÀ						
		[If B16 = 1] List down the home-cooked food indicated in B14 one at a time. [Nếu câu B16 = 1] Liệt kê toàn các món ăn được nấu tại nhà từ câu B14 cùng một lúc.	List all ingredients** used per recipe according to their order in the cooking process. Indicate brand name if possible. [**See code in Annex 2] Liệt kê các thành phần** được sử dụng trong công thức theo thứ tự sử dụng khi nấu nướng. Nếu nhãn hiệu nếu có thể. [**Xem mã ở Phụ lục 2]	Where did you get this? Thực phẩm này có nguồn gốc từ đâu?	If purchased, who bought it? Nếu mua, ai là người ra quyết định mua gì và ai đi mua?	Quantity of raw ingredient used for cooking Số lượng của thực phẩm sống dùng để nấu	Unit of measure Đơn vị tính	Price per unit Giá trên 1 đơn vị in '000VND /unit nghìn đồng/đơn vị
				1. own garden/farm [trong vườn/ ruộng] 2. ward/commune market (specify) [chợ xã (ghi rõ tên chợ xã)] 3. district market (specify) [chợ huyện (ghi rõ tên chợ)] 4. restaurant/cafe (specify) [nhà hàng/ quán cafe (ghi rõ tên nhà hàng/quán cafe)] 5. food stall/hawker [quầy thực phẩm/ người bán rong] 6. supermarket/grocery shop [siêu thị/ cửa hàng thực phẩm] 7. small store near home [cửa hàng tạp hóa nhỏ gần nhà] 8. office cafeteria [căn-tin cơ quan] 9. school cafeteria [căn-tin trường học] 10. gift from neighbour/friend [bạn bè/hàng xóm cho/tặng/biếu] 11. gift from parent/in-law/relative [bố mẹ vợ/chồng hoặc họ hàng cho/tặng/biếu] 12. barter [được trao đổi (với hàng hoá khác)] 13. party/special event [cỗ/ giỗ nhà khác/lễ hội/ dịp đặc biệt (hội chợ, v.v.)] 99. other (specify) [khác (ghi rõ)]	1. husband [chồng] 2. wife [vợ] 3. father told the son/daughter/helper/relative/ other HH member [bố dặn con trai/con gái/người giúp việc/họ hàng/thành viên khác] 4. mother told the son/daughter/helper/relative/ other HH member [mẹ dặn con trai/con gái/người giúp việc/họ hàng/thành viên khác] 5. son [con trai] 6. daughter [con gái] 7. helper/relative/other HH member [người giúp việc/họ hàng/thành viên khác] 99. other (specify) [khác (ghi rõ)]	2. gram [gr] 4. mililiter [mi-li-lit (ml)]		
		B32	B33	B34	B35	B36	B37	B39
B28 For the food eaten yesterday, was the amount eaten about usual, less than usual? Bữa ăn ngày hôm qua của cả nhà có khối lượng ăn ít hơn, nhiều hơn hay giống như mọi khi? 0. usual [vẫn như vậy] 1. less than usual (go to B29) [ít hơn mọi khi (chuyển sang B29)] 2. more than usual (go to B30) [nhiều hơn mọi khi (chuyển sang B30)]								
B29 If B28=1, what is the main reason? Nếu B28=1, lý do là gì? 1. was sick [Đang bị ốm] 2. low on cash [không có tiền] 3. traveling [Đi ra ngoài] 4. at a social event, special meal or on a special day [trong dịp lễ hội hoặc vào bữa đặc biệt] 5. on vacation [Đang được nghỉ] 6. too busy [quá bận] 7. not hungry [không cảm thấy đói] 8. dieting [Đang ăn kiêng] 9. fasting [Nhịn ăn] 10. bored [cảm thấy chán] 11. stressed [cảm thấy căng thẳng] 99. other (specify) [khác (ghi rõ)]								
B30 If B28=2, what is the main reason? Nếu B28=2, lý do là gì? 3. traveling [Đi ra ngoài] 4. at a social event, special meal or on a special day [trong dịp lễ hội hoặc vào bữa đặc biệt] 5. on vacation [Đang được nghỉ] 10. bored [cảm thấy chán] 11. stressed [cảm thấy căng thẳng] 99. other (specify) [khác (ghi rõ)]								
B31 How could you describe your current dietary habit? Mô tả thói quen ăn uống hàng ngày? 0. no special diet [vẫn như bình thường] 1. vegetarian [Ăn chay] 2. special diet [Đang ăn kiêng]								

Now, I would like to ask you about the food recipes your family usually prepares during: (a) family affairs like birthdays, offering prayers to the gods, etc.; (b) festivals you celebrated as part of your ethnic tradition/culture, e.g. Mong Spring Festival; and (c) festivals normally celebrated in Vietnam, e.g. Tet, Holiday of the Dead Thanh Minh), etc. in the last 12 months.
Bây giờ, tôi muốn được hỏi về công thức chế biến món ăn mà gia đình thường sử dụng trong các dịp: (a) các sự kiện trong gia đình như sinh nhật, thờ cúng Tổ tiên/ thần linh,....; (b) Các lễ hội tham gia như một phần của phong tục/ truyền thống văn hoá địa phương, như Lễ hội Mừng Xuân của người Mông; và (c) các lễ hội thường tổ chức trong năm như Tết, hoặc tiết thanh minh tảo mộ), trong 12 tháng qua.

B41 Name of occasion: _____
    Dịp diễn ra: _____
B42 Month being celebrated (start from the most recent month): _____
    Tháng có lễ hội (bắt đầu từ tháng gần đây nhất): _____

What are the food recipes and drinks (including alcoholic drinks) your household normally prepares during this occasion? Please be detailed about the name of the recipe. Follow instruction in B14. Công thức đồ ăn và đồ uống (bao gồm đồ uống có cồn) mà gia đình thường chuẩn bị vào dịp này? Liệt kê chi tiết tên của món ăn. Thực hiện theo hướng dẫn ở phần B14.	TOTAL SERVING OF COOKED FOOD TỔNG PHẦN THỨC ĂN ĐƯỢC NẤU				
	Volume of total serving Thể tích/Khối lượng của toàn bộ khẩu phần ăn (chỉ tính phần ăn được)	Unit Đơn vị	Who cooked? [Multiple response] Ai nấu? [Nhiều phương án]	How many people shared this meal? Có bao nhiêu người cùng ăn bữa này?	
				Adult Người lớn	Children Trẻ em
		1. gram [gram] 2. mL [mL]	1. husband [chồng] 2. wife [vợ] 3. son/daughter [con trai/con gái] 4. parent/-in law [bố mẹ/bố mẹ vợ/chồng] 5. other relatives [họ hàng] 6. friends [bạn bè] 99. other (specify) [khác (ghi rõ)]		
B43	B44	B45	B47	B48	B49
REPEAT THIS SHEET FOR OTHER OCCASIONS. LẶP LẠI TRANG NÀY DÀNH CHO CÁC DỊP KHÁC					

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Household Food Insecurity Access Scale (HFIAS)
Thang đo đánh giá tình trạng an ninh thực phẩm hộ gia đình (HFIAS)

Now, I am going to ask you about the food eaten in your household in the past 4 weeks.
I am going to read you several statements. Please tell me either yes or no, and if yes, how often does it happen.
Bây giờ, tôi sẽ hỏi về các loại thực phẩm ông bà ăn trong vòng 4 tuần trở lại đây.
Tôi sẽ đọc các câu sau. Vui lòng cho biết là Có hay Không, và nếu có, thì điều này có thường xuyên xảy ra không?

B50 In the past 4 weeks, did you worry that your household would not have enough food?
Trong vòng 4 tuần trở lại đây, có bao giờ Ông/ Bà lo lắng là trong nhà không có đủ thức ăn?

| | 0. no (go to B52) [không (chuyển sang B52)] |
| | 1. yes [có] |

B51 If [yes] was it ..?   1. ... rarely (1-2 times)   3. ... often (> 10 times)   B51
Nếu [có] thì việc này   ... thi thoảng (1-2 lần)   ... thường xuyên (> 10 lần)
thường xuyên không?   2. ... sometimes (3-10 times)
                              ... đôi khi (3-10 lần)

B52 In the past 4 weeks, were you or any household member not able to eat the kinds of foods
you preferred because of a lack of resources?
Trong vòng 4 tuần trở lại đây, có bao giờ Ông/ Bà hoặc các thành viên khác không thể ăn
loại thực phẩm ưa thích bởi vì không có đủ nguồn lực (thiếu tiền mua, không tự trồng được, không mua bán trao đổi được trên thị trường) không?

| | 0. no (go to B54) [không (chuyển sang B54)] |
| | 1. yes [có] |

B53 If [yes] was it ..?   1. ... rarely (1-2 times)   3. ... often (> 10 times)   B53
Nếu [có] thì việc này   ... thi thoảng (1-2 lần)   ... thường xuyên (> 10 lần)
thường xuyên không?   2. ... sometimes (3-10 times)
                              ... đôi khi (3-10 lần)

B54 In the past 4 weeks, did you or any household member have to eat a limited variety of foods
due to a lack of resources?
Trong vòng 4 tuần trở lại đây, có bao giờ Ông/ Bà hoặc các thành viên khác phải ăn hạn chế các loại thực phẩm
do thiếu nguồn lực (thiếu tiền mua, không tự trồng được, không mua bán trao đổi được trên thị trường) không?

| | 0. no (go to B56) [không (chuyển sang B56)] |
| | 1. yes [có] |

B55 If [yes] was it ..?   1. ... rarely (1-2 times)   3. ... often (> 10 times)   B55
Nếu [có] thì việc này   ... thi thoảng (1-2 lần)   ... thường xuyên (> 10 lần)
thường xuyên không?   2. ... sometimes (3-10 times)
                              ... đôi khi (3-10 lần)

B56 In the past 4 weeks, did you or any household member have to eat some foods that you really
did not want to eat because of a lack of resources to obtain other types of food?
Trong vòng 4 tuần trở lại đây, có bao giờ Ông/ Bà hoặc thành viên khác phải ăn các loại thực phẩm
mà mọi người không thực sự muốn ăn vì thiếu nguồn lực (thiếu tiền mua, không tự trồng được, không mua bán trao đổi được trên thị trường) để có các loại thực phẩm khác không?

B57 If [yes] was it ..?   1. ... rarely (1-2 times)   3. ... often (> 10 times)   B57
Nếu [có] thì việc này   ... thi thoảng (1-2 lần)   ... thường xuyên (> 10 lần)
thường xuyên không?   2. ... sometimes (3-10 times)
                              ... đôi khi (3-10 lần)

B58 In the past 4 weeks, did you or any household member have to eat a smaller meal than you
felt you needed because there was not enough food?
Trong vòng 4 tuần trở lại đây, có bao giờ Ông/ Bà hoặc các thành viên khác có phải ăn ít thức ăn hơn trong một bữa so với
lượng mà mọi người cần vì không có đủ thức ăn?

| | 0. no (go to B60) [không (chuyển sang B60)] |
| | 1. yes [có] |

B59 If [yes] was it ..?   1. ... rarely (1-2 times)   3. ... often (> 10 times)   B59
Nếu [có] thì việc này   ... thi thoảng (1-2 lần)   ... thường xuyên (> 10 lần)
thường xuyên không?   2. ... sometimes (3-10 times)
                              ... đôi khi (3-10 lần)

B60 In the past 4 weeks, did you or any household member have to eat fewer meals in a day
because there was not enough food?
Trong vòng 4 tuần trở lại đây, có bao giờ Ông/ Bà hoặc các thành viên khác có phải ăn ít bữa hơn trong ngày
vì không có đủ thức ăn?

| | 0. no (go to B62) [không (chuyển sang B62)] |
| | 1. yes [có] |

B61 If [yes] was it ..?   1. ... rarely (1-2 times)   3. ... often (> 10 times)   B61
Nếu [có] thì việc này   ... thi thoảng (1-2 lần)   ... thường xuyên (> 10 lần)
thường xuyên không?   2. ... sometimes (3-10 times)
                              ... đôi khi (3-10 lần)

B62 In the past 4 weeks, was there ever no food to eat of any kind in your household because of
lack of resources to get food?
Trong vòng 4 tuần trở lại đây, có bao giờ trong nhà không còn một chút thực phẩm nào vì
thiếu nguồn lực để có được thực phẩm?

| | 0. no (go to B64) [không (chuyển sang B64)] |
| | 1. yes [có] |

B63 If [yes] was it ..?   1. ... rarely (1-2 times)   3. ... often (> 10 times)   B63
Nếu [có] thì việc này   ... thi thoảng (1-2 lần)   ... thường xuyên (> 10 lần)
thường xuyên không?   2. ... sometimes (3-10 times)
                              ... đôi khi (3-10 lần)

B64 In the past 4 weeks, did you or any household member go to sleep at night hungry because
there was not enough food?
Trong vòng 4 tuần trở lại đây, có bao giờ Ông/ Bà hoặc thành viên khác phải chịu đói khi đi ngủ
vì không có đủ thức ăn?

| | 0. no (go to B66) [không (chuyển sang B66)] |
| | 1. yes [có] |

B65 If [yes] was it ..?   1. ... rarely (1-2 times)   3. ... often (> 10 times)   B65
Nếu [có] thì việc này   ... thi thoảng (1-2 lần)   ... thường xuyên (> 10 lần)
thường xuyên không?   2. ... sometimes (3-10 times)
                              ... đôi khi (3-10 lần)

B66 In the past 4 weeks, did you or any household member go a whole day and night without
eating anything because there was not enough food?
Trong vòng 4 tuần trở lại đây, có bao giờ Ông/ Bà hoặc thành viên khác ra ngoài cả ngày mà không được ăn gì
vì không có đủ thức ăn?

| | 0. no (go to C1) [không (chuyển sang C1)] |
| | 1. yes [có] |

B67 If [yes] was it ..?   1. ... rarely (1-2 times)   3. ... often (> 10 times)   B67
Nếu [có] thì việc này   ... thi thoảng (1-2 lần)   ... thường xuyên (> 10 lần)
thường xuyên không?   2. ... sometimes (3-10 times)
                              ... đôi khi (3-10 lần)

C. FOOD CHOICE AND DIETARY BELIEFS
C. LỰA CHỌN THỰC PHẨM VÀ VĂN HOÁ ẨM THỰC

Now, let us move to what motivates you to eat these food and also your dietary beliefs.
Bây giờ, chúng tôi muốn tìm hiểu về sở thích và các quyết định lựa chọn thực phẩm của Ông/Bà

Food Choice
Lựa chọn thực phẩm

I will read you several statements. You will tell me whether you find each one important or not important by selecting a number in the following scale of 1-5 wherein 1 means not important at all and 5 means very important.
Note to enumerator: Interview the one who is responsible in preparing food for all family members. Show him/her the scale and let them point to the number.
Tôi sẽ đọc những câu sau đây. Ông/ Bà hãy đánh giá mức độ quan trọng của việc này trong việc lựa chọn thực phẩm hàng ngày theo thang điểm từ 1 đến 5
Ghi chú với điều tra viên: Hỏi người chuẩn bị bữa ăn chính trong gia đình. Chỉ cho họ thang đo và để họ chỉ vào con số.

It is important to me that the food I eat on a typical day ...

Theo Ông/Bà, thức ăn ăn hàng ngày (cần) [….]. Điều đó quan trọng ở mức nào?

Scale
1. Not important at all
2. Slightly unimportant
3. Normal
4. Important
5. Very important

Thang đo:
1. Hoàn toàn không quan trọng
2. Không quan trọng lắm
3. Bình thường
4. Khá quan trọng
5. Rất quan trọng

Code	Statement	Code	Statement
C1	... is easy to prepare / ... dễ chuẩn bị/sơ chế	C8	... contains natural ingredients (contains no additives, preservatives, or food colors) / ... chứa thành phần tự nhiên (không chứa chất phụ gia, chất bảo quản, phẩm màu nhân tạo, v.v...)
C7	... contains no additives and preservatives / ... không chứa chất phụ gia và chất bảo quản	C44	... makes me feel full or satiated / ... giúp tôi cảm thấy đầy đủ hoặc mãn nguyện
C14	... is low in calories / ... hàm lượng calo thấp	C39	... helps me cope with stress / ... giúp làm giảm mệt mỏi
C19	... has a pleasant texture / ... được nấu vừa tới (ví: thịt bò hầm không bị dai, rau luộc không bị nát/nhũng)	C28	... is what I usually eat / ... là loại thực phẩm tôi thường ăn
C24	... is in harmony with my religious views / ... phù hợp với tôn giáo của tôi	C46	... is a balanced meal of meat and vegetables / ... bữa ăn có đủ thịt và rau
C6	... is readily available in my farm or garden / ... luôn có sẵn trong vườn/ ruộng nhà	C16	... is low in fat / ... hàm lượng chất béo thấp
C2	... can be cooked very simply / ... có thể được nấu một cách đơn giản	C31	... is similar with what my ethnic group cooks / ... giống với những món ăn truyền thống của dân tộc tôi
C25	... is not forbidden in my religion / ... không bị cấm trong tôn giáo của tôi	C38	... cheers me up / ... giúp cơ thể cảm thấy phấn chấn, vui hơn
C33	... is nutritious / ... giàu dinh dưỡng	C9	... contains no artificial ingredients / ... không chứa hoá chất
C36	... is high in protein / ... giàu đạm	C34	... contains a lot of vitamins and minerals / ... chứa nhiều chất khoáng và vitamin
C11	... is free from heavy metals / ... không có tồn dư kim loại nặng	C35	... keeps me healthy / ... giúp tôi khoẻ mạnh
C12	... comes from a country I approve politically / ... đến từ quốc gia mà tôi tin tưởng	C10	... is free from any pesticide residue or toxic chemicals / ... không có dư lượng thuốc trừ sâu hoặc hoá chất độc hại
C13	... has the country of origin clearly marked / ... có nhãn mác quốc gia sản xuất rõ ràng	C37	... is good for my skin/teeth/hair/nails, etc. / ... tốt cho da/ răng/ tóc, móng,...
C3	... takes no time to prepare / ... không mất thời gian chuẩn bị/sơ chế	C32	... is high in fibre and roughage / ... chứa nhiều chất xơ
C15	... helps me control my weight / ... giúp kiểm soát trọng lượng cơ thể	C27	... is like the food I ate when I was a child / ... là loại thực phẩm tôi hay ăn từ khi còn nhỏ
C30	... is similar with what my neighbors cook / ... giống với những món ăn hàng xóm tôi nấu	C40	... keeps me awake/alert / ... giúp cơ thể tỉnh táo
C17	... tastes good / ... ăn ngon miệng	C18	... smells nice / ... có mùi vị thơm ngon
C41	... helps me relax / ... giúp cơ thể cảm thấy thư giãn/thoải mái	C42	... makes me feel good / ... giúp tôi cảm thấy tốt
C4	... can be bought in shops close to where I live or work / ... mua được ở cửa hàng gần nơi tôi sống/ làm việc	C22	... is good value for money / ... hợp lý về giá (chất lượng tương xứng với giá)
C20	... looks nice / ... đẹp mắt	C26	... is familiar / ... quen thuộc với bản thân mình
C21	... is not expensive / ... không quá đắt	C45	... is a balanced meal of rice and meat and/or vegetables / ... bữa ăn có đủ cơm, thịt và rau
C43	... helps me to cope with life / ... giúp tôi đối phó với cuộc sống	C29	... is favored by other household members / ... là món ăn ưa thích của các thành viên khác
C47	... is a balance of hot, cold and neutral food / ... bữa ăn cân bằng/hài hòa giữa đồ ăn nóng, lạnh và trung tính	C23	... is cheap / ... rẻ
C5	... is easily available in shops / ... có sẵn/phổ biến ở các cửa hàng		

Dietary beliefs: Hot-cold (Âm and Dương) classification and physical health
Niềm tin trong ẩm thực: Phân loại đồ ăn nóng- lạnh (Hàn và Nhiệt) và sức khỏe thể chất

C48 Do you classify your food as "hot", "cold" and "neutral"?
Ông/ Bà có phân các loại thực phẩm theo tính "nóng/nhiệt", "lạnh/hàn", và "trung tính" không?

☐ 0. no *(go to C51)* [không *(chuyển sang C51)*]
1. yes [có]

If [yes], what is your interpretation of each classification, and what are some common examples under each (Place "999" if don't know or "88888" if not appl)?
Nếu [có], cách hiểu của ông/bà về tính "nóng", "lạnh", và "trung tính" như thế nào. Xin nêu ví dụ mỗi loại (Chọn "999" nếu không biết hoặc "88888" = không áp dụng)

	Interpretation or definition / Mô tả hoặc định nghĩa C49		Common examples / Ví dụ C50	
1.Hot [Tính nóng]	1		3	
	2		4	
2.Cold [Tính hàn (lạnh)]	1		3	
	2		4	
3.Neutral [Trung tính]	1		3	
	2		4	

C51 Do you use food to treat a malady?
Ông/ Bà có sử dụng thực phẩm để chữa bệnh không?

☐ 0. no *(go to C56)* [không *(chuyển sang C56)*]
1. yes [có]

If [yes], list down the common food treatments for each given malady (For respondents who don't classify according to "hot", "cold", "neutral",
ask them how they classify and write down their responses in the Classification column; otherwise, place "88888" if not applicable.
Nếu [có], liệt kê các loại thực phẩm thường dùng cho từng loại bệnh (Đề nghị người trả lời phân loại thành thực phẩm "nóng", "lạnh" hay "trung tính",
điền "88888" = không áp dụng).

Code / Mã	Malady / Bệnh	Food treatment / Thực phẩm chữa bệnh	Classification* / Phân loại	Main reason for using this food as treatment / Lý do chính sử dụng thực phẩm chữa bệnh
			1. hot [nóng] 2. cold [lạnh] 3. neutral [trung tính] 99. other (specify) [khác (ghi rõ)] 999. don't know [không biết] 88888. Không phân loại	
C52		C53	C54	C55
	1. fever [sốt]	a		a
		b		b
		c		c
	2. infection [nhiễm trùng]	a		a
		b		b
		c		c
	3. diarrhea [tiêu chảy]	a		a
		b		b
		c		c
	4. sore throat [viêm họng]	a		a
		b		b
		c		c

If ['yes'] , list down the common food treatments for each given malady [For respondents who don't classify according to "hot", "cold", "neutral", ask them how they classify and write down their responses in the Classification column; otherwise, place "88888" if not applicable].

Nếu ['có'] , liệt kê các loại thực phẩm thường dùng cho từng loại bệnh [Đề nghị người trả lời phân loại thành thực phẩm "nóng", "lạnh" hay "trung tính", điền "88888"= không áp dụng].

Code Mã	Malady Bệnh	Food treatment Thực phẩm chữa bệnh	Classification* Phân loại 1. hot [nóng] 2. cold [lạnh] 3. neutral [trung tính] 99. other (specify) [khác (ghi rõ)] 999. don't know [không biết] 88888. Không phân loại	Main reason for using this food as treatment Lý do chính sử dụng thực phẩm chữa bệnh
C52		C53	C54	C55
	5. constipation [táo bón]	a		a
		b		b
		c		c
	6. cancer [ung thư]	a		a
		b		b
		c		c
	7. pneumonia [viêm phổi]	a		a
		b		b
		c		c
	8. colds [cảm lạnh]	a		a
		b		b
		c		c
	9. headaches [đau đầu]	a		a
		b		b
		c		c
	10. stomach cramps [co thắt dạ dày]	a		a
		b		b
		c		c

Note to enumerator: If the main person who prepares the food in the household is not the Mother, invite the Mother to join you for the following questions.
[FOR THE MOTHER ONLY] During pregnancy, …
Ghi chú với điều tra viên: Nếu người được hỏi thường chuẩn bị bữa ăn trong nhà không phải là Mẹ, mời Mẹ đến trả lời những câu hỏi sau đây.
[CHỈ HỎI NGƯỜI MẸ] Khi mang bầu, …

… what are the most common food that you eat? … loại thực phẩm mà bà/chị thường ăn?	Classification* Phân loại	Why do you eat this food during pregnancy? Tại sao bà/chị lại ăn thực phẩm này khi mang thai?	… what are the most common food that you avoid? … loại thực phẩm nào bà/chị thường tránh?	Classification* Phân loại	Why do you avoid this food during pregnancy? Tại sao bà/chị lại tránh ăn những thực phẩm này?
	1. hot 2. cold 3. neutral 99. other (specify) 999. don't know 88888. NA 1. nóng 2. lạnh 3. trung tính 99. khác (ghi rõ) 999. không biết 88888. không áp dụng			1. hot 2. cold 3. neutral 99. other (specify) 999. don't know 88888. NA 1. nóng 2. lạnh 3. trung tính 99. khác (ghi rõ) 999. không biết 88888. không áp dụng	
C56	C57	C58	C59	C60	C61
1		1	1		1
2		2	2		2
3		3	3		3
4		4	4		4
5		5	5		5

[FOR THE MOTHER ONLY] After child birth. …
[CHỈ HỎI NGƯỜI MẸ] Sau khi sinh, …

… what are the most common food that you eat? … loại thực phẩm mà bà/chị thường ăn là gì?	Classification* Phân loại	Why do you eat this food after giving birth? Tại sao bà/chị lại ăn thực phẩm này sau khi sinh?	… what are the most common food that you avoid? … loại thực phẩm nào bà/chị thường tránh?	Classification* Phân loại	Why do you avoid this food after giving birth? Tại sao bà/chị lại tránh ăn những thực phẩm này sau khi sinh?
	1. hot 2. cold 3. neutral 99. other (specify) 999. don't know 88888. NA 1. nóng 2. lạnh 3. trung tính 99. khác (ghi rõ) 999. không biết 88888. không áp dụng			1. hot 2. cold 3. neutral 99. other (specify) 999. don't know 88888. NA 1. nóng 2. lạnh 3. trung tính 99. khác (ghi rõ) 999. không biết 88888. không áp dụng	
C62	C63	C64	C65	C66	C67
1		1	1		1
2		2	2		2
3		3	3		3
4		4	4		4
5		5	5		5

D.P. ABBREVIATED-WOMEN'S EMPOWERMENT ON AGRICULTURE INDEX (A-WEAI)
D.P. VIẾT TẮT-CHỈ SỐ TRAO QUYỀN CHO PHỤ NỮ TRONG NÔNG NGHIỆP (A-WEAI)

At this stage, I would like to interview the (1) primary* and (2) secondary* decision-makers SEPARATELY. (See notes below)
One should be male and the other female *(Place 88888 if not applicable, meaning there is no appropriate secondary decision-maker).*
Trong phần này, tôi xin phỏng vấn RIÊNG hai người đóng vai trò chính trong việc ra quyết định trong gia đình (xem ghi chú bên dưới)
Một người nên là nam giới và người còn lại là nữ giới (nếu không có người ra quyết định thứ 2, điền *88888*)

1. Role in Household Decision-making around Production and Income Generation
1. Vai trò trong Quyết định của Hộ về Sản xuất và Thu nhập

Now, I would like to ask you some questions about your participation in certain types of work activities and on making decisions on various aspects of household life.	Did you yourself participate in [ACTIVITY] in the past 12 months (MAY 2015-APR 2016)?	When decisions are made regarding [ACTIVITY], who is it that normally makes the decision? [Tick all that applies] If response is SELF ONLY, go to D5	How much input did you have in making decisions about [ACTIVITY]?	To what extent do you feel you can make your own personal decisions regarding [ACTIVITY] if you want(ed) to? Select one.	How much input did you have on the use of income generated from [ACTIVITY]?
Tôi muốn hỏi Ông/ Bà một vài câu hỏi về sự tham gia của Ông/ Bà vào một số hoạt động cụ thể và việc ra quyết định trong hộ.	Ông/ Bà có tham gia vào [TÊN HOẠT ĐỘNG] trong vòng 12 tháng trở lại đây (THÁNG NĂM 2015 - THÁNG TƯ 2016)?	Khi quyết định được ra trong [TÊN HOẠT ĐỘNG], ai là người quyết định? [Chọn tất cả các phương án đúng] Nếu câu trả lời là TỰ QUYẾT ĐỊNH, chuyển sang D5	Ông/ Bà có ảnh hưởng như thế nào đến việc ra quyết định về [TÊN HOẠT ĐỘNG]?	Nếu phải một mình ra quyết định về [TÊN HOẠT ĐỘNG], Ông/ Bà tự tin như thế nào? Chọn một.	Ông/ Bà có ảnh hưởng như thế nào đến việc quyết định sử dụng thu nhập từ [TÊN HOẠT ĐỘNG]?
Activity description	0. no *(go to the next activity)* [không *(chuyển tới hoạt động tiếp theo)*] 1. yes [có]	1. self [tự quyết định] 2. spouse [vợ/ chồng] 3. other HH member [thành viên khác trong hộ] 4. other non-HH member [không phải thành viên trong hộ] 88888. not applicable [không áp dụng]	1. input in few decisions [Hầu như không có sức ảnh hưởng] 2. input into some decisions [Có sức ảnh hưởng trong một số quyết định] 3. input into most or all decisions [Có sức ảnh hưởng trong hầu hết tất cả quyết định] 88888 NA/no decision [không áp dụng/ Hoặc không tham gia vào việc ra quyết định]	1. not at all [Hoàn toàn không tự tin] 2. small extent [Thiếu tự tin] 3. medium extent [Tương đối tự tin] 4. to a high extent [Hoàn toàn tự tin] 88888. not applicable [không áp dụng]	1. input in few decisions [Hầu như không có sức ảnh hưởng] 2. input into some decisions [Có sức ảnh hưởng trong một số quyết định] 3. input into most or all decisions [Có sức ảnh hưởng trong hầu hết tất cả quyết định] 88888 NA/no decision [không áp dụng/ Hoặc không tham gia vào việc ra quyết định]
Mô tả hoạt động	D1	D2	D3	D4	D5
A. Food crop farming: These are crops that are grown primarily for household food consumption. A. Trồng các cây lương thực phục vụ tiêu dùng trong hộ					
B. Cash crop farming: These are crops that are grown for sale in the market. B. Trồng các cây lương thực để đem bán ở chợ.					
C. Livestock raising C. Chăn nuôi					
D. Non-farm economic activities: This would include things like running a small business, self-employment, buy-and-sell. D. Những hoạt động kinh tế phi nông nghiệp: Bao gồm kinh doanh, buôn bán.					
E. Wage and salary employment (including pensions of retirees or gifts from relatives/friends): This could be work that is paid for in cash or in-kind, including both agriculture and other wage work. E. Làm công ăn lương (gồm lương hưu hoặc quà từ người thân, bạn bè). Đây là công việc được trả lương bằng tiền mặt hoặc hiện vật, bao gồm làm công trong nông nghiệp và các công việc khác.					
F. Aquaculture (fishing or fishpond culture) F. Đánh bắt/ nuôi trồng thuỷ sản					
G. Major household expenditures (such as bicycles, land, etc.) G. Những khoản chi tiêu lớn trong nhà (ví dụ mua xe, mua đất…)	■				■
H. Minor household expenditures (such as food for daily consumption or other household needs) H. Những khoản chi tiêu nhỏ trong nhà (ví dụ đi chợ hàng ngày, hoặc các nhu cầu thiết yếu khác)	■				■

Notes to enumerator:
Ghi chú với Điều tra viên:

The primary and secondary member are usually the husband and wife; however, they can also be another member as long as there is **one male and one female aged 18 years old and over** (for instance, a mother could be living with her adult son or father with an adult daughter).
Thành viên chính và thành viên chính thứ hai thường là chồng và vợ; tuy nhiên, họ có thể là thành viên khác trong nhà với điều kiện là một nam giới và một nữ giới trưởng thành (ví dụ, người mẹ có thể sống với người con trai lớn hoặc cha ở với con gái lớn).

In general, the primary decision-maker is also the head of the household but this may not always be the case (i.e. elderly parent living with adult son/daughter and the adult son/daughter may be the primary or secondary respondent).
Nói chung, người ra quyết định chính thường là chủ hộ nhưng vẫn có trường hợp ngoại lệ (ví dụ bố mẹ lớn tuổi ở với con trai/ con gái, trong trường hợp này con trai/ con gái có thể là người ra quyết định chính và thứ hai).

It may also be the case that there is only a primary female respondent and there is no adult male present in the household. In cases whereby the primary male adult is absent from the house due to migration (has gone for work), and has been or is expected to be away for more than 3 months out of the next/previous 6 months, the primary female adult is considered the primary decision maker.
Cũng có thể có trường hợp tất cả các thành viên gia đình đều là nữ. Đối với trường hợp nam giới thường xuyên vắng mặt vì di cư (công việc), và đã đi vắng hoặc sẽ đi vắng ít nhất 3 tháng trong vòng 6 tháng trước / 6 tháng tới, thì người phụ nữ được coi là người ra quyết định chính.

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2. Access to Productive Capital
2. Tiếp cận vốn cho sản xuất

Now, I would like to ask you about your household's access to and ownership of a number of items that could be used to generate income. Bây giờ, tôi muốn được hỏi Ông/ bà về các tài sản trong nhà và quyền sở hữu của các vật dụng có thể tạo ra thu nhập	Does anyone in your household currently have any [item]? Có ai trong hộ của ông/ bà hiện có [vật dụng]? 0. no *(go to the next item)* [không *(chuyển đến câu tiếp theo)*] 1. yes [có]	Do you own any of the item? Circle all applicable. Ông/ bà có sở hữu bất kỳ vật dụng này? Khoanh tròn các phương án có thể 0. no [không] 1. yes, solely [có, sở hữu riêng] 2. yes, jointly [có, sở hữu chung]
Productive capital Vốn cho sản xuất	D6	D7
A. Agricultural land (pieces/plots) A. Đất sản xuất (mảnh/ miếng)		
B. Large livestock (cattle, water buffalo, horse, etc.) B. Gia súc lớn (trâu, bò, ngựa...)		
C. Small livestock (goats, pigs, etc.) C. Gia súc nhỏ (dê, lợn...)		
D. Chickens, ducks, turkeys, pigeons D. Gà, vịt, gà tây, bồ câu		
E. Fish pond or fishing equipment E. Ao cá hoặc dụng cụ đánh bắt cá		
F. Farm equipment (non-mechanized; hand tools, animal-drawn plough, etc.) F. Dụng cụ nông nghiệp (không phải cơ giới; dụng cụ thô sơ, cái cày bừa...)		
G. Farm equipment (mechanized; tractor-plough, power tiller, treadle pump, etc.) G. Dụng cụ nông nghiệp (loại cơ giới: máy cày, máy kéo, máy bơm...)		
H. Nonfarm business equipment H. Dụng cụ phi nông nghiệp		
I. House or other structures I. Nhà hoặc các công trình khác		
J. Large consumer durables (refrigerator, TV, sofa, etc.) J. Đồ gia dụng lớn (tủ lạnh, tivi, ghế sofa....)		
K. Small consumer durables (radio, cookware, etc.) K. Đồ gia dụng nhỏ (đài radio, nồi cơm...)		
L. Mobile phones L. Điện thoại di động		
M. Other land not used for agricultural purposes (pieces/plots, residential or commercial) M. Đất khác không được dùng cho mục đích nông nghiệp (mảnh/ miếng, đất ở hoặc đất thương mại)		
N. Means of transportation (bicycle, motorcycle, car, etc.) N. Phương tiện đi lại (xe đạp, xe máy, ô tô...)		

3. Access to Credit
3. Tiếp cận tín dụng

Next, I would like to ask about your household's experience with borrowing money or other items in the past 12 months. Tiếp theo, tôi muốn được hỏi về kinh nghiệm của Ông/ Bà về việc đi vay trong vòng 12 tháng trở lại đây.	Has anyone in your household taken any loans or borrowed cash/in-kind from [SOURCE] in the past 12 months? Có ai trong gia đình Ông/ Bà đi vay từ [NGUỒN VAY] trong 12 tháng trở lại đây? 0. no *(go to the next source)* [không *(đi đến nguồn vay kế tiếp)*] 1. yes [có]	Form(s) of loan Hình thức vay là gì? 1. cash [tiền mặt] 2. in-kind [hiện vật] 3. cash and in-kind [cả tiền mặt và hiện vật] 999. don't know [không biết]	Who makes the decision to borrow from [SOURCE] most of the time? [Tick all that applies] Ai là người quyết định đi vay từ [NGUỒN VAY] này? [Chọn các phương án đúng] 1. self [tự quyết định] 2. spouse [vợ/ chồng] 3. other HH member [thành viên khác trong hộ] 4. other non-HH member [không phải thành viên trong hộ] 88888 not applicable	Who makes the decision about what to do with the money/item borrowed from [SOURCE] most of the time? [Tick all that applies] Ai là người ra quyết định việc sử dụng các nguồn tiền/ hiện vật vay được từ [NGUỒN VAY] này? [Chọn các phương án đúng] 1. self [tự quyết định] 2. spouse [vợ/ chồng] 3. other HH member [thành viên khác trong hộ] 4. other non-HH member [không phải thành viên trong hộ] 88888 not applicable
Lending source Nguồn vay	D8	D9	D10	D11
A Non-government organization (NGO) A Tổ chức phi chính phủ (NGO) - vd: CARE, Oxfam, Tổ chức cứu trợ trẻ em, Plan International, ActionAid				
B Formal lender (bank/financial institution, e.g. Agribank, VBSP) B Ngân hàng (ngân hàng/ tổ chức tín dụng, như Agribank, VBSP)				
C Informal lender (private moneylenders and traders and friends charging interest) C Tín dụng tư nhân (người cho vay, hoặc bạn bè cho vay với lãi suất)				
D Friends/relatives (charging zero interest) D Bạn bè/ người thân (không tính lãi suất)				
E Union (Farmers'/Women's Union, People's Credit Funds) E Tổ/ Hội (Hội nông dân/Hội phụ nữ, Quỹ tín dụng nhân dân)				
F Informal savings and credit groups (SCGs) F Nhóm/tổ tiết kiệm, tín dụng nhỏ (tiết kiệm quay vòng, v.v.)				
G. Other G. Khác (Cơ sở kinh doanh đầu vào nông nghiệp cho vay trả chậm giống, phân bón...)				

4. Group Membership
4. Thành viên trong tổ nhóm

Now I am going to ask you about groups in the community. These can be either formal or informal and customary groups. Bây giờ tôi sẽ hỏi về các tổ/ nhóm trong cộng đồng. Nó có thể là tổ/ nhóm chính thức hoặc phi chính thức hoặc theo tập quán địa phương. Group Tổ nhóm	Is there a [GROUP] in your community (village/commune)? Có [TỔ/ NHÓM] sau đây trong thôn/xã không? 0. no *(go to next group)* [không *(chuyển đến nhóm tiếp theo)*] 1. yes [có] 999 don't know [không biết]	Are you an active member of this [GROUP]? Ông/ bà có phải thành viên của [TỔ/ NHÓM]? 0. no [không] 1. yes [có]
	D12	D13
A Agricultural/Livestock/Fisheries producer's group (including marketing group) A Nhóm nông nghiệp/ chăn nuôi/ thuỷ sản (bao gồm nhóm thị trường)		
B Youth Union B Đoàn thanh niên		
C Forest user's group C Nhóm người sử dụng rừng (trồng rừng)		
D Credit or microfinance group, insurance group D Nhóm tín dụng hoặc tài chính vi mô, nhóm bảo hiểm		
F Trade and business association group F Nhóm/ Tổ hợp tác kinh doanh		
G Civic groups (improving community) or charitable group G Nhóm cộng đồng hoặc thiện nguyện, cứu trợ (vd: Hội chữ thập đỏ)		
H Religious group H Nhóm tôn giáo		
I Women's Union I Hội phụ nữ		
J War Veteran Union J Hội cựu chiến binh		
K Vietnam Fatherland's Front K Mặt trận Tổ quốc		
L Other (specify) L Khác (ghi rõ)		

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6. Time Allocation

6. Phân bổ thời gian

Note to enumerator: Please record a log of the activities of the individual in the last complete 24 hours (starting yesterday morning at 4AM, finishing 3:59AM of the current day). The time intervals are marked in 15-min intervals and one activity can be marked for each time period by drawing a line through that activity.

Ghi chú với điều tra viên: Ghi lại các hoạt động của từng cá nhân trong vòng 24 tiếng đồng hồ qua (bắt đầu từ 4 giờ sáng ngày hôm qua, kết thúc lúc 3 giờ 59 phút sáng của ngày hiện tại). Khoảng thời gian được đánh dấu là 15 phút một khoảng và một hoạt động có thể được đánh dấu cho từng khoảng thời gian bằng cách kẻ một đường thẳng đi qua hoạt động đó.

Now, I would like to ask you about how you spent your time during the past 24 hours. We will begin from yesterday morning, and continue through to this morning. This will be a detailed accounting. I'm interested in everything you do (i.e. resting, eating, personal care, work inside and outside the home, caring for children, cooking, shopping, socializing, etc.), even if it does not take much of your time.

Bây giờ tôi muốn hỏi ông/ bà đã làm gì trong 24 tiếng đồng hồ qua. Chúng ta sẽ bắt đầu từ sáng ngày hôm qua, và tiếp tục đến sáng ngày hôm nay. Điều này sẽ thật chi tiết. Tôi quan tâm đến tất cả những việc Ông/ bà làm (ví dụ nghỉngơi, chăm sóc bản thân, làm việc trong hoặc ngoài nhà, chăm sóc trẻ nhỏ, nấu ăn, đi chợ, hoạt động xã hội...), cho dù hoạt động đó không tốn nhiều thời gian của ông/ bà.

Activity (Hoạt động)	Night Đêm		Morning Sáng		Day Ngày								
D14	4	5	6	7	8	9	10	11	12	13	14	15
A. Sleeping and resting												
A. Ngủ và nghỉngơi												
B. Eating and drinking												
B. Ăn uống												
C. Personal care												
C. Vệ sinh cá nhân												
D. School (also homework)												
D. Đi học (và làm bài tập về nhà)												
E. Work as employed												
E. Đi làm công ăn lương												
F. Own business work												
F. Tự kinh doanh												
G. Farming/livestock/fishing												
G. Làm ruộng/ chăn nuôi/ đánh cá												
J. Shopping/getting service (incl. health services)												
J. Đi chơi/ sử dụng các dịch vụ (bao gồm chăm sóc sức khoẻ)												
K. Weaving, sewing, textile care												
K. Dệt, may, sửa quần áo												
L. Cooking												
L. Nấu ăn												
M. Domestic work (incl. fetching wood and water)												
M. Việc nhà (ví dụ: quét nhà, rửa bát, lấy củi, xách nước, v.v.)												
N. Care for children/adults/elderly												
N. Chăm sóc trẻ nhỏ/ người lớn/ người già												
P. Travelling and commuting												
P. Đi lại												
Q. Watching TV/listening to radio/reading												
Q. Xem TV/ nghe đài/ đọc sách báo												
T. Exercising and sports												
T. Tập thể dục, thể thao												
U. Social activites and hobbies												
U. Các hoạt động xã hội và sở thích												
W. Religious activities												
W. Các hoạt động tôn giáo/tín ngưỡng												
X. Other (specify) _____												
X. Khác (ghi rõ) _____												

Activity (Hoạt động)	Evening Tối			Night Đêm								
D14	16	17	18	19	20	21	22	23	24	1	2	3
A. Sleeping and resting												
A. Ngủ và nghỉngơi												
B. Eating and drinking												
B. Ăn uống												
C. Personal care												
C. Vệ sinh cá nhân												
D. School (also homework)												
D. Đi học (và làm bài tập về nhà)												
E. Work as employed												
E. Đi làm công ăn lương												
F. Own business work												
F. Tự kinh doanh												
G. Farming/livestock/fishing												
G. Làm ruộng/ chăn nuôi/ đánh cá												
J. Shopping/getting service (incl. health services)												
J. Đi chơi/ sử dụng các dịch vụ (bao gồm chăm sóc sức khoẻ)												
K. Weaving, sewing, textile care												
K. Dệt, may, sửa quần áo												
L. Cooking												
L. Nấu ăn												
M. Domestic work (incl. fetching wood and water)												
M. Việc nhà (ví dụ: quét nhà, rửa bát, lấy củi, xách nước, v.v.)												
N. Care for children/adults/elderly												
N. Chăm sóc trẻ nhỏ/ người lớn/ người già												
P. Travelling and commuting												
P. Đi lại												
Q. Watching TV/listening to radio/reading												
Q. Xem TV/ nghe đài/ đọc sách báo												
T. Exercising and sports												
T. Tập thể dục, thể thao												
U. Social activites and hobbies												
U. Các hoạt động xã hội và sở thích												
W. Religious activities												
W. Các hoạt động tôn giáo/tín ngưỡng												
X. Other (specify) _____												
X. Khác (ghi rõ) _____												

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GENDER DIMENSIONS OF HOUSEHOLD DECISION-MAKING PROCESSES
CÁC KHÍA CẠNH VỀ GIỚI TRONG VIỆC RA QUYẾT ĐỊNH CỦA HỘ

Now, we would like to ask you who normally makes decisions on the following items.
Note to enumerator: Ask each item. Statements 01 - 30 are production-related. Remind the respondent that these questions are about who makes the decisions and NOT who does the activity.
Place "88888" if household is not involved in any agricultural production.
Bây giờ, chúng tôi muốn hỏi Ông/ bà trong nhà mình ai là người **thường ra quyết định** về những vấn đề sau.
Ghi chú với điều tra viên: Hỏi cho từng câu. Các câu từ 1 - 30 có liên quan đến sản xuất. Lưu ý người được phỏng vấn rằng những câu hỏi này về người ra quyết định và KHÔNG PHẢI là người thực hiện.
Điền "88888" nếu hộ gia đình không liên quan đến bất kỳ hoạt động sản xuất nông nghiệp.

Group Nhóm	Code Mã	Item Mục		D16.P. Primary respondent D16.P. Người trả lời chính
		Note: *Agricultural production/activity refers to cultivation of crops and rearing of animals regardless of whether they are consumed at home or for sale. Ghi chú: * Hoạt động sản xuất nông nghiệp được định nghĩa là cách hoạt động trồng trọt và chăn nuôi, bất kể là tiêu dùng trong hộ hay để bán.		1. self only [tự bản thân] 2. spouse only [vợ hoặc chồng] 3. both husband and wife [cả vợ và chồng] 4. other household member [thành viên khác] 5. other non-household member [không phải thành viên trong nhà] 88888 not applicable [không áp dụng]
D15				D16
1. Production activities Các hoạt động sản xuất	01	Was any member of your household been engaged in any agricultural production* or activity (SEE NOTE ABOVE) in the last 12 months? Có bất kỳ thành viên nào trong hộ Ông/ bà tham gia vào các hoạt động sản xuất nông nghiệp (XEM PHẦN GHI CHÚ Ở TRÊN) trong vòng 12 tháng qua?	0. no (go to D15.31) [không (chuyển đến D15.31)] 1. yes [có]	
		If yes, who normally decides on .... ? Nếu có, ai thường là người ra quyết định về .... ?		
	02	... what crops to grow? ... loại cây được trồng?		
	03	... what varieties to use? ... giống được sử dụng?		
	04	... when to plant? ... thời điểm gieo trồng?		
	05	... what crop establishment method to adopt? ... áp dụng phương pháp trồng nào?		
	06	... which land preparation to use? ... sử dụng cách làm đất được nào?		
	07	... what crop establishment method to adopt? ... áp dụng phương pháp trồng nào?		
	08	... what crop establishment method to adopt? ... áp dụng phương pháp trồng nào?		
	09	... what crop establishment method to adopt? ... áp dụng phương pháp trồng nào?		
	10	... what crop establishment method to adopt? ... áp dụng phương pháp trồng nào?		
	11	... who to hire and the number of labour to hire for agricultural activities? ... thuê ai và số lượng lao động được thuê cho các hoạt động nông nghiệp?		
	12	... when to harvest and do threshing? ... thời điểm thu hoạch và tuốt lúa?		
	13	... whether to sell or consume the harvested crop? ... nên bán hay tiêu dùng trong hộ các loại nông sản thu hoạch được?		
	14	... the quantity of output to sell and consume? ... khối lượng được bán và tiêu dùng trong hộ?		
	15	... how to store seeds? ... dự trữ hạt giống như thế nào?		
	16	... where and whom to sell the harvested crop? ... bán ở đâu và bán cho ai các loại nông sản được thu hoạch?		
	17	... at what price to sell the harvested crop? ... giá bán của các loại nông sản được thu hoạch?		
	18	... how to pack and transport the harvested crop? ... đóng gói và vận chuyển các loại nông sản được thu hoạch		
	19	... who gathers animal feed for the livestock and other farm animals? ... người nào trong hộ người đi lấy thức ăn cho gia súc và các động vật khác?		
	20	... whether to kill and sell or consume farm animals? ... giết mổ để bán hoặc tự tiêu dùng thịt của các con vật nuôi?		
	21	... at what price to sell the farm animal? ... bán với giá nào?		
	22	... whether or not to adopt a new agricultural technology in the farm? ... nên hay không áp dụng công nghệ mới trong nông nghiệp?		
2. Control of resources and income Kiểm soát các nguồn lực và thu nhập	23	... how much money to spend on farm inputs? ... chi bao nhiêu tiền mua đầu vào nông nghiệp?		
	24	... who manages the lease/purchase of additional land? ... người nào trong hộ quản lý việc cho thuê/ mua thêm đất?		
	25	... who manages the lease/purchase of farm machinery? ... người nào trong hộ quản lý việc cho thuê/ mua thêm máy móc nông nghiệp?		
	26	... who manages the lease/purchase of farm equipment? ... người nào trong hộ quản lý việc cho thuê/ mua thêm dụng cụ nông nghiệp?		
	27	... who manages the income on sale of staples and fruit crops? ... người nào trong hộ quản lý thu nhập từ việc bán các loại lương thực và hoa quả?		
	28	... who manages the income on sale of horticultural crops? ... người nào trong hộ quản lý thu nhập từ việc bán rau?		
	29	... who manages the income on sale of livestock? ... người nào trong hộ quản lý thu nhập từ việc bán vật nuôi?		
	30	... who manages the income on sale of fish and other aquaculture? ... người nào trong hộ quản lý thu nhập từ việc bán cá và các loại thuỷ sản?		
	31	... who manages the income on sale of land? ... người nào trong hộ quản lý thu nhập từ việc bán đất?		
	32	... who manages the income from non-farm business(es), e.g. trading? ... người nào trong hộ quản lý thu nhập từ các hoạt động kinh doanh phi nông nghiệp, ví dụ buôn bán?		
2. Control of resources and income Kiểm soát các nguồn lực và thu nhập	33	... who manages the overall household income? ... người nào trong hộ quản lý toàn bộ thu nhập của hộ?		
	34	... whom to sell some land? ... người nào trong hộ bán đất?		
	35	... whom to lease some land? ... người nào trong hộ cho thuê đất?		
	36	... at what price to sell the land? ... giá bán đất?		
	37	... at what price to lease the land? ... giá cho thuê đất?		
	38	... when to repair the house and its parts? ... thời điểm nào sửa nhà?		

D. Gender (Primary)

Group Nhóm	Code Mã	Item Mục		D16.P. Primary respondent D16.P. Người trả lời chính 1. self only [tự bản thân] 2. spouse only [vợ hoặc chồng] 3. both husband and wife [cả vợ và chồng] 4. other household member [thành viên khác] 5. other non-household member [không phải thành viên trong nhà] 88888 not applicable [không áp dụng]
		Note: *Agricultural production/activity refers to cultivation of crops and rearing of animals regardless of whether they are consumed at home or for sale. Ghi chú: * Hoạt động sản xuất nông nghiệp được định nghĩa là cách hoạt động trồng trọt và chăn nuôi, bất kể là tiêu dùng trong hộ hay để bán.		
D15				**D16**
3. Consumption Tiêu dùng	39	... what food items to buy? ... mua loại thực phẩm nào?		
	40	... how much money to spend on food? ... dành bao nhiêu tiền mua thực phẩm?		
	41	... what meals to cook on an ordinary day? ... nấu gì trong ngày thường?		
	42	... what meals to cook during days when money is low? ... nấu gì trong những ngày ít tiền?		
	43	... what meals to cook on special occasions (festivals, birthdays, Tet holiday, etc.)? ... nấu gì trong các dịp đặc biệt (lễ hội, sinh nhật, Tết...)?		
	44	... who allocates food to each household member every meal? ... người nào trong hộ phân chia thức ăn cho từng thành viên trong bữa ăn?		
	45	... who stores leftover food for the next meal? ... người nào trong hộ cất thức ăn còn thừa cho bữa sau?		
	46	... who packs meals for the children to bring to school? ... người nào trong hộ đóng gói đồ ăn cho trẻ con mang đến trường?		
4. Child rearing Nuôi dưỡng trẻ	47	... who looks after the children at home? ... người nào trong hộ chăm sóc trẻ con ở nhà?		
	48	... what type of food to prepare for children under 5 years old ? ... loại thức ăn được chuẩn bị cho trẻ nhỏ dưới 5 tuổi?		
	49	... what brand of milk to buy? ... mua nhãn hiệu sữa nào?		
	50	... what type of milk to buy, e.g. soya, low-fat, etc.? ... loại sữa nào được mua, ví dụ sữa đậu nành, ít béo...?		
	51	... what milk substitutes to prepare or buy, e.g. rice-water, water only, etc.? ... những sản phẩm thay thế sữa được chuẩn bị hoặc mua, ví dụ nước gạo, nước...?		
	52	... when to feed children below 5 years old? ... khi nào cho trẻ dưới 5 tuổi ăn?		
	53	... how many children to raise in the family? ... sinh bao nhiêu con?		
5. Health Sức khoẻ	54	... when to visit the clinic or hospital when sick? ... khi nào nên đi khám bệnh khi bị ốm?		
	55	... who accompanies the sick when visiting the clinic or hospital? ... người nào trong hộ đưa người ốm đi khám bệnh?		
	56	... who takes care of the sick person in the family? ... người nào trong hộ chăm sóc người ốm trong gia đình?		
6. Education Giáo dục	57	... where children should go for higher education? ... nơi học của con sau bậc trung học phổ thông?		
	58	... who buys school supplies for the children? ... người nào trong hộ là người mua đồ dùng học tập cho con?		
	59	... who brings the children to and picks them up from school? ... người nào trong hộ đưa đón con đến trường?		
7. Access to training/workshop/extension services Tiếp cận tập huấn/ hội thảo/ dịch vụ khuyến nông	60	... who attends training and/or workshop related with agricultural production? ... người nào trong hộ tham gia các buổi tập huấn và/hoặc hội thảo liên quan đến sản xuất nông nghiệp?		
	61	... who attends training and/or workshop related with child rearing, vaccinations and other health-related topics? ... ai tham gia các buổi tập huấn và/hoặc hội thảo liên quan đến chăm sóc trẻ con, tiêm vác-xin và các chủ đề liên quan đến sức khoẻ?		
	62	... who will attend other types of training/workshop ... ai sẽ tham gia các buổi tập huấn/ hội thảo khác?		
	63	... who keeps the pamphlets/flyers received from these training/workshops? ... người nào trong hộ giữ các tờ rơi/ tờ hướng dẫn từ những buổi tập huấn/ hội thảo?		
	64	... who meets with extension workers? ... người nào trong hộ gặp các cán bộ khuyến nông?		
8. Credit Tín dụng	65	... who borrows money for agricultural activities? ... người nào trong hộ đi vay tiền cho các hoạt động nông nghiệp?		
	66	... who borrows money for health and/or education-related reasons? ... người nào trong hộ đi vay tiền để chi trả các chi phí y tế và/ hoặc giáo dục?		
	67	... who borrows money for personal reasons, when income is not enough? ... người nào trong hộ đi vay tiền cho các mục đích cá nhân, khi thu nhập không đủ?		
	68	... how much to borrow? ... lượng tiền đi vay?		
	69	... where to borrow? ... vay tiền ở đâu?		
	70	... who manages the money after borrowing? ... người nào trong hộ là người quản lý tiền sau khi đi vay?		

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D.S. ABBREVIATED-WOMEN'S EMPOWERMENT ON AGRICULTURE INDEX (A-WEAI)
D.S. VIẾT TẮT-CHỈ SỐ TRAO QUYỀN CHO PHỤ NỮ TRONG NÔNG NGHIỆP (A-WEAI)

At this stage, I would like to interview the (1) primary* and (2) secondary* decision-makers SEPARATELY. (See notes below)
One should be male and the other female *(Place 88888 if not applicable, meaning there is no appropriate secondary decision-maker)*.
Trong phần này, tôi xin phỏng vấn RIÊNG hai người đóng vai trò chính trong việc ra quyết định trong gia đình (xem ghi chú bên dưới)
Một người nên là nam giới và người còn lại là nữ giới (nếu không có người ra quyết định thứ 2, điền 88888)

<table>
<tr><td colspan="2">

D.S. SECONDARY:_____
(Refer to A6).
D.S. NGƯỜI RA QUYẾT ĐỊNH QUAN TRỌNG THỨ HAI:_____
(Xem ở A6).

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1. Role in Household Decision-making around Production and Income Generation
1. Vai trò trong Quyết định của Hộ về Sản xuất và Thu nhập

Now, I would like to ask you some questions about your participation in certain types of work activities and on making decisions on various aspects of household life. / Tôi muốn hỏi Ông/ Bà một vài câu hỏi về sự tham gia của Ông/ Bà vào một số hoạt động cụ thể và việc ra quyết định trong hộ.	Did you yourself participate in [ACTIVITY] in the past 12 months (MAY 2015-APR 2016)? / Ông/ Bà có tham gia vào [TÊN HOẠT ĐỘNG] trong vòng 12 tháng trở lại đây (THÁNG NĂM 2015 - THÁNG TƯ 2016)?	When decisions are made regarding [ACTIVITY], who is it that normally makes the decision? [Tick all that applies] *If response is SELF ONLY, go to D5* / Khi quyết định được ra trong [TÊN HOẠT ĐỘNG], ai là người quyết định? [Chọn tất cả các phương án đúng] Nếu câu trả lời là TỰ QUYẾT ĐỊNH, chuyển sang D5	How much input did you have in making decisions about [ACTIVITY]? / Ông/ Bà có ảnh hưởng như thế nào đến việc ra quyết định về [TÊN HOẠT ĐỘNG]?	To what extent do you feel you can make your own personal decisions regarding [ACTIVITY] if you want(ed) to? Select one. / Nếu phải một mình ra quyết định về [TÊN HOẠT ĐỘNG], Ông/ Bà tự tin như thế nào? Chọn một.	How much input did you have on the use of income generated from [ACTIVITY]? / Ông/ Bà có ảnh hưởng như thế nào đến việc quyết định sử dụng thu nhập từ [TÊN HOẠT ĐỘNG]?
Activity description / Mô tả hoạt động	0. no *(go to the next activity)* [không *(chuyển tới hoạt động tiếp theo)*] 1. yes [có]	1. self [tự quyết định] 2. spouse [vợ/ chồng] 3. other HH member [thành viên khác trong hộ] 4. other non-HH member [không phải thành viên trong hộ] 88888. not applicable [không áp dụng]	1. input in few decisions [Hầu như không có sức ảnh hưởng] 2. input into some decisions [Có sức ảnh hưởng trong một số quyết định] 3. input into most or all decisions [Có sức ảnh hưởng trong hầu hết tất cả quyết định] 88888 NA/no decision [không áp dụng/ Hoặc không tham gia vào việc ra quyết định]	1. not at all [Hoàn toàn không tự tin] 2. small extent [Thiếu tự tin] 3. medium extent [Tương đối tự tin] 4. to a high extent [Hoàn toàn tự tin] 88888. not applicable [không áp dụng]	1. input in few decisions [Hầu như không có sức ảnh hưởng] 2. input into some decisions [Có sức ảnh hưởng trong một số quyết định] 3. input into most or all decisions [Có sức ảnh hưởng trong hầu hết tất cả quyết định] 88888 NA/no decision [không áp dụng/ Hoặc không tham gia vào việc ra quyết định]
	D1	D2	D3	D4	D5
A. Food crop farming: These are crops that are grown primarily for household food consumption. / A. Trồng các cây lương thực phục vụ tiêu dùng trong hộ					
B. Cash crop farming: These are crops that are grown for sale in the market. / B. Trồng các cây lương thực để đem bán ở chợ.					
C. Livestock raising / C. Chăn nuôi					
D. Non-farm economic activities: This would include things like running a small business, self-employment, buy-and-sell. / D. Những hoạt động kinh tế phi nông nghiệp: Bao gồm kinh doanh, buôn bán.					
E. Wage and salary employment (including pensions of retirees or gifts from relatives/friends): This could be work that is paid for in cash or in-kind, including both agriculture and other wage work. / E. Làm công ăn lương (gồm lương hưu hoặc quà từ người thân, bạn bè). Đây là công việc được trả lương bằng tiền mặt hoặc hiện vật, bao gồm làm công trong nông nghiệp và các công việc khác.					
F. Aquaculture (fishing or fishpond culture) / F. Đánh bắt/ nuôi trồng thuỷ sản					
G. Major household expenditures (such as bicycles, land, etc.) / G. Những khoản chi tiêu lớn trong nhà (ví dụ mua xe, mua đất...)	■				■
H. Minor household expenditures (such as food for daily consumption or other household needs) / H. Những khoản chi tiêu nhỏ trong nhà (ví dụ đi chợ hàng ngày, hoặc các nhu cầu thiết yếu khác)	■				■

Notes to enumerator:
Ghi chú với Điều tra viên:

The primary and secondary member are usually the husband and wife; however, they can also be another member as long as there is <u>one male and one female aged 18 years old and over</u> (for instance, a mother could be living with her adult son or father with an adult daughter).
Thành viên chính và thành viên chính thứ hai thường là chồng và vợ; tuy nhiên, họ có thể là thành viên khác trong nhà với điều kiện là một nam giới và một nữ giới trưởng thành (ví dụ, người mẹ có thể sống với người con trai lớn hoặc cha ở với con gái lớn).

In general, the primary decision-maker is also the head of the household but this may not always be the case (i.e. elderly parent living with adult son/daughter and the adult son/daughter may be the primary or secondary respondent).
Nói chung, người ra quyết định chính thường là chủ hộ nhưng vẫn có trường hợp ngoại lệ (ví dụ bố mẹ lớn tuổi ở với con trai/ con gái, trong trường hợp này con trai/ con gái có thể là người ra quyết định chính và thứ hai).

It may also be the case that there is only a primary female respondent and there is no adult male present in the household. In cases whereby the primary male adult is absent from the house due to migration (has gone for work), and has been or is expected to be away for more than 3 months out of the next/previous 6 months, the primary female adult is considered the primary decision maker.
Cũng có thể có trường hợp tất cả các thành viên gia đình đều là nữ. Đối với trường hợp nam giới thường xuyên vắng mặt vì di cư (công việc), và đã đi vắng hoặc sẽ đi vắng ít nhất 3 tháng trong vòng 6 tháng trước / 6 tháng tới, thì người phụ nữ được coi là người ra quyết định chính.

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2. Access to Productive Capital
2. Tiếp cận vốn cho sản xuất

	Does anyone in your household currently have any [item]? Có ai trong hộ của ông/ bà hiện có [vật dụng]?	Do you own any of the item? Circle all applicable. Ông/ bà có sở hữu bất kỳ vật dụng này? Khoanh tròn các phương án có thể
Now, I would like to ask you about your household's access to and ownership of a number of items that could be used to generate income. Bây giờ, tôi muốn được hỏi ông/ bà về các tài sản trong nhà và quyền sở hữu của các vật dụng có thể tạo ra thu nhập	0. no (go to the next item) [không (chuyển đến câu tiếp theo)] 1. yes [có]	0. no [không] 1. yes, solely [có, sở hữu riêng] 2. yes, jointly [có, sở hữu chung]
Productive capital Vốn cho sản xuất	D6	D7
A. Agricultural land (pieces/plots) A. Đất sản xuất (mảnh/ miếng)		
B. Large livestock (cattle, water buffalo, horse, etc.) B. Gia súc lớn (trâu, bò, ngựa...)		
C. Small livestock (goats, pigs, etc.) C. Gia súc nhỏ (dê, lợn...)		
D. Chickens, ducks, turkeys, pigeons D. Gà, vịt, gà tây, bồ câu		
E. Fish pond or fishing equipment E. Ao cá hoặc dụng cụ đánh bắt cá		
F. Farm equipment (non-mechanized; hand tools, animal-drawn plough, etc.) F. Dụng cụ nông nghiệp (không phải cơ giới; dụng cụ thô sơ, cái cày bừa...)		
G. Farm equipment (mechanized: tractor-plough, power tiller, treadle pump, etc.) G. Dụng cụ nông nghiệp (loại cơ giới: máy cày, máy kéo, máy bơm...)		
H. Nonfarm business equipment H. Dụng cụ phi nông nghiệp		
I. House or other structures I. Nhà hoặc các công trình khác		
J. Large consumer durables (refrigerator, TV, sofa, etc.) J. Đồ gia dụng lớn (tủ lạnh, tivi, ghế sofa....)		
K. Small consumer durables (radio, cookware, etc.) K. Đồ gia dụng nhỏ (đài radio, nồi cơm...)		
L. Mobile phones L. Điện thoại di động		
M. Other land not used for agricultural purposes (pieces/plots, residential or commercial) M. Đất khác không được dùng cho mục đích nông nghiệp (mảnh/ miếng, đất ở hoặc đất thương mại)		
N. Means of transportation (bicycle, motorcycle, car, etc.) N. Phương tiện đi lại (xe đạp, xe máy, ô tô...)		

3. Access to Credit
3. Tiếp cận tín dụng

	Has anyone in your household taken any loans or borrowed cash/in-kind from [SOURCE] in the past 12 months? Có ai trong gia đình ông/ Bà đi vay từ [NGUỒN VAY] trong 12 tháng trở lại đây?	Form(s) of loan Hình thức vay là gì?	Who makes the decision to borrow from [SOURCE] most of the time? [Tick all that applies] Ai là người quyết định đi vay từ [NGUỒN VAY] này? [Chọn các phương án đúng]	Who makes the decision about what to do with the money/item borrowed from [SOURCE] most of the time? [Tick all that applies] Ai là người ra quyết định việc sử dụng các nguồn tiền/ hiện vật vay được từ [NGUỒN VAY] này? [Chọn các phương án đúng]
Next, I would like to ask about your household's experience with borrowing money or other items in the past 12 months. Tiếp theo, tôi muốn được hỏi về kinh nghiệm của ông/ Bà về việc đi vay trong vòng 12 tháng trở lại đây.	0. no (go to the next source) [không (đi đến nguồn vay kế tiếp)] 1. yes [có]	1. cash [tiền mặt] 2. in-kind [hiện vật] 3. cash and in-kind [cả tiền mặt và hiện vật] 999. don't know [không biết]	1. self [tự quyết định] 2. spouse [vợ/ chồng] 3. other HH member [thành viên khác trong hộ] 4. other non-HH member [không phải thành viên trong hộ] 88888 not applicable	1. self [tự quyết định] 2. spouse [vợ/ chồng] 3. other HH member [thành viên khác trong hộ] 4. other non-HH member [không phải thành viên trong hộ] 88888 not applicable
Lending source Nguồn vay	D8	D9	D10	D11
A Non-government organization (NGO) A. Tổ chức phi chính phủ (NGO) - vd: CARE, Oxfam, Tổ chức cứu trợ trẻ em, Plan International, ActionAid				
B Formal lender (bank/financial institution, e.g. Agribank, VBSP) B. Ngân hàng (ngân hàng/ tổ chức tín dụng, như Agribank, VBSP)				
C Informal lender (private moneylenders and traders and friends charging interest) C. Tín dụng tư nhân (người cho vay, hoặc bạn bè cho vay với lãi suất)				
D Friends/relatives (charging zero interest) D. Bạn bè/ người thân (không tính lãi suất)				
E Union (Farmers'/Women's Union, People's Credit Funds) E. Tổ/ Hội (Hội nông dân/Hội phụ nữ, Quỹ tín dụng nhân dân)				
F Informal savings and credit groups (SCGs) F. Nhóm/tổ tiết kiệm, tín dụng nhỏ (tiết kiệm quay vòng, v.v.)				
G. Other G. Khác (Cơ sở kinh doanh đầu vào nông nghiệp cho vay trả chậm giống, phân bón...)				

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4. Group Membership
4. Thành viên trong tổ nhóm

Now I am going to ask you about groups in the community. These can be either formal or informal and customary groups. Bây giờ tôi sẽ hỏi về các tổ/ nhóm trong cộng đồng. Nó có thể là tổ/ nhóm chính thức hoặc phi chính thức hoặc theo tập quán địa phương. Group Tổ nhóm	Is there a [GROUP] in your community (village/commune)? Có [TỔ/ NHÓM] sau đây trong thôn/xã không? 0. no *(go to next group)* [không *(chuyển đến nhóm tiếp theo)*] 1. yes [có] 999 don't know [không biết]	Are you an active member of this [GROUP]? Ông/ bà có phải thành viên của [TỔ/ NHÓM]? 0. no [không] 1. yes [có]
	D12	D13
A Agricultural/Livestock/Fisheries producer's group (including marketing group) A Nhóm nông nghiệp/ chăn nuôi/ thuỷ sản (bao gồm nhóm thị trường)		
B Youth Union B Đoàn thanh niên		
C Forest user's group C Nhóm người sử dụng rừng (trồng rừng)		
D Credit or microfinance group, insurance group D Nhóm tín dụng hoặc tài chính vi mô, nhóm bảo hiểm		
F Trade and business association group F Nhóm/ Tổ hợp tác kinh doanh		
G Civic groups (improving community) or charitable group G Nhóm cộng đồng hoặc thiện nguyện, cứu trợ (vd: Hội chữ thập đỏ)		
H Religious group H Nhóm tôn giáo		
I Women's Union I Hội phụ nữ		
J War Veteran Union J Hội cựu chiến binh		
K Vietnam Fatherland's Front K Mặt trận Tổ quốc		
L Other (specify) L Khác (ghi rõ)		

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6. Time Allocation
6. Phân bổ thời gian

Note to enumerator: Please record a log of the activities of the individual in the last complete 24 hours (starting yesterday morning at 4AM, finishing 3:59AM of the current day). The time intervals are marked in 15-min intervals and one activity can be marked for each time period by drawing a line through that activity.

Ghi chú với điều tra viên: Ghi lại các hoạt động của từng cá nhân trong vòng 24 tiếng đồng hồ qua (bắt đầu từ 4 giờ sáng ngày hôm qua, kết thúc lúc 3 giờ 59 phút sáng của ngày hiện tại). Khoảng thời gian được đánh dấu là 15 phút một khoảng và một hoạt động có thể được đánh dấu cho từng khoảng thời gian bằng cách kẻ một đường thẳng đi qua hoạt động đó.

Now, I would like to ask you about how you spent your time during the past 24 hours. We will begin from yesterday morning, and continue through to this morning. This will be a detailed accounting. I'm interested in everything you do (i.e. resting, eating, personal care, work inside and outside the home, caring for children, cooking, shopping, socializing, etc.), even if it does not take much of your time.

Bây giờ tôi muốn hỏi ông/ bà đã làm gì trong 24 tiếng đồng hồ qua. Chúng ta sẽ bắt đầu từ sáng ngày hôm qua, và tiếp tục đến sáng ngày hôm nay. Điều này sẽ thật chi tiết. Tôi quan tâm đến tất cả những việc Ông/ bà làm (ví dụ nghỉ ngơi, chăm sóc bản thân, làm việc trong hoặc ngoài nhà, chăm sóc trẻ nhỏ, nấu ăn, đi chợ, hoạt động xã hội...), cho dù hoạt động đó không tốn nhiều thời gian của ông/ bà.

Activity (Hoạt động) D14	Night Đêm 4		5		6		Morning Sáng 6				7		Day Ngày 7		8		9		10		11		12		13		14		15		
A. Sleeping and resting																														
A. Ngủ và nghỉ ngơi																														
B. Eating and drinking																														
B. Ăn uống																														
C. Personal care																														
C. Vệ sinh cá nhân																														
D. School (also homework)																														
D. Đi học (và làm bài tập về nhà)																														
E. Work as employed																														
E. Đi làm công ăn lương																														
F. Own business work																														
F. Tự kinh doanh																														
G. Farming/livestock/fishing																														
G. Làm ruộng/ chăn nuôi/ đánh cá																														
J. Shopping/getting service (incl. health services)																														
J. Đi chợ/ sử dụng các dịch vụ (bao gồm chăm sóc sức khoẻ)																														
K. Weaving, sewing, textile care																														
K. Dệt, may, sửa quần áo																														
L. Cooking																														
L. Nấu ăn																														
M. Domestic work (incl. fetching wood and water)																														
M. Việc nhà (ví dụ: quét nhà, rửa bát, lấy củi, xách nước, v.v.)																														
N. Care for children/adults/elderly																														
N. Chăm sóc trẻ nhỏ/ người lớn/ người già																														
P. Travelling and commuting																														
P. Đi lại																														
Q. Watching TV/listening to radio/reading																														
Q. Xem TIvi/ nghe đài/ đọc sách báo																														
T. Exercising and sports																														
T. Tập thể dục, thể thao																														
U. Social activites and hobbies																														
U. Các hoạt động xã hội và sở thích																														
W. Religious activities																														
W. Các hoạt động tôn giáo/tín ngưỡng																														
X. Other (specify)																														
X. Khác (ghi rõ) _____																														

Activity (Hoạt động) D14	Evening Tối 16		17		18				Night Đêm 19		20		21		22		23		24		1		2		3		
A. Sleeping and resting																											
A. Ngủ và nghỉ ngơi																											
B. Eating and drinking																											
B. Ăn uống																											
C. Personal care																											
C. Vệ sinh cá nhân																											
D. School (also homework)																											
D. Đi học (và làm bài tập về nhà)																											
E. Work as employed																											
E. Đi làm công ăn lương																											
F. Own business work																											
F. Tự kinh doanh																											
G. Farming/livestock/fishing																											
G. Làm ruộng/ chăn nuôi/ đánh cá																											
J. Shopping/getting service (incl. health services)																											
J. Đi chợ/ sử dụng các dịch vụ (bao gồm chăm sóc sức khoẻ)																											
K. Weaving, sewing, textile care																											
K. Dệt, may, sửa quần áo																											
L. Cooking																											
L. Nấu ăn																											
M. Domestic work (incl. fetching wood and water)																											
M. Việc nhà (ví dụ: quét nhà, rửa bát, lấy củi, xách nước, v.v.)																											
N. Care for children/adults/elderly																											
N. Chăm sóc trẻ nhỏ/ người lớn/ người già																											
P. Travelling and commuting																											
P. Đi lại																											
Q. Watching TV/listening to radio/reading																											
Q. Xem TIvi/ nghe đài/ đọc sách báo																											
T. Exercising and sports																											
T. Tập thể dục, thể thao																											
U. Social activites and hobbies																											
U. Các hoạt động xã hội và sở thích																											
W. Religious activities																											
W. Các hoạt động tôn giáo/tín ngưỡng																											
X. Other (specify)																											
X. Khác (ghi rõ) _____																											

GENDER DIMENSIONS OF HOUSEHOLD DECISION-MAKING PROCESSES
CÁC KHÍA CẠNH VỀ GIỚI TRONG VIỆC RA QUYẾT ĐỊNH CỦA HỘ

Now, we would like to ask you who normally makes decisions on the following items.
Note to enumerator: Ask each item. Statements 01 - 30 are production-related. Remind the respondent that these questions are about who makes the decisions and NOT who does the activity.
Place "88888" if household is not involved in any agricultural production.
Bây giờ, chúng tôi muốn hỏi Ông/ bà trong nhà mình ai là người **thường ra quyết định** về những vấn đề sau.
Ghi chú với điều tra viên: Hỏi cho từng câu. Các câu từ 1 - 30 có liên quan đến sản xuất. Lưu ý người được phỏng vấn rằng những câu hỏi này về người ra quyết định và KHÔNG PHẢI là người thực hiện.
Điền "88888" nếu hộ gia đình không liên quan đến bất kỳ hoạt động sản xuất nông nghiệp.

Group / Nhóm	Code / Mã	Item / Mục		D16.S. Secondary respondent D16.S. NGƯỜI RA QUYẾT ĐỊNH QUAN TRỌNG THỨ HAI: 1. self only [tự bản thân] 2. spouse only [vợ hoặc chồng] 3. both husband and wife [cả vợ và chồng] 4. other household member [thành viên khác] 5. other non-household member [không phải thành viên trong nhà] 88888 not applicable [không áp dụng]
		Note: *Agricultural production/activity refers to cultivation of crops and rearing of animals regardless of whether they are consumed at home or for sale. Ghi chú: * Hoạt động sản xuất nông nghiệp được định nghĩa là cách hoạt động trồng trọt và chăn nuôi, bất kể là tiêu dùng trong hộ hay để bán.		
D15				D16
	01	Was any member of your household been engaged in any agricultural production* or activity (SEE NOTE ABOVE) in the last 12 months? Có bất kỳ thành viên nào trong hộ Ông/ bà tham gia vào các hoạt động sản xuất nông nghiệp (XEM PHẦN GHI CHÚ Ở TRÊN) trong vòng 12 tháng qua?	0. no (go to D15.31) [không (chuyển đến D15.31)] 1. yes [có]	
		If yes, who normally decides on …. ? Nếu có, ai thường là người ra quyết định về …. ?		
1. Production activities Các hoạt động sản xuất	02	… what crops to grow? … loại cây được trồng?		
	03	… what varieties to use? … giống được sử dụng?		
	04	… when to plant? … thời điểm gieo trồng?		
	05	… what crop establishment method to adopt? … áp dụng phương pháp trồng nào?		
	06	… which land preparation to use? … sử dụng cách làm đất được nào?		
	07	… what crop establishment method to adopt? … áp dụng phương pháp trồng nào?		
	08	… what crop establishment method to adopt? … áp dụng phương pháp trồng nào?		
	09	… what crop establishment method to adopt? … áp dụng phương pháp trồng nào?		
	10	… what crop establishment method to adopt? … áp dụng phương pháp trồng nào?		
	11	… who to hire and the number of labour to hire for agricultural activities? … thuê ai và số lượng lao động được thuê cho các hoạt động nông nghiệp?		
	12	… when to harvest and do threshing? … thời điểm thu hoạch và tuốt lúa?		
	13	… whether to sell or consume the harvested crop? … nên bán hay tiêu dùng trong hộ các loại nông sản thu hoạch được?		
	14	… the quantity of output to sell and consume? … khối lượng được bán và tiêu dùng trong hộ?		
	15	… how to store seeds? … dự trữ hạt giống như thế nào?		
	16	… where and whom to sell the harvested crop? … bán ở đâu và bán cho ai các loại nông sản được thu hoạch?		
	17	… at what price to sell the harvested crop? … giá bán của các loại nông sản được thu hoạch?		
	18	… how to pack and transport the harvested crop? … đóng gói và vận chuyển các loại nông sản được thu hoạch		
	19	… who gathers animal feed for the livestock and other farm animals? … người nào trong hộ người đi lấy thức ăn cho gia súc và các động vật khác?		
	20	… whether to kill and sell or consume farm animals? … giết mổ để bán hoặc tự tiêu dùng thịt của các con vật nuôi?		
	21	… at what price to sell the farm animal? … bán với giá nào?		
	22	… whether or not to adopt a new agricultural technology in the farm? … nên hay không áp dụng công nghệ mới trong nông nghiệp?		
2. Control of resources and income Kiểm soát các nguồn lực và thu nhập	23	… how much money to spend on farm inputs? … chi bao nhiêu tiền mua đầu vào nông nghiệp?		
	24	… who manages the lease/purchase of additional land? … người nào trong hộ quản lý việc cho thuê/ mua thêm đất?		
	25	… who manages the lease/purchase of farm machinery? … người nào trong hộ quản lý việc cho thuê/ mua thêm máy móc nông nghiệp?		
	26	… who manages the lease/purchase of farm equipment? … người nào trong hộ quản lý việc cho thuê/ mua thêm dụng cụ nông nghiệp?		
	27	… who manages the income on sale of staples and fruit crops? … người nào trong hộ quản lý thu nhập từ việc bán các loại lương thực và hoa quả?		
	28	… who manages the income on sale of horticultural crops? … người nào trong hộ quản lý thu nhập từ việc bán rau?		
	29	… who manages the income on sale of livestock? … người nào trong hộ quản lý thu nhập từ việc bán vật nuôi?		
	30	… who manages the income on sale of fish and other aquaculture? … người nào trong hộ quản lý thu nhập từ việc bán cá và các loại thuỷ sản?		
	31	… who manages the income on sale of land? … người nào trong hộ quản lý thu nhập từ việc bán đất?		
	32	… who manages the income from non-farm business(es), e.g. trading? … người nào trong hộ quản lý thu nhập từ các hoạt động kinh doanh phi nông nghiệp, ví dụ buôn bán?		
2. Control of resources and income Kiểm soát các nguồn lực và thu nhập	33	… who manages the overall household income? … người nào trong hộ quản lý toàn bộ thu nhập của hộ?		
	34	… whom to sell some land? … người nào trong hộ bán đất?		
	35	… whom to lease some land? … người nào trong hộ cho thuê đất?		
	36	… at what price to sell the land? … giá bán đất?		
	37	… at what price to lease the land? … giá cho thuê đất?		
	38	… when to repair the house and its parts? … thời điểm nào sửa nhà?		

D. Gender [Secondary]

Group Nhóm	Code MS	Item Mục		D16.S. Secondary respondent D16.S. NGƯỜI RA QUYẾT ĐỊNH QUAN TRỌNG THỨ HAI: 1. self only [tự bản thân] 2. spouse only [vợ hoặc chồng] 3. both husband and wife [cả vợ và chồng] 4. other household member [thành viên khác] 5. other non-household member [không phải thành viên trong nhà] 88888 not applicable [không áp dụng]
D15		Note: *Agricultural production/activity refers to cultivation of crops and rearing of animals regardless of whether they are consumed at home or for sale. Ghi chú: * Hoạt động sản xuất nông nghiệp được định nghĩa là cách hoạt động trồng trọt và chăn nuôi, bất kể là tiêu dùng trong hộ hay để bán.		D16
3. Consumption Tiêu dùng	39	... what food items to buy? ... mua loại thực phẩm nào?		
	40	... how much money to spend on food? ... dành bao nhiêu tiền mua thực phẩm?		
	41	... what meals to cook on an ordinary day? ... nấu gì trong ngày thường?		
	42	... what meals to cook during days when money is low? ... nấu gì trong những ngày ít tiền?		
	43	... what meals to cook on special occasions (festivals, birthdays, Tet holiday, etc.)? ... nấu gì trong các dịp đặc biệt (lễ hội, sinh nhật, Tết...)?		
	44	... who allocates food to each household member every meal? ... người nào trong hộ phân chia thức ăn cho từng thành viên trong bữa ăn?		
	45	... who stores leftover food for the next meal? ... người nào trong hộ cất thức ăn còn thừa cho bữa sau?		
	46	... who packs meals for the children to bring to school? ... người nào trong hộ đóng gói đồ ăn cho trẻ con mang đến trường?		
4. Child rearing Nuôi dưỡng trẻ	47	... who looks after the children at home? ... người nào trong hộ chăm sóc trẻ con ở nhà?		
	48	... what type of food to prepare for children under 5 years old ? ... loại thức ăn được chuẩn bị cho trẻ nhỏ dưới 5 tuổi?		
	49	... what brand of milk to buy? ... mua nhãn hiệu sữa nào?		
	50	... what type of milk to buy, e.g. soya, low-fat, etc.? ... loại sữa nào được mua, ví dụ sữa đậu nành, ít béo...?		
	51	... what milk substitutes to prepare or buy, e.g. rice-water, water only, etc.? ... những sản phẩm thay thế sữa được chuẩn bị hoặc mua, ví dụ nước gạo, nước....?		
	52	... when to feed children below 5 years old? ... khi nào cho trẻ dưới 5 tuổi ăn?		
	53	... how many children to raise in the family? ... sinh bao nhiêu con?		
5. Health Sức khoẻ	54	... when to visit the clinic or hospital when sick? ... khi nào nên đi khám bệnh khi bị ốm?		
	55	... who accompanies the sick when visiting the clinic or hospital? ... người nào trong hộ đưa người ốm đi khám bệnh?		
	56	... who takes care of the sick person in the family? ... người nào trong hộ chăm sóc người ốm gia đình?		
6. Education Giáo dục	57	... where children should go for higher education? ... nơi học của con sau bậc trung học phổ thông?		
	58	... who buys school supplies for the children? ... người nào trong hộ là người mua đồ dùng học tập cho con?		
	59	... who brings the children to and picks them up from school? ... người nào trong hộ đưa đón con đến trường?		
7. Access to training/workshop/extension services Tiếp cận tập huấn/ hội thảo/ dịch vụ khuyến nông	60	... who attends training and/or workshop related with agricultural production? ... người nào trong hộ tham gia các buổi tập huấn và/hoặc hội thảo liên quan đến sản xuất nông nghiệp?		
	61	... who attends training and/or workshop related with child rearing, vaccinations and other health-related topics? ... ai tham gia các buổi tập huấn và/hoặc hội thảo liên quan đến chăm sóc trẻ con, tiêm vác-xin và các chủ đề liên quan đến sức khoẻ?		
	62	... who will attend other types of training/workshop ... ai sẽ tham gia các buổi tập huấn/ hội thảo khác?		
	63	... who keeps the pamphlets/flyers received from these training/workshops? ... người nào trong hộ giữ các tờ rơi/ tờ hướng dẫn từ những buổi tập huấn/ hội thảo?		
	64	... who meets with extension workers? ... người nào trong hộ gặp các cán bộ khuyến nông?		
8. Credit Tín dụng	65	... who borrows money for agricultural activities? ... người nào trong hộ đi vay tiền cho các hoạt động nông nghiệp?		
	66	... who borrows money for health and/or education-related reasons? ... người nào trong hộ đi vay tiền để chi trả các chi phí y tế và/ hoặc giáo dục?		
	67	... who borrows money for personal reasons, when income is not enough? ... người nào trong hộ đi vay tiền cho các mục đích cá nhân, khi thu nhập không đủ?		
	68	... how much to borrow? ... lượng tiền đi vay?		
	69	... where to borrow? ... vay tiền ở đâu?		
	70	... who manages the money after borrowing? ... người nào trong hộ là người quản lý tiền sau khi đi vay?		

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E. MICRONUTRIENT SUPPLEMENTATION, BREASTFEEDING PRACTICES AND MATERNAL KNOWLEDGE ABOUT NUTRITION INFORMATION
E. BỔ SUNG VI CHẤT, VIỆC CHO CON BÚ SỮA MẸ VÀ NHỮNG KIẾN THỨC CỦA NGƯỜI MẸ VỀ DINH DƯỠNG

E0 Are there any female household members? [Trong hộ có phụ nữ không? (ĐTV quan sát và xác nhận)]
    0. no [không] >>E1a
    1. yes [có] >> E1

E1 In the household, are there any women who have given birth or are pregnant? [Trong hộ, có phụ nữ nào đã sinh con hoặc đang mang bầu không?]
    0. no [không] >>E1a
    1. yes [có] >> E1c

E1a Are there any children under five in the household? [Hộ có trẻ dưới 5 tuổi không?]
    0. no [không]
    1. yes [có]

If ED=0 & E1a=0 >> E25 - E27, Sec F
Nếu ED=0 & E1a=0 >> E25 - E27, Phần F
If ED=0 & E1a=1 >> E2 - E4, E16 - E17, E25 - E27 and Sec F
Nếu ED=0 & E1a=1 >> Hỏi E2 - E4, E16 - E17, E25 - E27 và Phần F
If E1=0 & E1a=0 >> E23 - E27
Nếu E1=0 & E1a=0 >> Hỏi E23 - E27
If E1=0 & E1a=1 >> E2 - E4, E16 - E17 & E23 - E27
Nếu E1=0 & E1a=1 >> Hỏi E2 - E4, E16 - E17 & E23 - E27

E1c Are there any members who gave birth in the past 5 years? [Có ai sinh con trong 5 năm trở lại đây không?]
    0. no [không] >> E5-E13 & E23 - E27
    1. yes [có] >> E14

E14 Are there any members who gave birth in the past 2 years? [Có ai sinh con trong 2 năm trở lại đây không?]
    0. no [không] >> E2 - E13 & E23 - E27
    1. yes [có] >> E2 - E27

If [yes], I would like to ask you about your child(ren)'s micronutrient supplementation. Again, this part only refers to children under 5 years old. Write their names in E2 - E4. **Children's Micronutrient Supplementation** Nếu [Có], Xin ông bà cho biết về các thông tin việc bổ sung vi chất các dinh dưỡng. Phần này dành riêng cho trẻ dưới 5 tuổi. Viết tên của từng thành viên trong các ô E2 - E4. **Việc bổ sung các vi chất dinh dưỡng cho trẻ em**	Name 1: Thành viên thứ 1: E2	Name 2: Thành viên thứ 2: E3	Name 3: Thành viên thứ 3: E4
Did [name] have the following... within the last 6 months? Trong 6 tháng qua, thành viên [tên] có tham gia các hoạt động sau đây không?			
A .... get vitamin A from CHC when child was malnourished/ diarrhoea/ measles/ ... Uống vitamin A từ trạm y tế xã/phường khi trẻ bị suy dinh dưỡng/ tiêu chảy/ sởi/ sốt/ ho? **Codes for A-E:** Mã cho câu A-E:			
B ... consume vitamin A from Micronutrient Day? ... Uống Vitamin A trong Ngày Vi chất dinh dưỡng? 0. no [không] 1. yes [có]			
C ... consume vitamin A from other source? ... Uống Vitamin A từ các nguồn khác? 999. don't know [không biết]			
D Did [name] get dewormed within the last 6 months? Thành viên [tên] có được tẩy giun trong 6 tháng qua không?			
E Do [name] have night blindness symptoms* within the last 6 months? Thành viên [tên] có hiện tượng quáng gà* trong 6 tháng qua không?			
F Who told you about Micronutrient Day/Vitamin A day? [Tick all that applies] Ông bà biết thông tin về Ngày Vi chất dinh dưỡng/ Ngày Vitamin A từ nguồn thông tin nào? [Đánh dấu các phương án được lựa chọn] 1. health staff [nhân viên y tế] 2. invitation letter [thư mời] 3. relative [họ hàng, người thân] 4. neighbour [hàng xóm] 5. TV/radio [TV/Đài] 99. other (specify) [khác (Ghi rõ)] 999. don't know/not informed [không biết/ Không được thông báo]		██ ██

Note: *Please explain about the Micronutrient Day and night blindness symptom if the respondent does not know.
Ghi chú: * Giải thích về Ngày Vi chất dinh dưỡng và hiện tượng quáng gà nếu người trả lời phỏng vấn không biết.

Mother's Micronutrient Supplementation These only refer to the mother's condition **Bổ sung vi chất dinh dưỡng cho người mẹ** Phần này dành riêng cho người mẹ		
E5 Did you take vitamin A after the delivery of your youngest child? Bà/Chị có bổ sung Vitamin A sau khi sinh con bé nhất không?	0. no [không] 1. yes [có]	999. don't know [không biết] 88888. not applicable [NA]
E6 Did you get dewormed during the last 6 months? Bà/Chị có tẩy giun trong 6 tháng qua không?	0. no [không] 1. yes [có]	999. don't know [không biết] 88888. not applicable [NA]
E7 Do you ever have a night blindness symptom during the last pregnancy? Bà/Chị có khi nào mắc chứng quáng gà/ dạ thị trong lần mang thai gần nhất không?	0. no [không] 1. yes [có]	999. don't know [không biết] 88888. not applicable [NA]
E8 Did you consume iron or iron-folate tablets in the last 6 months? Bà/Chị có bổ sung viên sắt/ viên sắt - axit folic trong 6 tháng qua không?	0. no [không] 1. yes [có]	999. don't know [không biết] 88888. not applicable [NA]
E9 If [yes], how many days did you consume? Nếu [Có], bà/chị đã sử dụng bao nhiêu ngày trong 6 tháng qua?	days số ngày	
E10 Did you consume iron or iron-folate tablets at any time from 3 months prior to pregnancy to 3 months after delivery of the youngest child? [If no/don't know, go to E14] Bà/Chị có bổ sung viên sắt/ viên sắt - axit folic tại bất kỳ thời điểm nào trong vòng 3 tháng trước khi mang thai tới 3 tháng ngay sau khi sinh thành viên nhỏ tuổi nhất không? [Nếu không/không biết, chuyển sang câu E14]	0. no [không] 1. yes [có]	999. don't know [không biết] 88888. not applicable [NA]

	E11 Period Thời điểm		E12 No. of months Số tháng
E11 If [yes], when did you consume the iron or iron-folate tablets during your pregnancy? [Ask each period. Tick all that applies] Nếu [Có], thời điểm nào bà/chị bổ sung viên sắt/ viên sắt - axit folic trong thời gian mang thai? [Hỏi cho từng thời kỳ. Đánh dấu các phương án được lựa chọn]	Before [Trước] During [Trong]	1. 3mo before preg. [3 tháng trước khi mang thai.] 2. 1st trimester [3 tháng đầu thai kỳ] 3. 2nd trimester [3 tháng giữa thai kỳ] 4. 3rd trimester [3 tháng cuối thai kỳ]	
E12 If [yes], how many days did you consume? [Ask for each 3-month time period. Please fill "0" if none] Nếu [có], bà/chị uống viên sắt - axit folic này trong bao nhiêu ngày trong mỗi thời kỳ sau đây? [Hỏi cho từng thời kỳ 3 tháng. Điền "0" nếu không bổ sung]	After [Sau]	5. 3mo after delivery [3 tháng sau sinh]	
E13 How did you acquire these iron or iron-folate tablets? [Tick all that applies] Làm thế nào bà/chị có được các viên sắt/ viên sắt - axit folic này? [Đánh dấu các phương án được lựa chọn]		1. buy [mua] 2. free [Phát miễn phí] 3. gift [Quà tặng] 99. other (specify) [Khác (ghi rõ)]	

E15 Name of the youngest who is under 2 years old: _____
Tên thành viên nhỏ tuổi nhất dưới 2 tuổi: _____

E16 How long after birth was [name] breastfed for the first time (or put the child to the breast)? [Record number of hours]
Sau khi sinh bao nhiêu giờ, [Tên] được cho ăn sữa mẹ lần đầu tiên (hoặc bú sữa mẹ trực tiếp)?

	Hours [Giờ]

E17 What was [name] given to drink during the first three days after birth? [Read each option to the respondent] [Tick all that applies]
Chị cho [Tên] uống gì trong vòng 3 ngày đầu sau khi sinh? [Đọc từng phương án cho người trả lời phỏng vấn] [Đánh dấu các phương án được lựa chọn]

0. breast milk [sữa mẹ]
1. plain water [nước trắng]
2. sugar/glucose water [nước đường/ glucose]
3. honey [mật ong]
4. infant formula [sữa công thức hoặc sữa bột, sữa đặc cho trẻ sơ sinh]
5. other milk (not breast milk) [các loại sữa tươi khác (không phải sữa mẹ)]
6. fruit juice/coco milk/herbal [nước hoa quả/nước dừa/thảo dược]
7. clear broth (rice, bones, meat) [nước luộc (nước cháo, nước xương, nước thịt)]
8. sugar-salt-water solution/ORS or syrup [nước điện giải/ ORS hoặc Siro]
99. other (specify) [khác (ghi rõ)_____]

E18 Did you squeeze out any colostrum before putting [name] to the breast?
Bà/Chị có vắt sữa non trước khi cho [Tên] bé bú không?

0. no [không]
1. yes [có]

E19 Are you still breastfeeding [name]?
Bà/chị hiện có còn cho [Tên] bú sữa mẹ không?

0. no (go to E23) [không (chuyển sang câu E23)]
1. yes [có]

E20 How many times did you breastfeed yesterday from the time you woke up to the time you went to bed? [Including feeding expressed breast milk. If answer is not numeric, probe for approximate answer]
Ngày hôm qua, chị cho [TÊN] bú bao nhiêu lần từ lúc bà/chị thức dậy đến khi đi ngủ? [Bao gồm cả số lần cho con ăn sữa mẹ được vắt ra. Nếu câu trả lời không là số cụ thể, thăm dò để có câu trả lời xấp xỉ]

No. of daylight feeding times
Số lần cho con bú sữa mẹ vào ban ngày

E21 How many times did you breastfeed yesterday from the time you went to sleep to the time you woke up? [Including feeding expressed breast milk. If answer is not numeric, probe for approximate answer]
Đêm hôm qua, chị cho [TÊN] bú bao nhiêu lần từ lúc bà/chị đi ngủ đến lúc thức dậy? [Bao gồm cả số lần cho con ăn sữa mẹ được vắt ra. Nếu câu trả lời không là số cụ thể, thăm dò để có câu trả lời xấp xỉ]

No. of night time feeding times
Số lần cho con bú sữa mẹ vào ban đêm

E22 When [name] is breastfeeding, do you give a little from each breast or empty one breast first before moving to second one?
Khi cho [Tên] bú, bà/chị có cho con bú mỗi bên một chút hay cho con bú cạn một bên trước khi chuyển sang bên còn lại?

1. a little from each breast [mỗi bên một chút]
2. empty one breast before switching to the other [bú cạn một bên trước khi chuyển sang bên còn lại]
999. don't know [Không biết]

E23 Did you ever meet with the following health staff within the last month? [Tick all that applies]
Trong tháng trước, bà/chị có gặp các nhân viên y tế sau không? [Đánh dấu phương án được lựa chọn]

0. no [không]
1. VHW/Nutrition volunteer [cán bộ y tế thôn/bản/ làng/ Tình nguyện viên dinh dưỡng]
2. Women's union [hội phụ nữ]
3. CHC staff [cán bộ y tế xã]
4. Health staff in hospital center [cán bộ y tế tại các bệnh viện công]
5. Private health sector [cơ sở y tế tư nhân]
99. other (specify) [khác (ghi rõ)]

E24 During the last 3 months, did you hear, see or have been counseled on any of the following ... ? [Note to enumerator: Read each time. If YES, indicate main source only.]
Trong 3 tháng qua, bà/chị có nghe, nhìn hay được tư vấn các thông tin sau đây không ? [Ghi chú với điều tra viên: Đọc từng phương án. Nếu câu trả lời là "Có" nêu nguồn chính (chọn 1 mã)]

			Codes for E24 / Mã cho câu E24
A	Infants should be breastfed immediately after birth. / Trẻ sơ sinh nên được cho bú ngay sau khi sinh	A	0. no [không]
B	Nursing more leads to more breastmilk. / Cho con bú thường xuyên sẽ có nhiều sữa hơn	B	1. nutrition meeting group [nhóm dinh dưỡng]
C	Infants should be exclusively breastfed for up to 6 months. / Trẻ sơ sinh chỉ nên bú sữa mẹ trong 6 tháng đầu	C	2. health staff [nhân viên y tế]
D	Other than breastmilk, infant under 6 months should not be given any water. / Ngoài sữa mẹ, không nên cho trẻ dưới 6 tháng tuổi uống bất kỳ loại nước nào	D	3. TV 4. radio/loudspeaker [Đài/ đài phát thanh]
E	Continue to BF up to 24 months or beyond. / Tiếp tục cho con bú cho tới khi con 24 tháng tuổi hoặc hơn	E	5. newspaper/magazine [báo/ Tạp chí]
F	Ban on advertising of breastmilk substitutes for children under 2 years. / Cấm quảng cáo các loại sữa khác có thể thay cho sữa mẹ cho trẻ dưới 2 tuổi	F	6. internet/mobile/tablet [internet/ di động/ máy tính bảng] 7. poster/leaflet [Áp phích quảng cáo/ tờ rơi]
G	Feed infants meat, fish, eggs, and other animal source food. / Cho trẻ sơ sinh ăn các loại thịt, cá, trứng và các loại thực ăn khác có nguồn gốc từ động vật	G	99. other (specify) [khác (ghi rõ)] 999. don't know/don't remember [Không biết/ không nhớ]
H	Feed infants green leafy vegetables (spinach, jute, watercress, kangkong). / Cho trẻ ăn các loại rau lá xanh (rau dền, rau đay, rau cải xoong, rau muống)	H	
I	Wash hands with soap before preparing food and before feeding the child. / Rửa tay với xà bông trước khi chuẩn bị đồ ăn và trước khi cho trẻ ăn	I	
J	Monitor a child's growth (heigh and weight). / Theo dõi sự tăng trưởng của trẻ (Chiều cao và cân nặng)	J	
K	Women should consume iron tablets before and during pregnancy to prevent anemia. / Phụ nữ nên uống viên sắt trước và trong khi mang thai để tránh bị thiếu máu	K	
L	Extend paid maternity leave from 4 to 6 months. / Kéo dài thời gian nghỉ thai sản từ 4 tháng lên 6 tháng	L	
M	Using iodized salt in the meals. / Sử dụng muối I ốt trong bữa ăn	M	

E25 Does your family use iodized salt or soup powder (ex. Bột Canh Thiên Hương) for cooking or flavouring?
Gia đình bà/chị có sử dụng muối I ốt hoặc muối bột canh/ bột súp (Như: Bột canh Thiên Hương) cho việc nấu ăn hoặc làm gia vị không?

0. no [không]
1. yes [có]

E26 Do you or other household members take any multivitamins, minerals and other food supplements?
Có ai trong gia đình mình uống bất kỳ loại vitamin tổng hợp, khoáng chất và các thực phẩm bổ sung không?

0. no (go to F1) [không (chuyển sang câu F1)]
1. yes [có]
999. don't know (go to F1) [không biết (chuyển sang câu F1)]

E27 If [yes], please provide examples and identify who among the household member is taking them.
Nếu [Có], vui lòng lấy ví dụ và nếu cụ thể ai là ai trong gia đình đang sử dụng các loại vitamin khoáng chất trên

HH member code [Refer to Section A1]
Mã thành viên [Xem phần A1]
(88888 if not appli)

1	
2	
3	

E.Micronutrient Supplementation

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F. HEALTH INDICATORS, ACCESS TO CLEAN WATER AND SANITATION, HANDWASHING PRACTICES, AND LIFESTYLE
F. CHỈ SỐ VỀ SỨC KHOE, TIẾP CẬN NƯỚC SẠCH VÀ VỆ SINH, VIỆC RỬA TAY VÀ LỐI SỐNG

On Disease Incidence and Access to Health Clinic
Bệnh tật và Việc tiếp cận các cơ sở y tế

List of diseases Danh sách các bệnh	Is anyone in your household currently suffering from [illness]? Có ai trong gia đính ông/bà từng mắc các bệnh sau không? 0. no [không] 1. yes [có]	[If F2 = yes] [Nếu câu F2 = Có] Which household member was it? [Refer to HH member code in A1] Thành viên nào trong hộ từng bị? [Xem mã ở câu A1]	What year was the household member(s) first diagnosed? Phát hiện bệnh [...] lần đầu vào năm nào? Year Năm	What did this household member(s) do to control the [disease]? [No prompting, classify up to 3 responses with codes below] Thành viên đó đã làm gì để kiểm soát các bệnh này? [KHÔNG đọc các phương án lựa chọn cho người trả lời phỏng vấn, ghi 3 phương án trả lời tương ứng với các mã bên dưới]		
F1	F2	F3	F4	F5	F6	F7
1. overweight? Thừa cân?						
2. underweight? Nhe cân/Thiếu cân?						
3. diabetes? Tiểu đường?						
4. high blood pressure? Huyết áp cao?						
5. heart disease? Bệnh tim mạch?						
6. cancer? Ung thư?						
7. pneumonia? Viêm phổi?						
8. measles? Sởi?						
9. malaria? Sốt xuất huyết?						
10. typhoid? Thương hàn?						
11. hepatitis A and/or B? Viêm gan A và/hoặc B						
99. other (specify) Khác (ghi rõ)						

Have you or any household member experienced ... in the last 2 weeks? [See code]
Có trong gia đình ông/bà bị các bệnh....trong 2 tuần qua không? [Xem mã]

F8 ...severe diarrhea? ...tiểu chảy nặng?	F8	
F9 ...fever? ...Sốt	F9	
F10 ...cough? ...ho?	F10	
F11 ...runny, stuffy nose? ...chảy nước mũi/nghẹt mũi?	F11	
F12 ...shortness of breath? ...khó thở?	F12	

F13 How close is the nearest health centre/clinic (meters)?
Khoảng cách từ nhà tới phòng khám/trung tâm y tế gần nhất? [ ] meters / mét

F14 Have you visited it in the last 6 months?
Ông/bà có tới các phòng khám này trong vòng 6 tháng qua? [ ]
0. no (go to F16) [không (chuyển tới câu F16)]
1. yes (có)

F15 If 『yes』, for what purpose/reason? [Tick all that applies]
Nếu 『có』, vì sao ông/ bà tới đó? [đánh dấu tất cả các phương án được lựa chọn]
1. voluntary check-up [kiểm tra sức khoẻ tự nguyện]
2. invited by health staff [Được nhân viên y tế mời đến]
3. emergency situation [trong tình trạng cấp cứu (tai nạn, sinh em bé)]
4. attend training/ workshop [tham gia tập huấn/hội thảo]
5. buy medicines/ supplements/ vaccines/ immunizations [mua thuốc/các chất bổ sung/ vắc xin/miễn dịch]
99. other (specify) [khác (ghi rõ_____]

Codes for F8-12
Mã cho câu F8-12
0. none of us [Không ai mắc]
1. all of us [tất cả mọi người]
2. only children [chỉ cho trẻ nhỏ]
3. only adults [chỉ có người lớn]
4. some adults and some children [vài người lớn và vài trẻ nhỏ]

Codes for F5 - F7
Mã cho câu F5 - F7
0. did not do anything to control disease [không làm gì để kiểm soát dịch bệnh]
1. decrease fat consumption [giảm mỡ trong khẩu phần ăn]
2. decrease sugar consumption [giảm đường trong khẩu phần ăn]
3. decrease salt consumption [giảm muối trong khẩu phần ăn]
4. decrease cholesterol consumption (e.g. egg yolk, palm or coconut oil, meat) [hạn chế dùng các thực phẩm làm tăng mỡ máu (vd: lòng đỏ trứng, dầu cọ hoặc dầu dừa, thịt)]
5. increase fibre consumption [tăng chất xơ trong khẩu phần ăn]
6. decrease weight (or total calories) [Giảm lượng thức ăn (hoặc giảm tổng số calo/năng lượng)]
7. increase fruit consumption [tăng ăn hoa quả]
8. increase vegetable consumption [tăng ăn rau củ]
9. eat less processed food [giảm ăn các loại thực phẩm đóng hộp/chế biến]
10. exercise more [tăng cường tập thể dục]
11. decrease alcohol consumption [hạn chế các loại đồ uống có cồn]
12. take medication [uống thuốc]
13. take vitamins or alternative med [bổ sung vitamin hoặc thuốc bổ]
14. reduce or stop consuming food related to allergy [giảm thiểu hoặc không dùng các thực phẩm gây dị ứng]
15. reduce protein consumption [giảm lượng tiêu thụ đạm (protein)]
99. other (specify) [khác (ghi rõ)_____]

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F16 If 『no』, why did you not visit it in the last 6 months? [Tick all that applies.]
Nếu 『Không』, lý do vì sao? [đánh dấu tất cả các phương án được lựa chọn]

- 0. none got sick [không bị bệnh]
- 1. simple ailments and can be cured at home [các bệnh nhẹ và có thể tự chữa ở nhà]
- 2. no money to pay the health centre/clinic [không có tiền để trả cho cơ sở y tế/phòng khám]
- 3. too far from residence [quá xa nhà]
- 4. go to a village/commune quack doctor (Thay Cuong) [đến gặp thầy cúng]
- 5. treated by themselves with pharmacist's guides [tự chữa theo gợi ý của người bán thuốc]
- 99. other (specify) [khác (ghi rõ)_____]

F17 How has the health status of household members changed in the last 5 years?
Tình trạng sức khoẻ của các thành viên trong hộ thay đổi như nào trong vòng 5 năm qua?

- 0. no change [không thay đổi gì]
- 1. improved [cải thiện hơn]
- 2. deteriorated [xấu hơn trước]
- 999. don't know [không biết]

F18a [If F17 = 1] What is the primary reason for the improvement in the health status of household members?
[Nếu câu F17 = 1] nguyên nhân của sự cải thiện này là gì?

- 1. medical intervention improved status [tác dụng của thuốc làm cải thiện tình trạng]
- 2. change in diet [thay đổi chế độ ăn uống]
- 3. change in lifestyle (e.g. exercise more, stopped smoking) [thay đổi lối sống (ví dụ: chăm chỉ tập thể dục hơn, ngừng hút thuốc)]
- 99. other (specify) [Khác (ghi rõ)_____]
- 999. don't know [Không biết]
- 88888 not applicable [Không áp dụng]

F18b [If F17 = 2] What is the primary reason for the deterioration in the health status of household members?
[Nếu câu F17 = 2] nguyên nhân của sự xấu đi này là gì?

- 1. household member had an accident [thành viên bị tai nạn]
- 2. household member fell ill due to disease [thành viên bị ốm do bệnh dịch]
- 3. change in diet [thay đổi chế độ ăn uống]
- 4. old age [tuổi già]
- 99. other (specify) [Khác (ghi rõ)_____]
- 999. don't know [Không biết]
- 88888 not applicable [Không áp dụng]

On Access to Clean Water
Việc Tiếp cận nguồn nước sạch

F19 What is the main source of drinking water for members of the household? [See code]
Nguồn nước chính dùng để ăn/uống của hộ anh chị là từ đâu? [Xem mã]   F19

F20 What is the main source of water used by your household for other purposes like cooking and handwashing? [See code]
Nguồn nước chính được dùng cho sinh hoạt (tắm giặt, chăn nuôi,...) là từ đâu? [Xem mã]   F20

F21 Do you treat your water in any way to make it safer to drink?
Ông/ bà có xử lý nước bằng bất kỳ biện pháp nào trước khi uống không?

- 0. no *(go to F23)* [không *(chuyển sang câu F23)*]
- 1. yes [có]

F22 If 『yes』, what do you usually do to the water to make it safer to drink? [Tick all that applies]
Nếu 『Có』, ông bà thường làm gì để xử lý nguồn nước? [Đánh dấu vào các phương án được lựa chọn]

- 1. boil [Đun sôi]
- 2. add bleach/chlorine [dùng hoá chất: phèn chua hoặc clo]
- 3. strain it thru a cloth [dùng vải lọc]
- 4. use water filter (ceramic, sand, machine, etc.) [sử dụng hệ thống lọc nước (gốm, cát,...)]
- 5. solar disinfection [để ngoài nắng]
- 6. let it stand and settle [Để nước tự lắng cặn]
- 99. other (specify) [khác (ghi rõ)_____]
- 999. don't know [không biết]

Codes for F19 - F20
Mã cho câu F19 - F20

- 1. source water [nước nguồn/nước mạch/nước mó]
- 2. surface water (river, dam, lake, pond, stream, canal, irrigation channels) [nước sông suối, ao hồ, kênh, mương và các kênh thuỷ lợi khác]
- 3. piped water [nước máy]
- 4. rainwater collection [nước mưa có chỗ chứa (bình, bể hoặc xô chậu chứa)]
- 5. tube well/borehole (giếng khoan)
- 6. dug well [giếng đào]
- 7. bottled water [nước đóng chai]
- 8. cart with small tank/drum [nước máy từ xe chở nước thô sơ, thùng, xô]
- 9. tanker-truck [nước máy từ xe xitéc]
- 99. other (specify) [khác (ghi rõ)]

On Access to Clean Toilet and Waste Disposal
Tiếp cận nhà vệ sinh và hệ thống xả

F23 What kind of toilet facility do members of your household usually use? [See code]
Nhà vệ sinh được gia đình sử dụng là loại nào? [Xem mã]   F23

F24 Do you share this toilet facility with other households?
Ông bà có dùng chung nhà vệ sinh này với các hộ khác không?

- 0. no [không]
- 1. yes [có]

F25 If 『yes』, how many other households share this toilet?
Nếu 『Có』, có bao nhiêu hộ dùng chung nhà vệ sinh này?   F25

F26 Can any member of the public use this toilet?
Bất kỳ người nào cũng có thể sử dụng nhà vệ sinh này không?

- 0. no [không]
- 1. yes [có]

F27 The last time [NAME OF YOUNGEST CHILD] passed stools, what was done to dispose of the stools?
Lần cuối cùng [TEN THANH VIEN NHO TUOI NHAT] đi vệ sinh, phân được xử lý như nào?

- 1. child used toilet/latrine [trẻ sử dụng nhà vệ sinh/hố xí]
- 2. put/rinsed into toilet/latrine [được bỏ/xả vào nhà vệ sinh/nhà xí]
- 3. put/rinsed into drain or ditch [vứt/xả vào cống rãnh, mương]
- 4. thrown into garbage [vứt ra bãi rác]
- 5. buried [được chôn]
- 6. left in the open [vứt bừa bãi]
- 7. used as compost [sử dụng làm phân bón]
- 99. other (specify) [không biết]
- 999. don't know [khác (ghi rõ)]
- 88888. not applicable [NA]

Code for F23
Mã câu F23

- 0. no toilet [không sử dụng nhà vệ sinh]
- 1. septic-tank latrine [nhà tiêu tự hoại]
- 2. pour-flush latrine [nhà tiêu thấm dội nước]
- 3. biogas [biogas]
- 4. double-pit dry latrine [nhà tiêu khô hai ngăn]
- 5. ventilated pit dry latrine (with vent pipe) [nhà tiêu khô chìm có ống thông hơi]
- 6. single-pit dry latrine [nhà tiêu khô 1 ngăn]
- 7. fishpond latrine [cầu tiêu ao cá]
- 8. ashes-bridge/bucket latrine [cầu tro/thùng]
- 99. other (specify) [khác (ghi rõ)_____]

On Hand-washing Practices
Việc rửa tay

Is hand washing practiced in your household ...   0. no [không], 1. yes [có], 88888 NA
Gia đình có rửa tay...

F28	... before preparing or eating food?	F28
	...trước khi chuẩn bị đồ ăn hoặc ăn uống không?	
F29	... before treating a wound or looking after someone sick?	F29
	... trước khi điều trị vết thương hoặc chăm sóc người ốm không?	
F30	... after going to toilet?	F30
	... Sau khi đi về sinh?	
F31	... after blowing your nose, covering your cough or sneezing?	F31
	...sau khi xỉ/ hỉ mũi, che miệng khi ho hoặc hắt xì không?	
F32	... after handling uncooked food like meat?	F32
	... sau khi xử lý các đồ ăn sống như thịt?	
F33	... after touching sores or cuts?	F33
	... sau khi chạm vào vết thương hoặc vết cắt?	
F34	... after changing a diaper?	F34
	... sau khi thay bỉm?	
F35	... after playing with or cleaning an animal?	F35
	... sau khi chơi hoặc tắm cho các con vật?	
F36	... after gardening or working in the farm?	F36
	... sau khi làm vườn hoặc làm đồng về?	
F37	... after handling garbage?	F37
	... sau khi vứt rác?	

On Lifestyle and Smoking Status
Lối sống và tình trạng hút thuốc

F38 On average, how many **hours per day** do the people from 13 years old & over in your household spend watching TV/videos, on the internet, and looking at smartphone/tablet for entertainment?
Trung bình một ngày, thành viên từ 13 tuổi trở lên trong gia đình dành bao nhiêu giờ **để giải trí** bằng cách xem TV/đầu đĩa, sử dụng internet, và điện thoại thông minh/máy tính bảng?
F38 hours/day [số giờ/ngày]

F39 On average, how many **hours per day** do the **CHILDREN** (5-12 yrs) in your household spend watching TV/videos, on the internet, and looking at smartphone/tablet for entertainment?
Note: If no children, *code as 88888 - not applicable.*
Trung bình một ngày, trẻ em (từ 5 đến 12 tuổi) trong gia đình dành bao nhiêu giờ để giải trí bằng cách xem TV/đầu đĩa, sử dụng internet, và điện thoại thông minh/máy tính bảng?
Nếu không có con từ 5-12 tuổi, **dùng mã 88888=NA**
F39 hours/day [số giờ/ngày]

F40 On average, how many **hours per week** does each ADULT in the household do exercise (e.g. sports, bike riding)?
Trung bình, một người lớn trong nhà dành bao nhiêu **giờ trong tuần** để tập thể dục (như: các môn thể thao, đạp xe)?
F40 hours/week [số giờ/tuần]

F41 On average, how many **hours per week** does each CHILD in the household do exercise (e.g. sports, bike riding, physical education at school, playing outside? *Code 88888 if no child.*
Trung bình, một trẻ em trong nhà dành bao nhiêu **giờ trong tuần** để tập thể dục (như: các môn thể thao, đạp xe, môn thể dục tại trường học, hoặc giờ ra chơi)? Nếu không có con 5-17 tuổi, *dùng mã 88888=NA*
F41 hours/week [số giờ/tuần]

F42 Who smokes cigarettes among the household members? List all smokers. [See code in A1 corresponding to each household member listed.]
Thành viên nào trong gia đình có hút thuốc? Liệt kê tất cả các thành viên hút thuốc [Xem mã thành viên tại câu A1 để điền vào câu trả lời].
F42
1
2
3
4
5

G. OTHER HOUSEHOLD CHARACTERISTICS AND ASSETS
G. CÁC ĐẶC ĐIỂM KHÁC CỦA HỘ VÀ TÀI SẢN

G1 Is your household in the list of poor households in the commune this year (2016)?
Gia đình Ông/ Bà có thuộc danh sách hộ nghèo của xã trong năm nay (2016)?
- 0. no [không]
- 1. yes [có]

G2 Were you in the list of poor households in the commune 3 years ago (2013)?
Gia đình Ông/ Bà có thuộc danh sách hộ nghèo của xã trong năm 2013 không?
- 0. no [không]
- 1. yes [có]

G3 Were you in the list of poor households in the commune 5 years ago (2011)?
Gia đình Ông/ Bà có thuộc danh sách hộ nghèo của xã trong năm 2011 không?
- 0. no [không]
- 1. yes [có]

G4 What is the main type of lighting used by your household?
Nguồn thắp sáng chính gia đình sử dụng là gì?
- 0. none [không sử dụng/không thắp sáng]
- 1. electric lights [Điện]
- 2. oil lamps [Đèn dầu]
- 3. candles [nến]
- 4. firewood [củi]
- 5. biogas [biogas]
- 99. other (specify) [khác (ghi rõ)_____]

G5 What type of fuel is normally used by your household for cooking? [Tick all that applies.]
Nguồn nhiên liệu gia đình sử dụng để đun nấu là gì? [Đánh dấu vào các phương án được lựa chọn]
- 1. electricity [điện]
- 2. LPG [ga]
- 3. biogas [khí sinh học (biogas)]
- 4. kerosene [dầu hoả]
- 5. firewood [bếp củi]
- 6. coal [than]
- 7. chaff [trấu]
- 99. other (specify) [khác (ghi rõ)_____]

G6 What is the type of the house?
Nhà ông bà đang ở thuộc loại nào?
- 1. solid [Nhà kiên cố (3 chiều làm bằng vật liệu cứng bền: sàn, tường, trần nhà)]
- 2. semi-solid [Nhà bán kiên cố (2/3 chiều làm bằng vật liệu cứng)]
- 3. temporary [nhà tạm]

G7 What is the ownership status of your house?
Hộ ông/bà có sở hữu ngôi nhà này không?
- 1. owned (go to G9) [sở hữu (chuyển sang câu G9)]
- 2. rented (go to G8) [thuê (chuyển sang câu G8)]
- 3. use without paying rent (go to G9) [sử dụng nhưng không phải trả tiền (chuyển sang câu G9)]

G8 How much rent do you pay per month? (in million VND per month) [999 don't know; 88888 if not applicable]
Ông bà phải trả bao nhiêu tiền thuê 1 tháng? [triệu VNĐ/tháng] [999 nếu không biết; 88888 =NA] | G8

G9 How much would it cost to rent housing like this in this neighbourhood? (in million VND per month) [999 don't know; 88888 if not applicable]
Nếu đi thuê một chỗ tương tự thế này trong khu vực ông/bà sống thì giá bao nhiêu? [triệu VNĐ/tháng] [999 nếu không biết; 88888 nếu không áp dụng] | G9

	Distance (in meters) from your house to the nearest …. Khoảng cách (mét) từ nơi này đến ….gần nhất là bao xa?	Regular mode of transport used to get there [See code] Phương tiện thường sử dụng để tới đó là gì? (xem mã bên dưới)	Average time (in minutes) one-way to get there Mất bao nhiêu phút để đi đến đó (1 chiều)
		1. on foot [đi bộ] 2. own motorbike [xe máy của nhà] 3. rented motorbike [xe máy đi thuê] 4. public minibus [xe buýt công cộng] 99. other (specify) [khác (ghi rõ)_____] 999. don't know [không biết]	
	G10	G11	G12
1. ...dirt road [đường đất]?			
2. ...asphalt/concrete/sealed road [đường nhựa/đường đá/đường bê tông]?			
3. ...gravel road [đường rải sỏi cát]?			
4. ...agriculture office [cơ quan nông nghiệp]?			
5. ...village market [chợ làng]?			
6. ...commune market [chợ xã]?			
7. ...district market [chợ huyện]?			
8. ...city market [chợ tỉnh]?			

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H. NON-FARM EXPENDITURE SOURCES IN THE LAST 12 MONTHS
H. CÁC KHOẢN CHI TIÊU DÙNG

We would like to ask you about your non-farm expenses for the past 12 months (Place "0" if none or "88888" if not applicable).

Tiếp theo chúng tôi xin được hỏi ông/bà về các khoản chi cho các hoạt động phi nông nghiệp trong 12 tháng qua (ghi "0" nếu câu trả lời là không, hoặc "88888" =NA)

Expenditure Item Các khoản chi tiêu	Code Mã	In the last 12 months, did any member of this household spend anything related to [expenditure item]? [Do not leave any blank. Indicate "0" if "no".] Trong 12 tháng qua hộ ông bà có chi tiêu cho các khoản sau đây không? [Liệt kê các khoản chi tiêu] [Không để trống bất kỳ ô nào. Ghi "0" cho câu trả lời "không"]	If yes, how many times did you and/or other members of this household spend on [expenditure item] in the last 12 months? Nếu có, số lần ông bà chi tiêu cho các khoản trên trong 12 tháng qua? [Liệt kê các khoản chi tiêu] Number Số lần	What was the payment frequency for this [expenditure item]? Số lần chi tiêu cho các khoản trên? [Liệt kê các khoản chi tiêu] (ví dụ: 2 lần/ngày, 1 lần/tuần, 2 lần/tháng...) Frequency Tần suất	On the average, how much did your household spend each time for [expenditure item]? Ask minimum and maximum to calculate average. Trung bình hộ ông/bà chi bao nhiêu tiền một lần cho từng khoản? [Liệt kê các khoản chi tiêu] In '000 VND/unit of frequency (e.g. VND/day, VND/week, VND/month, VND/quarter, etc.) Tính bằng 000 VND/ đơn vị tần suất (Ví dụ: VND/ngày, VND/tuần, VND/tháng, VND/quý)	Total expenditure (H2 X H4) Tổng chi tiêu (H2 X H4) In '000 VND tính bằng '000 VND
		0. no [không] 1. yes [có]		1. day(s) [ngày] 2. week(s) [tuần] 3. month(s) [tháng] 4. quarter(s) [quí] 5. semi-annual [nửa năm] 6. annual [năm] 88888 not applicable [không áp dụng]		
		H1	H2	H3	H4	H5
Household electrical equipment a/ Các đồ điện cho sinh hoạt a/ (a)	01					
Housing maintenance and minor renovation b/ Sửa sang lại nhà cửa hoặc có những nâng cấp nhỏ b/	02					
Utilities (electricity, water, internet, gas, kerosene) Tiền điện nước (điện, nước, internet, ga, dầu hoả)	03					
Telephone (fixed line, mobile recharge, public phones) Tiền điện thoại (gồm điện thoại cố định, thẻ điện thoại di động, hoặc điện thoại công cộng)	04					
Non-electrical items (body products, cleaning supplies, cosmetics, tissue, etc.) c/ Các đồ không phải đồ điện khác (sản phẩm sử dụng để vệ sinh thân thể, đồ dùng quét dọn lau chùi, các loại mỹ phẩm, giấy ăn,...) c/	05					
Health expenditures (hospital, clinic, doctor, medicine, etc.) Chi phí về sức khoẻ (viện phí, tiền khám bệnh, tiền thuốc,...)	06					
Health insurance d/ Bảo hiểm y tế d/	07					
Education expenditures (school fees, English classes, tutor, books, uniforms, etc.) Chi phí giáo dục (học phí, học thêm, sách vở, đồng phục,...)	08					
Transportation (bus fare, petrol, etc.) Chi phí đi lại (vé xe buýt, xe ô tô, tiền xăng,mua xe máy, mua xe đạp...)	09					
Domestic employees (housekeeper, driver, etc.) Thuê người làm (người giúp việc trong nhà, thuê người lái xe,...)	10					
Clothing (including shoes) Quần áo (bao gồm cả giầy dép)	11					
Tobacco (cigarettes, cigars, leaves, etc.) Thuốc lá (thuốc lá, xì gà, thuốc lào,...)	12					
Celebrations and ceremonies (paper money, food offerings, payment to Thay Cung) Lễ hội, tiền tuần (tiền mừng, mua đồ ăn, tiền trả cho thầy cúng)	13					
Other leisure spending (sports, movies, internet, magazines, etc.) Chi tiêu cho các hoạt động giải trí khác (chơi thể thao, xem phim, internet, mua tạp chí,...)	14					
Non-farm business expenditures (taxes, bank payments, office equipment, office supplies, etc.) Chi tiêu cho các hoạt động phi nông nghiệp khác (tiền thuế, lãi suất ngân hàng hoặc các khoản phí ngân hàng khác, đồ dùng văn phòng,...)	15					
Other non-food consumption spending (e.g. gifts, life insurance) Các khoản chi không phải đồ ăn, uống khác (như: quà tặng, bảo hiểm nhân thọ, mua nhà, mua đất, mua trâu...)	16					
Alcoholic beverages Các loại đồ uống có cồn	18					

Expenditure Item Các khoản chi tiêu	Code Mã	In the last month, did any member of this household spend anything related to [expenditure item]? [Do not leave any blank. Indicate "0" if "no".] Trong tháng trước, có thành viên nào của hộ chi tiêu cho các khoản sau đây không? [Không để trống bất kỳ ô nào. Ghi "0" cho câu trả lời "không"]	If yes, how many days per week did you and/or other members of this household spend on [expenditure item] in the last month? Trung bình một tuần hộ ông/bà chi tiêu cho khoản này bao nhiêu ngày? (ngày/tuần)	On the average, how much did your household spend each time for [expenditure item]? Ask minimum and maximum to calculate average. Chi phí trung bình cho một ngày đi mua khoản này là bao nhiêu? (nghìn đồng/ngày)	If yes, how many weeks did you and/or other members of this household spend on [expenditure item] in the last month? Trong tháng qua, có bao nhiêu tuần chi tiêu như vậy? (tuần/tháng)	Total expenditure (H7 X H9) Tổng chi tiêu (H7 X H9)
		H8	H6	H9	H7	H10
Food and non-alcoholic beverages (at home and away-from-home) Chi thực phẩm và đồ uống không cồn (gồm ăn ở nhà hoặc ăn ngoài)	17					

Definitions:
Định nghĩa

a/ Examples of household electrical equipment are:
a/ Ví dụ về các đồ điện cho sinh hoạt:
   (1) kitchen equipment like microwave, toaster, airpot, refrigerator, etc.
   (1) Đồ bếp như: lò vi sóng, lò nướng, bình đun nước tủ lạnh,...
   (2) cleaning equipment like vacuum cleaner, etc.
   (2) Đồ dùng quét dọn, lau chùi như máy hút bụi
   (3) personal items like electric razor, hair dryer, hair flat iron, ironing board, iron, powered toothbrush, etc.
   (3) các đồ dùng cá nhân như máy cạo râu, máy sấy tóc, máy ép/là tóc, bàn là/bàn ủi, bàn chải đánh răng tự động,...

b/ It refers to any housing repair (replacement of broken or damaged items like leaky faucets, broken windows, patching holes on walls) and/or home maintenance (cleaning rain gutters, drains, landscaping, etc.).
b/ Các loại chi phí liên quan tới việc sửa chữa nhà ở (thay các vật dụng bị hỏng như vòi nước bị rò, rỉ nước, cửa sổ bị vỡ, hỏng, vết nứt, lỗ trên tường) và việc trùng tu nhà ở (làm sạch ống/đường dẫn nước mưa, đường dẫn nước sạch, hoặc sửa sang khuôn viên vườn)

c/ Examples of non-electrical items are:
c/ Chi tiêu cho các đồ không phải đồ điện khác như:
   (1) kitchen items like sponge, plates, cups, chopsticks, etc.
   (1) dụng cụ làm bếp như: giẻ rửa bát, bát đĩa, cốc chén, đũa,...
   (2) cleaning supplies (broom, dustpan, dustbin, kitchen towels, etc.)
   (2) Dụng cụ dùng để lau chùi, dọn dẹp: chổi, hót rác, thùng rác, khăn/giẻ lau bếp,...
   (3) personal items (for body like shampoo, conditioner, toothpaste, body lotion, tissue papers, cosmetics; and other household items like laundry powder, etc.)
   (3) các đồ dùng cá nhân bao gồm: để vệ sinh thân thể như dầu gội đầu, dầu xả, kem đánh răng, kem dưỡng da toàn thân, giấy ăn, mỹ phẩm; và các đồ dùng khác như bột giặt,...

d/ Private health insurance like Bao Viet, Petro Vietnam Insurance, Bao Minh and PJICO.
d/ Bảo hiểm sức khoẻ cá nhân như Bảo Việt, bảo hiểm dầu khí (PVI), Bảo Minh, và bảo hiểm Petrolimex (PJICO)

I. HOUSEHOLD INCOME SOURCES IN THE LAST 12 MONTHS
I. THU NHẬP CỦA HỘ TRONG VÒNG 12 THÁNG GẦN ĐÂY

We would like to ask you about your income sources for the past 12 months (Place "0" if none or "88888" if not applicable).
Chúng tôi muốn hỏi Ông/ Bà về thu nhập của hộ trong vòng 12 tháng gần đây (Điền "0" nếu câu trả lời là không hoặc "88888" nếu không áp dụng).

Group / Nhóm	Income activity / Hoạt động tạo thu nhập	Code / Mã	In the last 12 months, did any member of this household receive income from [item]? [Do not leave any blank. Indicate "0" if "no".] / Trong vòng 12 tháng trở lại đây, có bất kỳ thành viên nào trong hộ nhận được thu nhập từ [hoạt động] này không? [Không để ô trống. Điền "0" nếu câu trả lời là "không"] — 0. no [không] / 1. yes [có]	If yes, how many times did the household member(s) receive income from [activity] in the last 12 months? / Nếu có, số lần các thành viên nhận được thu nhập từ các hoạt động trên trong 12 tháng qua? — Number / Số lần	What was the income frequency for this [activity]? / Tần suất nhận được thu nhập từ các hoạt động trên? (ví dụ: 1 lần/tuần, 3 lần/năm) — Frequency / Tần suất — 1. day(s) [ngày] / 2. week(s) [tuần] / 3. month(s) [tháng] / 4. quarter(s) [quý] / 5. semi-annual [nửa năm] / 6. annual [năm] / 7. times [số lần] / 88888 not applicable	On the average, how much gross revenue did the household member(s) receive for each time? In '000 VND/unit of frequency (e.g. VND/day, VND/week, VND/month, VND/quarter, etc.) / Trung bình mỗi lần, các thành viên nhận được tổng là bao nhiêu tiền cho từng hoạt động? In '000 VND / Tính bằng '000 VND/đơn vị tần suất (ví dụ: VND/ngày, VND/tuần, VND/tháng, VND/quý, vv.)	Total income (I3 X I5) / Tổng thu nhập (I3 X I5) In '000 VND / Tính bằng '000 VND
I1			I2	I3	I4	I5	I6
Farm and Non-farm business / Hoạt động nông nghiệp và phi nông nghiệp	Rice trading / Buôn bán lúa gạo	01					
	Maize trading / Buôn bán ngô	02					
	Fruit trading / Buôn bán trái cây	03					
	Vegetable trading / Buôn bán rau củ	04					
	Livestock and/or aquaculture trading / Buôn bán gia súc gia cầm và các thuỷ, hải sản	05					
	Other trading / Buôn bán (nông, lâm nghiệp) khác	06					
	Grain milling business / Kinh doanh xay xát lúa gạo hoặc các loại ngũ cốc khác	07					
	Food processing business / Kinh doanh chế biến thực phẩm	08					
	Non-food trading (e.g. clothes, construction materials, etc.) / Buôn bán các mặt hàng không phải thực phẩm (như quần áo, đồ xây dựng,...)	09					
	Transport operations / Vận tải	10					
	Other trading business / Kinh doanh, buôn bán khác	99					
Farm labour / Lao động nông nghiệp	Agricultural wage labour a/ / Làm công/thuê cho các hoạt động nông nghiệp	11					
Non-farm wage / Làm thuê phi nông nghiệp	Non-agricultural employment b/ / Làm công/thuê cho các hoạt động phi nông nghiệp khác	12					
Others / Khác	Sale of productive assets (e.g. land, farm implements, etc.) / Bán hoặc cho thuê tài sản (đất, các dụng cụ nông nghiệp,...)	13					
	Sale or lease of durable assets (e.g. jewelleries, appliances, motorbike, etc.) d/ / Bán hoặc cho thuê các tài sản lâu bền khác (ví dụ: đồ trang sức, đồ điện tử điện lạnh, xe máy,...)	14					
	Pension payment to retirees in the household / Tiền trợ cấp hưu trí	15					
	Remittances from other family members living outside the household / Tiền gửi từ các thành viên đang sống ở nơi khác	16					
	Rental income from leasing land or property / Tiền từ việc cho thuê nhà, thuê đất	17					
	Assistance programs (government/NGO) e/ / Từ các chương trình hỗ trợ (chính phủ, tổ chức phi chính phủ) e/	18					
	Alms from relatives/neighbors/friends / Quà tặng từ họ hàng/hàng xóm/ bạn bè	19					
	Other income sources (1) _____ / Các nguồn thu nhập khác (1)	99					
	Other income sources (2) _____ / Các nguồn thu nhập khác (2)	99					

Notes: a/ If an individual is sometimes paid in cash and in kind (e.g. payment includes lunch/dinner), ask the respondent the daily wage rate without meals and the daily wage with meals, and use the difference to indicate wage paid in kind. Then aggregate all agricultural wage labour income.
Ghi chú: a/ Nếu thành viên được trả cả dưới hình thức tiền mặt hoặc hiện vật (như tiền công bao gồm cả ăn trưa/ tối), hỏi người trả lời phỏng vấn tiền công hàng ngày không tính các bữa ăn là bao nhiêu và tiền lương hàng ngày bao gồm cả ăn trưa/tối, sau đó tính khoản chênh lệch để biết giá trị của hiện vật là bao nhiêu. Sau đó tính tổng tiền công cho lao động nông nghiệp.

b/ This refers to Codes 21-26 in Employment categories in Section A: Household Characteristics.
b/ Hoạt động này tính từ mã 21 đến 26 trong phần A: Đặc điểm hộ gia đình: Các nhóm công việc.

c/ Productive assets are assets that bring income to the household like farm machineries, farm equipment and land.
c/ Các tài sản/dụng cụ sản xuất là các tài sản/dụng cụ tạo ra thu nhập cho hộ như các dụng cụ làm đồng, máy móc nông nghiệp và đất đai

d/ Durable assets are assets that can be used for longer periods like household items (home appliances, consumer electronics, furniture), toys, etc.
d/ Tài sản lâu bền là các tài sản được sử dụng trong thời gian dài như các vật dụng trong gia đình (đồ điện tử, điện lạnh, hoặc nội thất), đồ chơi,...

e/ One example is the financial subsidy (e.g. 300,000 VND) given by the government to poor households during the Tet celebration.
e/ Ví dụ, khoản trợ cấp tài chính từ chính phủ cho hộ nghèo trong dịp tết Nguyên Đán (300.000 VND)

f/ For instance, money received from relatives/friends/neighbors when a family member died, etc.
f/ Ví dụ, tiền nhận như người thân, bạn bè, hàng xóm khi một thành viên trong gia đình qua đời,...

g/ If the respondent could not estimate the average values, ask for the minimum and maximum values and then compute the average from there.
g/ Nếu người trả lời không ước lượng được giá trị trung bình, hỏi giá trị nhỏ nhất và lớn nhất, sau đó tính số tiền trung bình mà thành viên nhận được

J. FARM CHARACTERISTICS
J. ĐẶC ĐIỂM SẢN XUẤT

Land area used and leased by the household in the last 12 months (as of June 30, 2016)
Diện tích đất được sử dụng hoặc cho thuê trong vòng năm sản xuất vừa qua [từ tháng 6 năm 2015 tới tháng 6 năm 2016]

Plot no Mảnh số	Distance of the house to the plot [no] Khoảng cách từ nhà đến mảnh [số]	Ave. time (one-way) to go to plot [no] Thời gian trung bình (một chiều) đến mảnh [số]	Land area Diện tích mảnh	Land use for the last 12 months (see code) Tình hình sử dụng đất trong vòng 12 tháng qua (xem phụ lục)	Water source (see code) Nguồn nước (xem mã)	Ownership status (see code) Tình trạng sở hữu	Main crops grown (see code) Cây trồng chính (xem mã)				
	meters mét	minutes phút	m2 m2				99. others (specify) [khác (ghi rõ)]				
J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	J11	J12
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

Conversion: 1 sao = _____ sq.m.
Đổi: 1 sào = _____ m2

Code for J5 (Mã cho câu J5)
1. paddy field [cây lương thực và các cây họ đậu]
2. vegetables [rau]
3. fruit trees [cây ăn quả]
4. forest land [đất rừng]
5. aquaculture [thuỷ sản]
6. animal husbandry [chăn nuôi]
7. fallow [đất bỏ hoang]
8. other plants (herbal: artichoke….) [Cây trồng khác (dược liệu: thảo quả, atisô,...)]

Code for J6 (Mã cho câu J6)
0. rainfall [nước mưa]
1. gravity [nước dẫn về]
2. pumped surface water [bơm nước mặt (hồ, ao)]
3. pumped groundwater [bơm nước ngầm (giếng đào, giếng khoan, v.v.)]
4. manual [tự đi lấy]
99. other (specify) [khác (ghi rõ)]

Code for J7 (Mã cho câu J7)
1. own [sở hữu]
2. rented/borrowed/contracted [thuê trả tiền/mượn miễn phí/hợp đồng]
3. share crop [mượn canh tác trả bằng hiện vật]

Crop type (Codes for J8-J12) (Mã cho câu J8-J12)

A. Staples and pulses: [Lương thực]	B. Vegetables: [Rau]	B. Vegetables: [Rau]	B. Vegetables: [Rau]	C. Fruits: [Hoa quả]
1 rice [lúa gạo]	16 chayote (leaves) [rau su su]	30 pumpkin (leaves) [rau bí]	59 rau mồng tơi	109 pear (Asian) [lê]
2 maize [ngô/bắp]	17 chilli [ớt]	31 pumpkin (fruit) [quả bí ngô]	60 rau ngót	110 pineapple [dứa]
3 sweet potato [khoai lang]	18 choy sum [cải chip]	32 radish [củ cải]	61 tang ki	111 plum [mận]
4 cassava [khoai mì/sắn]	19 chrysanthemum [cải cúc]	33 snow pea [đậu Hà Lan]	62 tía tô	99c. other fruits (specify)
5 peanuts [lạc]	20 cucumber [dưa chuột]	34 sweet potato leaves [lá khoai lang]	99b. other vegetables (specify)	D. Other crops: [Các loại cây trồng khác]
6 soybeans [đậu nành]	21 garlic [tỏi]	35 tomato [cà chua]	C. Fruits: [Hoa quả]	151 tobacco [thuốc lá]
10 beans [đậu/đỗ]	22 ginger [gừng]	36 watercress [cải xoong]	101 apple [táo]	152 tea [chè]
99a. other staples (specify)	23 green onion (leaves) [hành lá]	37 cardamom [bạch đậu khấu]	102 mong apple [táo mèo]	153 artichoke [a-ti-sô]
B. Vegetables: [Rau]	24 green onion (bulb) [hành củ]	38 onion [hành]	103 banana [chuối]	99d. other crops (specify) khác (ghi rõ)
11 bamboo shoot [măng]	25 kangkong [rau muống]	51 bắp cải xòe	104 kiwi fruit [quả kiwi]	
12 cabbage [bắp cải]	26 kohlrabi [su hào]	53 khởi tử	105 litchi [quả vải]	
13 cauliflower [súp lơ]	27 lettuce [rau diếp]	56 rau đắng	106 longan [nhãn]	
14 celery [cần tây]	28 mustard [rau cải]	57 rau đay	107 orange [cam]	
15 chayote (fruit) [quả su su]	29 potato [khoai tây]	58 rau dền	108 peach [đào]	

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Aquaculture

J13 Do you have aquaculture?
Ông/ bà có nuôi trồng thuỷ sản?

☐ 0. no *(go to J17)* [không *(chuyển qua câu J17)*]
1. yes [có]

J14 If 〖yes〗 , how many cages/rafts do you have and what is the capacity per cage/raft (as of June 30, 2016)?
Note: Put "0" if none.
Nếu 〖có〗 , Ông/ bà có bao nhiêu lồng/ bè và thể tích mỗi lồng/ bè (tính đến 30 tháng 6 năm 2016)?
Ghi chú: Điền "0" if nếu không có.

Item Mục	Code Mã	Number of cages/rafts (unit) Số lượng lồng/ bè (đơn vị)	Capacity per cage/raft (cu.m.) Thể tích của mỗi lồng/ bè (mét khối)
		J15	J16
1. fish [cá]			
2. shrimp [tôm]			
99. other (specify) [khác (ghi rõ)]			

Animal husbandry
Gia súc, gia cầm

J17 Do you have animals in the farm?
Ông/ bà có nuôi gia súc, gia cầm?

☐ 0. no *(go to J21)* [không *(chuyển qua câu J21)*]
1. yes [có]

J18 If 〖yes〗 , what animals do you have in the farm (as of June 30, 2016)?
Note: Put "0" if none. If cannot approximate total number of heads, record the average (e.g: record 25 for a range of 20-30)
Nếu 〖có〗 , ông/ bà nuôi những loại nào (tính đến ngày 30 tháng 6 năm 2016)?
Ghi chú: Điền "0" nếu không có. Nếu không thể ước lượng chính xác số lượng vật nuôi, ĐTV điền số trung bình (vd: 20-30 con thì điền 25).

Animal Loại gia súc, gia cầm	No. of heads Số đầu con	
	Adult Trưởng thành no. Số lượng	Young Số con con no. Số lượng
	J19	J20
1. buffalo trâu		
2. cow dairy/milking lấy sữa		
3. beef (of all ages), assisting cultivation lấy thịt (của tất cả các lứa tuổi), sức kéo		
4. pig lợn		
5. chicken gà		
6. duck vịt		
7. goose ngỗng		
8. goat dê		
9. horse ngựa		
10. dog chó		
11. mulard ngan		
13. bird chim		
14. rabbit thỏ		
15. porcupine nhim		
16. bees ong		
99. other (specify) khác (ghi rõ)___		

Experience in vegetable cultivation
Kinh nghiệm trong việc trồng rau

J21 Since when have you been farming and making decisions by yourself?
Ông/bà bắt đầu làm nông nghiệp và tự ra quyết định trong công việc từ bao giờ?

☐ J21
year [năm]
999 don't know [không biết]
88888 =NA

J22 If into vegetable cultivation, when did your household start growing vegetables?
Nếu trồng rau, ông bà bắt đầu trồng rau từ khi nào?

☐ J22
year [năm]
999 don't know [không biết]
88888 =NA

K. CROP OUTPUT AND DISPOSAL IN THE LAST CROPPING CYCLE
K. SẢN LƯỢNG VÀ TIÊU THỤ CỦA MÙA VỤ TRƯỚC

List all crops you have and provide the total production in the last cropping cycle. How did you dispose them in the last CROPPING CYCLE? *(Place "0" if none or "88888" if not applicable).*
Liệt kê tất cả các nông sản ông/bà trồng và cho biết tổng sản lượng của mùa vụ trước. Ông/bà tiêu thụ như thế nào? *(Ghi "0" nếu không có và "88888" nếu không áp dụng)*

List of crops* [See codes in J8-J12] Danh sách các nông sản* [Xem phụ J8-J12]	Date harvest From (dd/mm/yy) Thu hoạch Từ ngày.. ngày (ngày/tháng /năm)	Date harvest To (dd/mm/yy) Thu hoạch Từ ..đến ngày (ngày/tháng /năm)	Total production Tổng sản lượng kg	Production distribution / Phân phối sản phẩm					Marketing / Thị trường			
				Sold Bán kg	Home consumption Tiêu dùng trong gia đình kg	Given as gift, offering or used for seed storage where applicable Dùng làm quà biểu, phúng viếng hoặc để làm giống kg	Postharvest losses Tổn thất sau thu hoạch kg	Lost or spoilt in the farm Bị mất hoặc hỏng tại ruộng kg	Main buyer Người mua chính	How did you select which to sell? [Multiple response allowed] Ông/bà lựa chọn sản phẩm đem bán như thế nào? [Có thể có nhiều câu trả lời]	Ave. price Giá trung bình In '000 VND/kg Tính bằng '000 VNĐ/kg	Value [K4 X K11] Giá trị [K4 X K11] In '000 VND Tính bằng '000 VNĐ
									1. fellow farmers [các nông dân khác] 2. collectors [người thu gom] 3. cooperative (member) [hợp tác xã mà hộ là thành viên] 4. cooperative (non-member) [hợp tác xã mà hộ không phải là thành viên] 5. wholesaler's market [người mua buôn] 6. consumers at the market [người tiêu dùng tại chợ] 7. supermarket in Lao Cai city [siêu thị tại Thành phố Lào Cai] 8. retailers in Hanoi [người bán lẻ ở Hà nội] 9. retailers in other provinces [người bán lẻ ở các tỉnh khác] 10. supermarket in other provinces [siêu thị tại các tỉnh khác] 99. other (specify) [khác (ghi rõ)]	0. I do not select them myself/my buyer(s) select them by themselves [Ông bà không chọn mà người mua tự lựa chọn] 1. better appearance/condition [có bề ngoài ưa nhìn] 2. ripeness [Độ chín] 3. right size [Đúng kích cỡ] 4. no physical deformity/damage [không bị biến dạng, dập nát] 5. no blemishes [không bị trầy xước bề mặt] 6. customer demand [nhu cầu của người tiêu dùng] 7. higher price due to seasonality effect [giá cao hơn do hiệu ứng mùa vụ] 99. other (specify) [khác (ghi rõ)]_____]		
K1	K2a	K2b	K3	K4	K5	K6	K7	K8	K9	K10	K11	K12
a.												
b.												
c.												
d.												
e.												
f.												
g.												
h.												
e.												
f.												
e.												
f.												
e.												
f.												
e.												
f.												

Note: *List all crops (including medicinal plants) grown even those in the forest area. Do not include crops that were used for wood or timber.
Ghi chú: *Liệt kê toàn bộ tất cả các cây (bao gồm cả cây thuốc) được trồng kể cả gieo trồng ở phần đất rừng. Không bao gồm các cây lấy gỗ hoặc củi

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From the list of livestock and other animals in the previous page, how did you dispose them for the last 6 months?
Từ danh sách của gia súc và các loại vật nuôi khác ở trang trước, Ông/ bà cho biết cách xử lý trong vòng 6 tháng qua?

List of livestock and other animals Liệt kê các loại gia súc và vật nuôi khác	Disposal													Total value [K16+K19+K22+K25] Tổng giá trị
	Quantity sold. If none, write '0'. Số lượng bán Nếu không bán, ghi "0"	Unit Đơn vị	Price per unit Đơn giá	Value Giá trị	Quantity home consumed. If none, write '0'. Số lượng tiêu dùng trong nhà Nếu không có, ghi "0"	Unit Đơn vị	Value Giá trị	Quantity given as gift, bartered, used as payment for wage. If none, write '0'. Số lượng cho đi như quà tặng, trao đổi, hoặc dùng để trả lương Nếu không có, ghi "0"	Unit Đơn vị	Value Giá trị	Quantity used for other purposes. If none, write '0'. Số lượng dùng cho các mục đích khác Nếu không có, ghi "0"	Unit Đơn vị	Value Giá trị	
		1. kg [kg] 2. unit (for egg) [quả] 3. litter [lit] 4. unit (for livestock) [con] 99. other (specify) [khác (ghi rõ)]	In '000 VND/unit nghìn đồng/đơn vị	In '000 VND nghìn đồng		1. kg [kg] 2. unit (for egg) [quả] 3. litter [lit] 4. unit (for livestock) [con] 99. other (specify) [khác (ghi rõ)]	In '000 VND nghìn đồng		1. kg [kg] 2. unit (for egg) [quả] 3. litter [lit] 4. unit (for livestock) [con] 99. other (specify) [khác (ghi rõ)]	In '000 VND nghìn đồng		1. kg [kg] 2. unit (for egg) [quả] 3. litter [lit] 4. unit (for livestock) [con] 99. other (specify) [khác (ghi rõ)]	In '000 VND nghìn đồng	In '000 VND nghìn đồng
K13	K14	K15	K16a	K16	K17	K17a	K19	K20	K20a	K22	K23	K23a	K25	K26
Livestock and other animals **Gia súc và các vật nuôi khác**														
1. buffalo trâu														
2. cow dairy/milking lấy sữa														
3. beef (of all ages), assisting cultivation lấy thịt (của tất cả các lứa tuổi), sức kéo														
4. pig lợn														
5. chicken gà														
6. duck vịt														
7. goose ngỗng														
8. goat dê														
9. horse ngựa														
10. dog chó														
11. mulard ngan														
12. bird chim														
13. rabbit thỏ														
14. porcupine nhím														
15. bees ong														
99. other (specify) khác (ghi rõ)														
Animal by-products **Sản phẩm phụ từ vật nuôi**														
1. poultry eggs (chickens, ducks, etc.) trứng gia cầm (gà, vịt…)														
2. fresh milk sữa tươi														
99. others (specify) khác (ghi rõ)														
Aquaculture **Thuỷ sản**														
1. fish cá														
2. shrimp tôm														
99. others (specify) khác (ghi rõ)														

L. VEGETABLE INPUT EXPENDITURES IN THE LAST CROPPING CYCLE
L. CHI PHÍ TRỒNG RAU TRONG MÙA VỤ QUA

Now, we would like to collect information on all inputs you purchased for your vegetable production in the LAST CROPPING CYCLE *(Place "0" if none or "88888" if NA)*.
Bây giờ, chúng tôi sẽ thu thập thông tin về các đầu vào mà ông/bà đã mua để trồng rau trong MÙA VỤ VỪA QUA *(Ghi "0" nếu không có và "88888" nếu không áp dụng)*

Activity / Cách hoạt động	Input / Đầu vào	Code / Mã	Did your HH spend on [ITEM] in the last cropping cycle? / Hộ ông/bà có mua [....] trong mùa vụ vừa qua không? 0. no [không] 1. yes [có]	If yes, quantity bought / Số lượng mua 88888 not applicable [nếu không áp dụng]	Unit of measure / Đơn vị tính 1. gram [gr] 2. kilogram [kg (cân)] 3. milliliter [ml-il-lít (ml)] 4. liter [lít] 5. meter [mét] 6. seedling tray [khay cây giống] 7. piece [mảnh] 8. number[con số] 9. sack [bao] 10. sachet [gói nhỏ] 11. pack [đóng gói] 12. bottle [chai] 13. can [can] 14. day [ngày] 15. kWH (KWH số điện) 99. other (specify) [khác (ghi rõ)] 88888 not applicable [nếu không áp dụng]	Price per unit / Giá bán đơn vị In '000 VND/unit Tính bằng '000 VND/đơn vị 88888 not applicable [nếu không áp dụng]	In total, how much did you spend for [item] in the last cropping cycle? [L3 X L5] In '000 VND Tính bằng '000 VND 88888 not applicable [nếu không áp dụng]
L1			L2	L3	L4	L5	L6
Planting/ Trellising / Gieo giống/ làm giàn giáo hoặc hàng rào	Seed / Hạt giống	01					
	Seedling/sapling / Cây giống/ cây non	02					
	Seedling tray / Khay dựng cây giống/ cây non	03					
	Bamboo stakes / Cọc tre	04					
	Wire / Dây thép	05					
	Mulch / Lớp phủ (gỗ mục, trấu...)	06					
Nutrient management / Phân bón	Animal manure/compost / Phân hữu cơ/ phân ủ	07					
	Inorganic fertilizer / Phân vô cơ	08					
	Foliar fertilizer (organic and/or inorganic) / Phân bón lá (hữu cơ và/hoặc Vô cơ)	09					
Pest and disease management / Quản lý sâu và các loại dịch bệnh	Insecticide / Thuốc trừ sâu	10					
	Fungicide / Thuốc diệt nấm	11					
	Herbicide / Thuốc diệt cỏ	12					
	Organic/bio pesticide / Thuốc trừ sâu vô cơ/sinh học	13					
	Insect traps, pheromone traps, etc. / Các loại bẫy côn trùng	14					
Irrigation / Thuỷ lợi	Sprinkler, drip irrigation, etc. / Thiết bị dẫn, phun tới nước,...	15					
	Irrigation fee / Chi phí thủy lợi	16					
	PVC pipe, etc. / Ống PVC	17					
Other inputs / Đầu vào khác	Cost of other structures (e.g. protected cropping, etc.) / Các chi phí sửa chưa khác (vd: tường rào bảo vệ cây trồng,...)	18					
	Sacks / Rổ rá, bao dựng, vv	19					
	Fuel / Chi phí nhiên liệu	20					
	Electricity (e.g. for sprinkler, water pump, incubation) / Điện (tưới nước, bơm nước, máy xưới để ấp trứng)	21					
	Rental charges for farm implements (tractors, power tillers, animals used for land preparation and other activities) / Phí thuê dụng cụ (Máy kéo, máy cày/xới, hoặc thuê gia súc cho việc chuẩn bị đất và các hoạt động khác)	22					
Overhead costs / Chi phí gián tiếp	Land rent / Thuê đất	23					
	Land tax / Thuế đất	24					
	Interest charges / Trả lãi	25					
Other inputs	Other (specify) [Khác (ghi rõ)] (1)_____	99					
	Other (specify) [Khác (ghi rõ)] (2)_____	99					
	Other (specify) [Khác (ghi rõ)] (3)_____	99					

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M. Economic events/Shocks
M. Sự kiện kinh tế/ Cú sốc

Recall period: 5 years (2011-2016)**
Note to enumerator: Households sometimes have good and bad surprises. First ask about any bad surprises or things that hurt the household financially. Read each item.
Khoảng thời gian nhớ lại: 5 năm (2011-2016)**
Ghi chú với người điều tra: Nông hộ thương gặp phải những điều tốt hoặc xấu bất ngờ. Đầu tiên hãy hỏi họ về những sự kiện gây ảnh hưởng xấu đến tài chính của hộ

Code / Mã số	Shocks (unexpected events) / Cú sốc (sự kiện không mong đợi)	Which shocks did you experience in the last 5 years (2011-2016)? / Những cú sốc kinh tế bạn đã trải nghiệm trong 5 năm qua (2011-2016)? [Note to enumerator: Read each item] (Ghi chú với điều tra viên: Đọc từng phương án) 0. no [không] 1. yes [có]	If yes, how many times did it occur in your household in the last 5 years (2011-2016)? / Nếu có, những điều đó đã diễn ra bao nhiêu lần trong vòng 5 năm trở lại đây (2011-2016)? No. of occurrences / Số lần xảy ra	When did it happen? / Thời điểm xảy ra — Mo (e.g. if July, write '07') Tháng (ví dụ tháng 7, ghi '07')	Year (e.g. 2016) Năm (ví dụ 2016)	What is your current condition after the shock? / Điều kiện của hộ sau khi xảy ra cú sốc 0. same as before [vẫn như trước] 1. worse than before [tệ hơn trước] 2. better than before [tốt hơn trước]	What was the value of the total loss? / Tổng giá trị thiệt hại In '000 VND nghìn đồng	What did you do to cope with its effect? [No prompting. Classify up to 3 coping strategies. See codes Annex 2] / Ông/ bà đã làm gì để đối phó với tác động của nó? [Không nhắc. Phân loại 3 chiến lược ứng phó. Xem mã ở phần Phụ lục 2]			How long did the impact of the event last? / Thời gian ảnh hưởng kéo dài? no. of days số ngày 888 If ongoing (nếu còn tiếp diễn)	Please rank the worst 3 shocks. / Xếp hạng 3 cú sốc tồi tệ nhất 1. most worst shock [tệ nhất] 2. 2nd most worst shock [tệ nhì] 3. 3rd most worst shock [tệ ba]
		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11
01	Death of main earner / Người kiếm tiền chính trong nhà qua đời						■					
02	Death of other household members in the family / Những thành viên khác trong nhà qua đời						■					
03	Loss of income due to illness or injury of household member / Mất thu nhập do bệnh tật hoặc chấn thương của thành viên trong nhà											
04	Medical expenses due to illness or injury / Chi phí y tế do bệnh tật hoặc chấn thương											
05	Loss of a regular job of a household member / Một thành viên trong hộ bị mất việc											
06	Lost home due to river erosion / Mất nhà do lũ cuốn											
07	Eviction from previous residence for any other reason / Bị đuổi khỏi nơi cư trú trước đây vì bất cứ lý do nào											
08	Divorce or abandonment / Ly dị hoặc bị bỏ rơi						■					
09	Major loss of crops due to flood / Mất mùa do lũ lụt											
10	Major loss of crops due to other reasons (drought, storms, pests, diseases, etc.) / Mất mùa do nguyên nhân khác (hạn hán, bão, dịch bệnh…)											
11	Loss of livestock due to flood, severe cold, fog / Mất gia súc vì lũ lụt, rét đậm, rét hại, sương muối											
12	Loss of livestock due to disease death / Mất gia súc vì chết dịch bệnh											
13	Loss of livestock due to theft / Mất trộm gia súc											
14	Loss of productive assets due to flood / Mất công cụ sản xuất vì lũ lụt											
15	Loss of productive assets due to other reasons (theft, fire, river erosion, storms, etc.) / Mất công cụ sản xuất vì nguyên nhân khác (trộm, cháy, xói mòn đất, bão…)											
16	Loss or destruction of other consumption assets (personal) due to floods / Mất hoặc bị phá huỷ tài sản tiêu dùng (cá nhân) vì lũ lụt											
17	Loss of consumption assets (personal) due to factors other than floods / Mất hoặc bị phá huỷ tài sản tiêu dùng (cá nhân) vì nguyên nhân khác											

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Code / Mã số	Shocks (unexpected events) / Cú sốc (sự kiện không mong đợi)	Which shocks did you experience in the last 5 years (2011-2016)? Những cú sốc kinh tế bạn đã trải nghiệm trong 5 năm qua (2011-2016)? [Note to enumerator: Read each item] (Ghi chú với điều tra viên: Đọc từng phương án) 0. no [không] 1. yes [có]	If yes, how many times did it occur in your household in the last 5 years (2011-2016)? Nếu có, những điều đó đã diễn ra bao nhiêu lần trong vòng 5 năm trở lại đây (2011-2016)? No. of occurrences Số lần xảy ra	The last time it happened / Lần cuối cùng xảy ra									Please rank the worst 3 shocks. Xếp hạng 3 cú sốc tồi tệ nhất
				When did it happen? Thời điểm xảy ra		What is your current condition after the shock? Điều kiện của hộ sau khi xảy ra cú sốc 0. same as before [vẫn như trước] 1. worse than before [tệ hơn trước] 2. better than before [tốt hơn trước]	What was the value of the total loss? Tổng giá trị thiệt hại In '000 VND nghìn đồng	What did you do to cope with its effect? [No prompting. Classify up to 3 coping strategies. See codes Annex 2] Ông/ bà đã làm gì để đối phó với tác động của nó? [Không nhắc. Phân loại 3 chiến lược ứng phó. Xem mã ở phần Phụ lục 2]			How long did the impact of the event last? Thời gian ảnh hưởng kéo dài? no. of days số ngày 888 if ongoing (nếu còn tiếp diễn)	1. most worst shock [tệ nhất] 2. 2nd most worst shock [tệ nhì] 3. 3rd most worst shock [tệ ba]
				Mo (e.g. if July, write '07') Tháng (ví dụ tháng 7, ghi "07")	Year (e.g. 2016) Năm (ví dụ 2016)							
		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11
18	Costs of wedding / Chi phí cưới xin											
19	Division of father's property / Phân chia tài sản của cha mẹ											
20	Failure or bankrupcy of business / Bị phá sản											
21	Extortion / Bị tống tiền											
22	Family member put in prison / Có thành viên trong nhà bị đi tù											
23	Household member arrested by police / Có thành viên trong nhà bị cảnh sát bắt											
24	Paid a big bribe / Buộc phải hối lộ một khoản lớn											
25	Cost of court case / Chi phí theo kiện (vd: thuê luật sư)											
26	Losses due to court case / Chi phí thua kiện phải trả											
27	Reparations for victim of crime committed by household member / Bồi thường cho nạn nhân bởi tai nạn gây ra do thành viên trong nhà											
28	Strikes or political unrest / Đình công hoặc bất ổn chính trị											
29	Cut-off or decrease of regular remittances to household / Bị mất hoặc cắt giảm tiền kiều hối gửi về											
30	Withdrawal of NGO assistance / Rút tài trợ của các tổ chức phi chính phủ						■					
31	Increase in food prices / Tăng giá lương thực, thực phẩm						■					
32	Increase in prices of inputs / Tăng giá của các loại đầu vào						■					
99	Other (specify) / Khác (ghi rõ)											
99	Other (specify) / Khác (ghi rõ)											

Note: **In the second round (November-December 2016), the recall period was modified to September-October 2016.

Get the anthropometric measurements. Thank the respondents for their time.
Lấy số đo nhân trắc. Cảm ơn người được phỏng vấn.

End of interview. Thank you!
KẾT THÚC BUỔI PHỎNG VẤN. XIN CHÂN THÀNH CẢM ƠN!

Codes for M7-M9 (Mã cho câu M7-M9)
0. none [không làm gì cả]
1. sold land (homestead/agricultural) [bán đất (đất ở/ đất nông nghiệp)]
2. mortgaged/leased land (specify homestead or agricultural) [thế chấp / cho thuê đất (xác định rõ nhà cửa vườn hay đất nông nghiệp)]
3. sold productive asset (specify) [bán các tư liệu sản xuất (ghi rõ)]
4. mortgaged productive asset (specify) [thế chấp tư liệu sản xuất (ghi rõ)]
5. sold consumption asset (specify) [bán tài sản tiêu dùng (ghi rõ)]
6. mortgaged consumption asset (specify) [thế chấp tài sản tiêu dùng (ghi rõ)]
7. took loan from NGO/institution [vay từ các tổ chức Phi chính phủ/ đơn vị]
8. took loan from non-institution/banks [vay vốn từ ngân hàng/tổ chức tín dụng/nhóm tín dụng vi mô]
9. ate less food to reduce expenses [ăn ít hơn để giảm chi tiêu]
10. ate lower quality food to reduce expenses [ăn những loại kém chất lượng để giảm chi tiêu]
11. took children out of school [cho trẻ nghỉ học]
12. transferred children to less expensive school [chuyển trường cho trẻ đến nơi ít tốn kém hơn]
13. adult household member took job elsewhere temporarily [các thành viên trưởng thành trong hộ kiếm việc tạm thời ở nơi khác]
14. sent household member away permanently [gửi/ cho người nhà đi nơi khác vĩnh viễn]
15. sent children to be fostered by relatives [gửi trẻ đi làm con nuôi của họ hàng]
16. sent children into domestic service [gửi trẻ đi làm người ở]
17. sent children to work somewhere other than domestic service [gửi trẻ đi làm thuê ở bên ngoài nhưng không làm người ở]
18. sent household member away temporarily [gửi/cho người nhà đi nơi khác tạm thời]
19. emergency receipt of remittance from migrant family member [nhận trợ cấp tiền từ các thành viên đi làm ăn ở nước ngoài]
20. forced to change occupation [buộc phải thay đổi nghề nghiệp]
21. moved to other house [chuyển nhà đi nơi khác ở]
22. sent non-working household member to work [yêu cầu thành viên-không phải làm việc đi làm]
23. took help from others [nhận sự trợ giúp từ người khác]
99. other (specify) [khác (ghi rõ)]

A-7 First-stage regression results

Below are the first-stage coefficients and standard errors of the 3SLS regression models

in Chapter 3.3.

VARIABLES	(1) HAZ 6-60mo	(2) HAZ 6-60mo	(3) HAZ 6-60mo	(4) HAZ 6-60mo	(5) WHZ 6-60mo	(6) WHZ 6-60mo	(7) WHZ 6-60mo	(8) WHZ 6-60mo	(9) WAZ 6-60mo	(10) WAZ 6-60mo	(11) WAZ 6-60mo	(12) WAZ 6-60mo	(13) HAZ 6-60mo boys	(14) HAZ 6-60mo boys	(15) HAZ 6-60mo boys	(16) HAZ 6-60mo boys
VegDiversity				0.117				0.015				0.141				-0.795
				(0.368)				(0.316)				(0.218)				(0.541)
TimeMarket				0.272				0.180				0.269				1.001
				(0.486)				(0.413)				(0.281)				(0.610)
TradMarket				0.172				0.387				0.334*				0.975
				(0.330)				(0.293)				(0.201)				(0.630)
ModMarket				0.411				0.153				0.354**				0.301
				(0.286)				(0.244)				(0.166)				(0.432)
Income	-0.368	-0.129*	0.031	-0.325	-0.413*	-0.139**	0.033	-0.063	-0.417*	-0.139**	0.033	-0.209	-0.051	-0.177*	0.115	-0.381
	(0.240)	(0.069)	(0.055)	(0.269)	(0.242)	(0.069)	(0.055)	(0.236)	(0.242)	(0.069)	(0.055)	(0.164)	(0.333)	(0.093)	(0.074)	(0.382)
Workload	-0.788***	0.023	-0.018	0.775*	-0.730***	0.034	-0.021	-0.158	-0.732***	0.034	-0.021	0.367	-0.627*	0.113	-0.035	-0.005
	(0.254)	(0.073)	(0.058)	(0.407)	(0.255)	(0.073)	(0.058)	(0.336)	(0.255)	(0.073)	(0.058)	(0.232)	(0.367)	(0.104)	(0.082)	(0.560)
DDS	0.001	0.045	0.048*	0.053	-0.007	0.043	0.049**	-0.006	-0.007	0.043	0.049**	0.033	0.146	0.101**	0.063*	0.026
	(0.107)	(0.031)	(0.025)	(0.111)	(0.108)	(0.031)	(0.025)	(0.095)	(0.108)	(0.031)	(0.025)	(0.066)	(0.164)	(0.047)	(0.037)	(0.194)
AgeChild	-0.003	-0.001	-0.002	-0.012	-0.002	-0.001	-0.002	0.006	-0.002	-0.001	-0.002	-0.005	-0.010	-0.000	-0.002	-0.021
	(0.008)	(0.002)	(0.002)	(0.008)	(0.008)	(0.002)	(0.002)	(0.007)	(0.008)	(0.002)	(0.002)	(0.005)	(0.011)	(0.003)	(0.002)	(0.013)
MaleChild	0.024	0.034	-0.040	-0.047	0.009	0.030	-0.039	0.027	0.008	0.030	-0.039	0.020				
	(0.217)	(0.062)	(0.050)	(0.217)	(0.219)	(0.063)	(0.050)	(0.185)	(0.219)	(0.063)	(0.050)	(0.129)				
Diarrhea	-0.651**	0.108	0.011	0.404	-0.764**	0.087	0.017	-0.328	-0.760**	0.087	0.017	0.030	-0.780*	0.160	0.026	-0.297
	(0.300)	(0.086)	(0.069)	(0.387)	(0.299)	(0.086)	(0.068)	(0.350)	(0.299)	(0.086)	(0.068)	(0.242)	(0.416)	(0.116)	(0.090)	(0.620)
AgeMother	-0.007	0.003	0.000	-0.007	-0.007	0.003	0.000	0.005	-0.007	0.003	0.000	-0.000	0.001	0.003	0.002	-0.010
	(0.007)	(0.002)	(0.002)	(0.008)	(0.007)	(0.002)	(0.002)	(0.007)	(0.007)	(0.002)	(0.002)	(0.005)	(0.009)	(0.003)	(0.002)	(0.011)
EducMother	-0.007	0.006	0.011	-0.091	0.014	0.010	0.010	0.118**	0.013	0.010	0.010	0.043	0.028	-0.045**	0.019	-0.093
	(0.058)	(0.017)	(0.013)	(0.059)	(0.058)	(0.016)	(0.013)	(0.049)	(0.058)	(0.016)	(0.013)	(0.034)	(0.082)	(0.023)	(0.019)	(0.098)
MongMother	0.011	0.003	0.012	-0.394	-0.159	-0.030	0.021	0.458*	-0.159	-0.030	0.021	0.054	0.332	-0.169	0.094	-0.562
	(0.302)	(0.087)	(0.072)	(0.302)	(0.294)	(0.084)	(0.070)	(0.253)	(0.294)	(0.084)	(0.070)	(0.175)	(0.435)	(0.123)	(0.101)	(0.592)
HtMother	0.045**	0.009	-0.002	0.016									0.059**	0.010	-0.004	0.049
	(0.021)	(0.006)	(0.005)	(0.026)									(0.029)	(0.008)	(0.007)	(0.044)
BMIMother	-0.145***	-0.012	-0.008	-0.025	-0.144***	-0.012	-0.008	0.085	-0.144***	-0.012	-0.008	0.053	-0.126**	-0.020	-0.016	-0.076
	(0.040)	(0.011)	(0.009)	(0.067)	(0.040)	(0.011)	(0.009)	(0.057)	(0.040)	(0.011)	(0.009)	(0.040)	(0.054)	(0.015)	(0.012)	(0.083)
LV-HA (ref: LV-LA)	0.626*	0.063	-0.139*	0.206	0.662*	0.073	-0.142*	-0.297	0.671*	0.073	-0.142*	-0.149	0.697	0.012	-0.135	0.850
	(0.351)	(0.099)	(0.080)	(0.430)	(0.354)	(0.100)	(0.080)	(0.376)	(0.354)	(0.100)	(0.080)	(0.260)	(0.519)	(0.143)	(0.113)	(0.790)
HV-LA	0.592*	-0.086	-0.085	0.091	0.610*	-0.081	-0.087	-0.149	0.616*	-0.081	-0.087	-0.092	0.384	-0.135	-0.158	0.535
	(0.329)	(0.094)	(0.081)	(0.422)	(0.332)	(0.094)	(0.081)	(0.366)	(0.332)	(0.094)	(0.081)	(0.254)	(0.473)	(0.131)	(0.108)	(0.697)
HV-HA	0.935***	0.032	-0.117	0.438	1.058***	0.055	-0.124	-0.422	1.057***	0.055	-0.124	-0.072	1.055***	-0.116	-0.102	1.231
	(0.323)	(0.093)	(0.080)	(0.470)	(0.321)	(0.092)	(0.080)	(0.424)	(0.321)	(0.092)	(0.080)	(0.293)	(0.498)	(0.140)	(0.119)	(0.954)
Child5b	0.021	0.033	-0.015	-0.127	-0.010	0.027	-0.014	0.078	-0.010	0.027	-0.014	-0.042	0.048	0.008	-0.027	0.066
	(0.170)	(0.049)	(0.039)	(0.170)	(0.171)	(0.049)	(0.039)	(0.145)	(0.171)	(0.049)	(0.039)	(0.100)	(0.250)	(0.071)	(0.055)	(0.285)
Area	0.095*	0.014	0.046***	0.031	0.106*	0.016	0.045***	0.019	0.106*	0.016	0.045***	0.031	0.182	-0.001	0.049	0.017
	(0.055)	(0.016)	(0.013)	(0.062)	(0.055)	(0.016)	(0.012)	(0.054)	(0.055)	(0.016)	(0.012)	(0.037)	(0.139)	(0.039)	(0.031)	(0.186)
NonFoodExp_pc	0.133*	-0.013	-0.024	0.011	0.139*	-0.012	-0.024	0.087	0.138*	-0.012	-0.024	0.061	-0.004	-0.005	-0.013	0.070
	(0.070)	(0.020)	(0.016)	(0.085)	(0.071)	(0.020)	(0.016)	(0.074)	(0.071)	(0.020)	(0.016)	(0.051)	(0.116)	(0.033)	(0.026)	(0.132)
ImprovedToilet	-0.341	-0.050	-0.033	0.154	-0.355	-0.051	-0.033	0.008	-0.351	-0.051	-0.033	0.113	-0.377	-0.102	0.012	0.062
	(0.235)	(0.067)	(0.054)	(0.254)	(0.237)	(0.067)	(0.054)	(0.217)	(0.237)	(0.067)	(0.054)	(0.151)	(0.321)	(0.091)	(0.071)	(0.380)
Instruments:																
Distance	0.000**				0.000**				0.000**				0.000**			
	(0.000)				(0.000)				(0.000)				(0.000)			
PctNeighborTrad		0.656***				0.660***				0.658***				0.504***		
		(0.134)				(0.134)				(0.134)				(0.173)		
PctNeighborMod			0.481***				0.479***				0.478***				0.516**	
			(0.148)				(0.147)				(0.147)				(0.202)	
Constant	-0.536	-1.140	0.582	-3.816	6.236***	0.186	0.204	-3.368	6.259***	0.186	0.205	-3.392**	-4.399	-0.985	0.637	-5.361
	(3.313)	(0.952)	(0.771)	(3.331)	(1.110)	(0.316)	(0.255)	(2.289)	(1.109)	(0.316)	(0.255)	(1.581)	(4.554)	(1.287)	(1.029)	(5.610)
Observations	234	234	234	234	234	234	234	234	234	234	234	234	123	123	123	123
R-squared	0.233	0.171	0.179	0.101	0.218	0.164	0.178	0.112	0.218	0.164	0.178	0.067	0.221	0.220	0.221	-0.519

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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VARIABLES	(17) HAZ 6-60mo girls	(18) HAZ 6-60mo girls	(19) HAZ 6-60mo girls	(20) HAZ 6-60mo girls	(21) WHZ 6-60mo boys	(22) WHZ 6-60mo boys	(23) WHZ 6-60mo boys	(24) WHZ 6-60mo boys	(25) WHZ 6-60mo girls	(26) WHZ 6-60mo girls	(27) WHZ 6-60mo girls	(28) WHZ 6-60mo girls	(29) WAZ 6-60mo boys	(30) WAZ 6-60mo boys	(31) WAZ 6-60mo boys	(32) WAZ 6-60mo boys
VegDiversity				1.134**				0.772*				-1.201**				-0.046
				(0.503)				(0.449)				(0.492)				(0.273)
TimeMarket				-0.273				-0.159				0.553				0.378
				(0.834)				(0.491)				(0.749)				(0.334)
TradMarket				-0.250				-0.474				0.905**				0.407
				(0.406)				(0.544)				(0.381)				(0.345)
ModMarket				1.115**				-0.188				-0.245				0.069
				(0.473)				(0.343)				(0.430)				(0.233)
Income	-0.643*	-0.099	-0.014	0.449	-0.171	-0.191**	0.119	0.300	-0.693*	-0.113	-0.017	-1.373***	-0.162	-0.190**	0.120	-0.016
	(0.356)	(0.098)	(0.084)	(0.544)	(0.336)	(0.093)	(0.074)	(0.305)	(0.356)	(0.100)	(0.084)	(0.514)	(0.336)	(0.093)	(0.074)	(0.171)
Workload	-0.845**	-0.125	0.008	1.604**	-0.535	0.127	-0.041	0.540	-0.829**	-0.100	0.014	-1.379**	-0.537	0.128	-0.040	0.302
	(0.360)	(0.101)	(0.088)	(0.633)	(0.371)	(0.104)	(0.082)	(0.437)	(0.359)	(0.102)	(0.087)	(0.588)	(0.371)	(0.104)	(0.082)	(0.252)
DDS	-0.111	0.003	0.036	0.177	0.101	0.095**	0.066*	0.071	-0.111	0.005	0.037	-0.191	0.102	0.093*	0.066*	0.025
	(0.143)	(0.040)	(0.035)	(0.185)	(0.166)	(0.047)	(0.036)	(0.158)	(0.144)	(0.041)	(0.035)	(0.171)	(0.166)	(0.047)	(0.036)	(0.090)
AgeChild	0.005	-0.001	-0.002	-0.018	-0.012	-0.001	-0.002	0.023**	0.006	-0.001	-0.002	0.006	-0.012	-0.001	-0.002	-0.001
	(0.011)	(0.003)	(0.003)	(0.014)	(0.011)	(0.003)	(0.002)	(0.011)	(0.011)	(0.003)	(0.003)	(0.013)	(0.011)	(0.003)	(0.002)	(0.006)
MaleChild																
Diarrhea	-0.636	0.050	0.000	1.152*	-0.757*	0.151	0.030	0.744	-0.713*	-0.012	-0.008	-1.710***	-0.776*	0.147	0.030	0.277
	(0.441)	(0.123)	(0.106)	(0.633)	(0.422)	(0.116)	(0.090)	(0.524)	(0.430)	(0.122)	(0.102)	(0.594)	(0.424)	(0.116)	(0.090)	(0.307)
AgeMother	-0.013	0.003	-0.003	0.009	0.001	0.003	0.002	0.009	-0.013	0.003	-0.002	-0.015	0.001	0.003	0.002	0.001
	(0.011)	(0.003)	(0.003)	(0.015)	(0.009)	(0.003)	(0.002)	(0.009)	(0.011)	(0.003)	(0.003)	(0.014)	(0.009)	(0.003)	(0.002)	(0.005)
EducMother	-0.025	0.063***	0.006	0.033	0.076	-0.036	0.016	0.057	-0.034	0.061***	0.006	0.017	0.077	-0.036	0.016	0.039
	(0.083)	(0.023)	(0.020)	(0.111)	(0.079)	(0.022)	(0.018)	(0.083)	(0.083)	(0.023)	(0.020)	(0.103)	(0.079)	(0.022)	(0.018)	(0.048)
MongMother	-0.304	0.229*	0.018	0.653	0.141	-0.208*	0.106	0.389	-0.423	0.158	0.005	-0.425	0.135	-0.205*	0.108	-0.097
	(0.431)	(0.120)	(0.108)	(0.582)	(0.428)	(0.120)	(0.097)	(0.431)	(0.414)	(0.118)	(0.102)	(0.537)	(0.428)	(0.120)	(0.097)	(0.245)
HtMother	0.024	0.018**	0.002	0.013												
	(0.031)	(0.009)	(0.007)	(0.039)												
BMIMother	-0.182***	0.010	0.011	0.111	-0.107*	-0.017	-0.017	0.104*	-0.197***	0.003	0.011	-0.101	-0.107*	-0.017	-0.017	0.024
	(0.063)	(0.017)	(0.015)	(0.129)	(0.055)	(0.015)	(0.012)	(0.062)	(0.061)	(0.017)	(0.014)	(0.126)	(0.055)	(0.015)	(0.012)	(0.036)
LV-HA (ref: LV-LA)	0.712	0.066	-0.125	-0.377	0.948*	0.038	-0.144	-0.992	0.785*	0.080	-0.127	0.460	0.921*	0.033	-0.143	-0.048
	(0.472)	(0.130)	(0.112)	(0.671)	(0.525)	(0.143)	(0.112)	(0.676)	(0.472)	(0.133)	(0.112)	(0.629)	(0.528)	(0.143)	(0.112)	(0.395)
HV-LA	0.800	-0.010	0.080	-0.617	0.579	-0.117	-0.167	-0.590	0.788	-0.021	0.069	0.405	0.556	-0.122	-0.165	0.086
	(0.489)	(0.136)	(0.128)	(0.728)	(0.479)	(0.131)	(0.108)	(0.590)	(0.490)	(0.139)	(0.127)	(0.679)	(0.482)	(0.131)	(0.108)	(0.345)
HV-HA	0.962**	0.127	-0.093	-0.250	1.302***	-0.080	-0.118	-1.446*	1.001**	0.167	-0.097	0.779	1.292***	-0.080	-0.115	0.060
	(0.437)	(0.122)	(0.114)	(0.679)	(0.496)	(0.138)	(0.118)	(0.843)	(0.433)	(0.122)	(0.114)	(0.645)	(0.496)	(0.138)	(0.118)	(0.501)
Child5b	-0.042	0.035	0.003	-0.253	-0.005	0.000	-0.024	0.031	-0.063	0.021	0.002	0.021	-0.002	0.002	-0.024	0.025
	(0.235)	(0.066)	(0.056)	(0.290)	(0.253)	(0.071)	(0.055)	(0.228)	(0.234)	(0.067)	(0.056)	(0.265)	(0.253)	(0.071)	(0.055)	(0.126)
Area	0.074	0.011	0.044***	-0.045	0.214	0.003	0.048	-0.071	0.078	0.015	0.044***	0.141*	0.211	0.002	0.048	0.007
	(0.061)	(0.017)	(0.015)	(0.085)	(0.141)	(0.039)	(0.031)	(0.155)	(0.061)	(0.018)	(0.014)	(0.079)	(0.141)	(0.039)	(0.031)	(0.089)
NonFoodExp_pc	0.185**	-0.012	-0.025	-0.206	0.010	-0.002	-0.013	0.204*	0.181**	-0.011	-0.026	0.254**	0.010	-0.002	-0.014	0.203***
	(0.089)	(0.025)	(0.021)	(0.137)	(0.117)	(0.033)	(0.026)	(0.106)	(0.089)	(0.025)	(0.021)	(0.129)	(0.117)	(0.033)	(0.026)	(0.059)
ImprovedToilet	-0.257	-0.025	-0.043	0.245	-0.284	-0.093	0.008	0.150	-0.260	-0.049	-0.047	-0.325	-0.293	-0.091	0.009	0.161
	(0.354)	(0.098)	(0.084)	(0.453)	(0.326)	(0.091)	(0.071)	(0.299)	(0.352)	(0.099)	(0.083)	(0.418)	(0.326)	(0.091)	(0.071)	(0.167)
Instruments:																
Distance	0.000				0.000				0.000				0.000			
	(0.000)				(0.000)				(0.000)				(0.000)			
PctNeighborTrad		0.792***				0.486***				0.806***				0.529***		
		(0.186)				(0.174)				(0.190)				(0.177)		
PctNeighborMod			0.559**				0.502**				0.518**				0.512**	
			(0.230)				(0.202)				(0.225)				(0.202)	
Constant	4.207	-3.253**	-0.434	-10.921	4.280***	0.529	0.099	-6.309***	8.392***	-0.330	-0.100	7.157	4.258***	0.521	0.094	-2.714**
	(5.238)	(1.450)	(1.282)	(7.264)	(1.574)	(0.441)	(0.362)	(2.222)	(1.717)	(0.481)	(0.401)	(4.911)	(1.574)	(0.441)	(0.362)	(1.300)
Observations	111	111	111	111	123	123	123	123	111	111	111	111	123	123	123	123
R-squared	0.312	0.272	0.213	-0.830	0.194	0.210	0.219	-0.849	0.307	0.242	0.212	-1.064	0.195	0.210	0.219	0.250

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

VARIABLES	(33) WAZ 6-60mo girls	(34) WAZ 6-60mo girls	(35) WAZ 6-60mo girls	(36) WAZ 6-60mo girls	(37) Stunting 6-60mo	(38) Stunting 6-60mo	(39) Stunting 6-60mo	(40) Stunting 6-60mo	(41) Wasting 6-60mo	(42) Wasting 6-60mo	(43) Wasting 6-60mo	(44) Wasting 6-60mo	(45) underweight 6-60mo	(46) underweight 6-60mo	(47) underweight 6-60mo	(48) underweight 6-60mo
VegDiversity				-0.198				0.150				-0.057				0.172*
				(0.309)				(0.111)				(0.065)				(0.103)
TimeMarket				0.264				0.022				0.018				-0.101
				(0.486)				(0.142)				(0.083)				(0.128)
TradMarket				0.498**				-0.089				-0.023				-0.205**
				(0.246)				(0.098)				(0.059)				(0.093)
ModMarket				0.487*				-0.139*				-0.037				-0.115
				(0.278)				(0.083)				(0.049)				(0.075)
Income	-0.687*	-0.113	-0.017	-0.731**	-0.364	-0.129*	0.030	0.131	-0.415*	-0.139**	0.033	-0.124**	-0.414*	-0.139**	0.033	0.119
	(0.357)	(0.100)	(0.084)	(0.298)	(0.240)	(0.069)	(0.055)	(0.083)	(0.242)	(0.069)	(0.055)	(0.048)	(0.242)	(0.069)	(0.055)	(0.079)
Workload	-0.826**	-0.100	0.014	-0.055	-0.786***	0.023	-0.018	0.015	-0.731***	0.034	-0.021	0.042	-0.731***	0.033	-0.021	0.023
	(0.359)	(0.102)	(0.087)	(0.347)	(0.254)	(0.073)	(0.058)	(0.124)	(0.255)	(0.073)	(0.058)	(0.069)	(0.255)	(0.073)	(0.058)	(0.111)
DDS	-0.111	0.005	0.037	-0.026	0.001	0.045	0.048*	-0.033	-0.007	0.043	0.049**	-0.003	-0.007	0.043	0.049**	0.019
	(0.144)	(0.041)	(0.035)	(0.095)	(0.107)	(0.031)	(0.025)	(0.034)	(0.108)	(0.031)	(0.025)	(0.020)	(0.108)	(0.031)	(0.025)	(0.032)
AgeChild	0.006	-0.001	-0.002	-0.009	-0.003	-0.001	-0.002	0.001	-0.002	-0.001	-0.002	-0.003**	-0.002	-0.001	-0.002	-0.002
	(0.011)	(0.003)	(0.003)	(0.007)	(0.008)	(0.002)	(0.002)	(0.002)	(0.008)	(0.002)	(0.002)	(0.001)	(0.008)	(0.002)	(0.002)	(0.002)
MaleChild					0.025	0.033	-0.040	0.022	0.008	0.030	-0.039	-0.057	0.009	0.030	-0.039	-0.038
					(0.217)	(0.062)	(0.050)	(0.068)	(0.219)	(0.063)	(0.050)	(0.038)	(0.219)	(0.063)	(0.050)	(0.062)
Diarrhea	-0.714*	-0.012	-0.008	-0.640*	-0.656**	0.108	0.011	0.002	-0.762**	0.087	0.017	0.132*	-0.763**	0.086	0.017	0.186
	(0.430)	(0.122)	(0.102)	(0.341)	(0.300)	(0.086)	(0.069)	(0.119)	(0.299)	(0.086)	(0.068)	(0.072)	(0.299)	(0.086)	(0.068)	(0.116)
AgeMother	-0.013	0.003	-0.002	-0.006	-0.007	0.003	0.000	0.005**	-0.007	0.003	0.000	-0.002	-0.007	0.003	0.000	0.003
	(0.011)	(0.003)	(0.003)	(0.008)	(0.007)	(0.002)	(0.002)	(0.002)	(0.007)	(0.002)	(0.002)	(0.001)	(0.007)	(0.002)	(0.002)	(0.002)
EducMother	-0.033	0.061***	0.006	0.033	-0.006	0.006	0.011	0.024	0.013	0.010	0.010	-0.021**	0.013	0.010	0.010	-0.014
	(0.083)	(0.023)	(0.020)	(0.058)	(0.058)	(0.017)	(0.013)	(0.018)	(0.058)	(0.016)	(0.013)	(0.010)	(0.058)	(0.016)	(0.013)	(0.017)
MongMother	-0.419	0.158	0.005	0.016	0.010	0.003	0.011	0.059	-0.159	-0.030	0.021	-0.122**	-0.159	-0.029	0.021	0.094
	(0.415)	(0.118)	(0.102)	(0.304)	(0.302)	(0.087)	(0.072)	(0.094)	(0.294)	(0.084)	(0.070)	(0.052)	(0.294)	(0.084)	(0.070)	(0.085)
HtMother					0.045**	0.009	-0.002	-0.017**								
					(0.021)	(0.006)	(0.005)	(0.008)								
BMIMother	-0.196***	0.003	0.011	-0.010	-0.145***	-0.012	-0.008	0.035*	-0.144***	-0.012	-0.008	-0.020*	-0.144***	-0.012	-0.008	0.016
	(0.062)	(0.017)	(0.014)	(0.076)	(0.040)	(0.011)	(0.009)	(0.021)	(0.040)	(0.011)	(0.009)	(0.012)	(0.040)	(0.011)	(0.009)	(0.019)
LV-HA (ref: LV-LA)	0.774	0.080	-0.127	0.128	0.617*	0.064	-0.139*	-0.186	0.666*	0.073	-0.142*	0.079	0.665*	0.072	-0.142*	-0.111
	(0.475)	(0.133)	(0.112)	(0.359)	(0.350)	(0.099)	(0.080)	(0.132)	(0.354)	(0.100)	(0.080)	(0.077)	(0.353)	(0.099)	(0.080)	(0.125)
HV-LA	0.787	-0.021	0.069	-0.097	0.587*	-0.086	-0.086	-0.170	0.612*	-0.081	-0.087	0.059	0.612*	-0.082	-0.087	-0.053
	(0.490)	(0.139)	(0.127)	(0.390)	(0.329)	(0.094)	(0.081)	(0.130)	(0.332)	(0.094)	(0.081)	(0.075)	(0.332)	(0.094)	(0.081)	(0.121)
HV-HA	1.004**	0.167	-0.097	0.415	0.936***	0.032	-0.118	-0.351**	1.058***	0.055	-0.124	0.103	1.058***	0.055	-0.124	-0.169
	(0.433)	(0.122)	(0.114)	(0.375)	(0.323)	(0.093)	(0.080)	(0.144)	(0.321)	(0.092)	(0.080)	(0.087)	(0.321)	(0.092)	(0.080)	(0.140)
Child5b	-0.063	0.021	0.002	-0.152	0.022	0.033	-0.015	0.031	-0.010	0.027	-0.014	-0.035	-0.010	0.027	-0.014	-0.003
	(0.234)	(0.067)	(0.056)	(0.144)	(0.170)	(0.049)	(0.039)	(0.053)	(0.171)	(0.049)	(0.039)	(0.030)	(0.171)	(0.049)	(0.039)	(0.049)
Area	0.078	0.015	0.044***	0.076*	0.095*	0.014	0.046***	-0.022	0.106*	0.016	0.045***	0.005	0.106*	0.016	0.045***	-0.011
	(0.061)	(0.018)	(0.014)	(0.045)	(0.055)	(0.016)	(0.013)	(0.019)	(0.055)	(0.016)	(0.012)	(0.011)	(0.055)	(0.016)	(0.012)	(0.018)
NonFoodExp_pc	0.182**	-0.011	-0.026	0.058	0.133*	-0.013	-0.024	-0.012	0.139*	-0.012	-0.024	-0.012	0.139*	-0.012	-0.024	-0.030
	(0.089)	(0.025)	(0.021)	(0.075)	(0.070)	(0.020)	(0.016)	(0.026)	(0.071)	(0.020)	(0.016)	(0.015)	(0.071)	(0.020)	(0.016)	(0.025)
ImprovedToilet	-0.266	-0.049	-0.047	-0.078	-0.345	-0.050	-0.033	0.042	-0.354	-0.051	-0.033	-0.010	-0.354	-0.051	-0.033	0.057
	(0.354)	(0.099)	(0.083)	(0.232)	(0.235)	(0.067)	(0.054)	(0.079)	(0.237)	(0.067)	(0.054)	(0.045)	(0.237)	(0.067)	(0.054)	(0.073)
Instruments:																
Distance	0.000				0.000**				0.000**				0.000**			
	(0.000)				(0.000)				(0.000)				(0.000)			
PctNeighborTrad		0.804***				0.649***				0.658***				0.670***		
		(0.190)				(0.134)				(0.134)				(0.134)		
PctNeighborMod			0.517**				0.476***				0.478***				0.477***	
			(0.225)				(0.148)				(0.147)				(0.147)	
Constant	8.342***	-0.329	-0.100	0.085	-0.539	-1.139	0.586	1.793*	6.245***	0.186	0.205	1.125**	6.243***	0.183	0.205	-0.614
	(1.733)	(0.481)	(0.401)	(3.030)	(3.313)	(0.952)	(0.771)	(1.036)	(1.109)	(0.316)	(0.255)	(0.468)	(1.109)	(0.316)	(0.255)	(0.749)
Observations	111	111	111	111	234	234	234	234	234	234	234	234	234	234	234	234
R-squared	0.308	0.242	0.212	0.184	0.233	0.171	0.179	-0.157	0.218	0.164	0.178	0.070	0.218	0.164	0.178	-0.305

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

VARIABLES	(49) Stunting 6-60mo boys	(50) Stunting 6-60mo boys	(51) Stunting 6-60mo boys	(52) Stunting 6-60mo boys	(53) Stunting 6-60mo girls	(54) Stunting 6-60mo girls	(55) Stunting 6-60mo girls	(56) Stunting 6-60mo girls	(57) Wasting 6-60mo boys	(58) Wasting 6-60mo boys	(59) Wasting 6-60mo boys	(60) Wasting 6-60mo boys	(61) Wasting 6-60mo girls	(62) Wasting 6-60mo girls	(63) Wasting 6-60mo girls	(64) Wasting 6-60mo girls
VegDiversity				0.437**				0.117				-0.211**				0.131
				(0.185)				(0.138)				(0.089)				(0.096)
TimeMarket				-0.012				0.082				-0.029				-0.057
				(0.190)				(0.234)				(0.093)				(0.148)
TradMarket				-0.483**				0.043				0.088				-0.035
				(0.208)				(0.114)				(0.106)				(0.075)
ModMarket				-0.297**				-0.079				0.130**				-0.120
				(0.135)				(0.133)				(0.065)				(0.085)
Income	-0.057	-0.177*	0.114	0.031	-0.683*	-0.099	-0.014	0.261*	-0.180	-0.192**	0.119	-0.126**	-0.670*	-0.113	-0.017	0.046
	(0.332)	(0.093)	(0.074)	(0.153)	(0.357)	(0.098)	(0.084)	(0.138)	(0.336)	(0.093)	(0.074)	(0.063)	(0.357)	(0.100)	(0.084)	(0.095)
Workload	-0.625*	0.113	-0.035	0.247	-0.868**	-0.126	0.007	-0.087	-0.532	0.127	-0.040	-0.068	-0.815**	-0.101	0.014	0.243**
	(0.367)	(0.104)	(0.082)	(0.211)	(0.361)	(0.101)	(0.088)	(0.164)	(0.371)	(0.104)	(0.082)	(0.089)	(0.359)	(0.102)	(0.087)	(0.110)
DDS	0.145	0.104**	0.063*	-0.011	-0.113	0.003	0.036	-0.036	0.100	0.098*	0.066*	-0.031	-0.110	0.005	0.038	0.040
	(0.164)	(0.047)	(0.037)	(0.077)	(0.143)	(0.040)	(0.035)	(0.045)	(0.166)	(0.047)	(0.036)	(0.033)	(0.144)	(0.041)	(0.035)	(0.031)
AgeChild	-0.010	-0.000	-0.002	0.003	0.006	-0.001	-0.002	0.002	-0.012	-0.001	-0.002	-0.006***	0.006	-0.001	-0.002	-0.003
	(0.011)	(0.003)	(0.002)	(0.005)	(0.011)	(0.003)	(0.003)	(0.003)	(0.011)	(0.003)	(0.002)	(0.002)	(0.011)	(0.003)	(0.003)	(0.002)
MaleChild																
Diarrhea	-0.767*	0.165	0.026	0.206	-0.633	0.049	0.001	-0.004	-0.737*	0.156	0.030	-0.082	-0.716*	-0.013	-0.008	0.392***
	(0.413)	(0.116)	(0.090)	(0.233)	(0.441)	(0.123)	(0.106)	(0.159)	(0.421)	(0.116)	(0.090)	(0.106)	(0.430)	(0.122)	(0.102)	(0.109)
AgeMother	0.001	0.003	0.002	0.005	-0.013	0.003	-0.003	0.005	0.001	0.003	0.002	-0.001	-0.013	0.003	-0.002	-0.001
	(0.009)	(0.003)	(0.002)	(0.004)	(0.011)	(0.003)	(0.003)	(0.004)	(0.009)	(0.003)	(0.002)	(0.002)	(0.011)	(0.003)	(0.003)	(0.003)
EducMother	0.027	-0.046**	0.019	0.012	-0.034	0.063***	0.006	0.002	0.075	-0.036	0.016	-0.008	-0.030	0.061***	0.006	-0.016
	(0.082)	(0.023)	(0.019)	(0.039)	(0.083)	(0.023)	(0.020)	(0.027)	(0.079)	(0.022)	(0.018)	(0.017)	(0.083)	(0.023)	(0.020)	(0.019)
MongMother	0.336	-0.171	0.094	-0.085	-0.336	0.230*	0.019	0.031	0.147	-0.210*	0.107	-0.084	-0.407	0.159	0.004	-0.003
	(0.435)	(0.123)	(0.101)	(0.228)	(0.431)	(0.120)	(0.108)	(0.144)	(0.428)	(0.120)	(0.097)	(0.089)	(0.414)	(0.118)	(0.102)	(0.098)
HtMother	0.059**	0.010	-0.004	-0.028*	0.024	0.018**	0.002	-0.018*								
	(0.029)	(0.008)	(0.007)	(0.017)	(0.031)	(0.009)	(0.007)	(0.010)								
BMIMother	-0.126**	-0.020	-0.016	0.038	-0.189***	0.010	0.011	0.061*	-0.106*	-0.017	-0.017	-0.023*	-0.193***	0.003	0.011	0.007
	(0.054)	(0.015)	(0.012)	(0.031)	(0.063)	(0.017)	(0.015)	(0.034)	(0.055)	(0.015)	(0.012)	(0.013)	(0.062)	(0.017)	(0.014)	(0.024)
LV-HA (ref: LV-LA)	0.715	0.017	-0.135	-0.429	0.782*	0.065	-0.124	-0.255	0.976*	0.043	-0.144	0.227*	0.745	0.078	-0.127	-0.035
	(0.515)	(0.143)	(0.113)	(0.296)	(0.474)	(0.130)	(0.112)	(0.168)	(0.523)	(0.143)	(0.112)	(0.137)	(0.474)	(0.133)	(0.112)	(0.116)
HV-LA	0.400	-0.130	-0.159	-0.391	0.802	-0.010	0.082	-0.125	0.604	-0.112	-0.166	0.101	0.786	-0.021	0.069	0.097
	(0.469)	(0.131)	(0.108)	(0.262)	(0.489)	(0.136)	(0.128)	(0.184)	(0.478)	(0.131)	(0.108)	(0.119)	(0.490)	(0.139)	(0.127)	(0.125)
HV-HA	1.061**	-0.116	-0.102	-0.789**	0.943**	0.127	-0.091	-0.335*	1.313***	-0.080	-0.117	0.340**	1.013**	0.167	-0.098	-0.104
	(0.497)	(0.140)	(0.119)	(0.347)	(0.437)	(0.122)	(0.114)	(0.173)	(0.496)	(0.138)	(0.118)	(0.169)	(0.433)	(0.122)	(0.114)	(0.120)
Child5b	0.046	0.006	-0.027	0.018	-0.042	0.036	0.003	0.030	-0.009	-0.001	-0.024	0.001	-0.063	0.021	0.002	-0.047
	(0.249)	(0.071)	(0.055)	(0.115)	(0.235)	(0.066)	(0.056)	(0.070)	(0.253)	(0.071)	(0.055)	(0.047)	(0.234)	(0.067)	(0.056)	(0.047)
Area	0.184	0.000	0.049	-0.063	0.072	0.011	0.044***	-0.017	0.217	0.004	0.048	0.031	0.079	0.015	0.044***	-0.009
	(0.139)	(0.039)	(0.031)	(0.072)	(0.061)	(0.017)	(0.015)	(0.021)	(0.141)	(0.039)	(0.031)	(0.032)	(0.061)	(0.018)	(0.014)	(0.014)
NonFoodExp_pc	-0.004	-0.005	-0.013	-0.007	0.179**	-0.012	-0.025	0.005	0.010	-0.002	-0.013	-0.005	0.185**	-0.011	-0.026	-0.059**
	(0.116)	(0.033)	(0.026)	(0.053)	(0.089)	(0.025)	(0.021)	(0.035)	(0.117)	(0.033)	(0.026)	(0.022)	(0.089)	(0.025)	(0.021)	(0.024)
ImprovedToilet	-0.371	-0.104	0.012	0.072	-0.221	-0.025	-0.043	0.044	-0.275	-0.096	0.008	-0.040	-0.282	-0.049	-0.047	0.037
	(0.321)	(0.091)	(0.071)	(0.151)	(0.354)	(0.098)	(0.084)	(0.111)	(0.325)	(0.091)	(0.071)	(0.062)	(0.353)	(0.099)	(0.083)	(0.076)
Instruments:																
Distance	0.000***				0.000				0.000				0.000			
	(0.000)				(0.000)				(0.000)				(0.000)			
PctNeighborTrad		0.456***				0.804***				0.438**				0.820***		
		(0.167)				(0.186)				(0.173)				(0.190)		
PctNeighborMod			0.512**				0.570**				0.504**				0.514**	
			(0.202)				(0.230)				(0.202)				(0.225)	
Constant	-4.419	-0.999	0.641	3.144	4.660	-3.256**	-0.449	1.339	4.292***	0.538	0.098	1.558***	8.204***	-0.337	-0.099	-0.368
	(4.553)	(1.287)	(1.029)	(2.212)	(5.247)	(1.450)	(1.282)	(1.814)	(1.574)	(0.441)	(0.362)	(0.449)	(1.726)	(0.481)	(0.401)	(0.946)
Observations	123	123	123	123	111	111	111	111	123	123	123	123	111	111	111	111
R-squared	0.221	0.219	0.221	-2.154	0.310	0.272	0.213	0.099	0.192	0.209	0.219	-1.452	0.308	0.242	0.212	-0.149

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

VARIABLES	(65) underweight 6-60mo boys	(66) underweight 6-60mo boys	(67) underweight 6-60mo boys	(68) underweight 6-60mo boys	(69) underweight 6-60mo girls	(70) underweight 6-60mo girls	(71) underweight 6-60mo girls	(72) underweight 6-60mo girls
VegDiversity				0.311**				0.228*
				(0.157)				(0.137)
TimeMarket				-0.182				0.008
				(0.170)				(0.211)
TradMarket				-0.439**				-0.152
				(0.190)				(0.107)
ModMarket				-0.110				-0.069
				(0.119)				(0.121)
Income	-0.149	-0.190**	0.119	-0.032	-0.708**	-0.113	-0.017	0.274**
	(0.336)	(0.093)	(0.074)	(0.108)	(0.357)	(0.100)	(0.084)	(0.138)
Workload	-0.541	0.128	-0.040	0.099	-0.838**	-0.100	0.013	0.096
	(0.371)	(0.104)	(0.082)	(0.154)	(0.359)	(0.102)	(0.087)	(0.159)
DDS	0.104	0.092*	0.066*	0.038	-0.112	0.005	0.037	0.041
	(0.166)	(0.047)	(0.036)	(0.056)	(0.144)	(0.041)	(0.035)	(0.045)
AgeChild	-0.012	-0.001	-0.002	0.000	0.006	-0.001	-0.002	-0.003
	(0.011)	(0.003)	(0.002)	(0.004)	(0.011)	(0.003)	(0.003)	(0.003)
MaleChild								
Diarrhea	-0.805*	0.145	0.030	0.275	-0.711*	-0.012	-0.008	0.277*
	(0.422)	(0.116)	(0.090)	(0.184)	(0.430)	(0.122)	(0.102)	(0.159)
AgeMother	0.001	0.003	0.002	0.001	-0.013	0.003	-0.002	0.006*
	(0.009)	(0.003)	(0.002)	(0.003)	(0.011)	(0.003)	(0.003)	(0.004)
EducMother	0.078	-0.036	0.016	-0.042	-0.037	0.061***	0.006	-0.015
	(0.079)	(0.022)	(0.018)	(0.029)	(0.083)	(0.023)	(0.020)	(0.027)
MongMother	0.127	-0.204*	0.107	-0.043	-0.434	0.159	0.005	0.141
	(0.428)	(0.120)	(0.097)	(0.152)	(0.414)	(0.118)	(0.102)	(0.143)
HtMother								
BMIMother	-0.107**	-0.017	-0.017	0.037*	-0.200***	0.003	0.011	0.015
	(0.055)	(0.015)	(0.012)	(0.022)	(0.062)	(0.017)	(0.014)	(0.034)
LV-HA (ref: LV-LA)	0.881*	0.031	-0.144	-0.335	0.811*	0.079	-0.127	-0.114
	(0.524)	(0.143)	(0.112)	(0.237)	(0.473)	(0.133)	(0.112)	(0.168)
HV-LA	0.521	-0.124	-0.166	-0.223	0.789	-0.021	0.071	-0.100
	(0.479)	(0.131)	(0.108)	(0.207)	(0.490)	(0.139)	(0.127)	(0.182)
HV-HA	1.278***	-0.080	-0.117	-0.516*	0.993**	0.167	-0.096	-0.178
	(0.496)	(0.138)	(0.118)	(0.296)	(0.433)	(0.122)	(0.114)	(0.173)
Child5b	0.002	0.003	-0.024	-0.089	-0.062	0.021	0.001	0.078
	(0.253)	(0.071)	(0.055)	(0.080)	(0.234)	(0.067)	(0.056)	(0.069)
Area	0.206	0.002	0.048	-0.075	0.076	0.015	0.044***	-0.014
	(0.141)	(0.039)	(0.031)	(0.054)	(0.061)	(0.018)	(0.014)	(0.021)
NonFoodExp_pc	0.010	-0.002	-0.013	-0.032	0.179**	-0.011	-0.026	-0.041
	(0.117)	(0.033)	(0.026)	(0.037)	(0.089)	(0.025)	(0.021)	(0.035)
ImprovedToilet	-0.305	-0.090	0.009	-0.014	-0.245	-0.049	-0.047	0.143
	(0.326)	(0.091)	(0.071)	(0.105)	(0.353)	(0.099)	(0.083)	(0.110)
Instruments:								
Distance	0.000**				0.000			
	(0.000)				(0.000)			
PctNeighborTrad		0.551***				0.811***		
		(0.172)				(0.190)		
PctNeighborMod			0.506**				0.524**	
			(0.202)				(0.225)	
Constant	4.251***	0.516	0.097	-0.821	8.513***	-0.332	-0.102	-1.320
	(1.574)	(0.441)	(0.361)	(0.780)	(1.723)	(0.481)	(0.401)	(1.355)
Observations	123	123	123	123	111	111	111	111
R-squared	0.195	0.210	0.219	-0.856	0.305	0.242	0.212	-0.684

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

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06 November 2018

Dear Mr. Christian Genova,

On behalf of the National Institute of Nutrition of Vietnam, we are glad to receive your inquiry.

Regarding your request for the copyright permission for the National Nutrition Surveillance 2013 (Mother and child under 5) questionnaire of the NIN to conduct your survey in Lao Cai province in 2016, we hereby grant permission to you to use this material in your dissertation.

We wish you all the best with your Ph.D. candidature.

Best regards,

Le Danh Tuyen
Director
The National Institute of Nutrition