Food System Transformation in Indonesia: Factors Influencing Demand and Supply for Alternative Pest Management Farming Systems

by

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Abbreviations

ACIAR	Australian Centre for International Agricultural Research
AIC	Akaike Information Criteria
ANOVA	Analysis of Variance
APM	Alternative Pest Management
BIC	Bayesian Information Criteria
BMPs	Best Management Practices
BSE	Bovine Spongiform Encephalopathy
BW	Best Worst
BWS	Best Worst Scaling
COOL	Country of Origin Labelling
FFS	Farmer Field School
GAP	Good Agriculture Practices
GDP	Growth Domestic Products
GM	Genetic Modified
GMO	Genetic Modified Organism
HAACP	Hazard Analytical by Critical Control Point
HGV	Hydroponically Grown Vegetables
HPAI	Highly Pathogenic Avian Influenza
HS	Household Size
HSD	Honest Significance Difference
ICASEPS	Indonesian Center for Agricultural Socio Economic and Policy Studies
IFPRI	International Food Policy Research Institute
IMR	Inverse Mill's Ratio
IPM	Integrated Pest Management
IPM-FFS	Integrated Pest Management – Farmer Field School

LC	Latent Class
LR	Log-likelihood Ratio
NOP	National Organic Program
NRM	Natural Resource Management
OLS	Ordinary Least Squares
PATANAS	Panel Tani Nasional (National Farmers Panel Survey)
PSM	Propensity Score Matching
RT	Rukun Tetangga
RW	Rukun Warga
SA	Sustainable Agriculture
SAP	Sustainable Agriculture Practices
SD	Standard Deviation
SPF	Stochastic Production Frontier
TE	Technical Efficiency
TPC	Third Party Certification
UK	United Kingdom
US	United States
USDA	United States Department of Agriculture
WTP	Willingness To Pay

Abstract

In Indonesia, demand is growing for food with additional food safety and quality assurances, termed credence attributes. Indonesian food retailers are selling fresh fruits and vegetables labelled as organic and pesticide-free. Some of these claims are underpinned by retailer-mandated food standards, which include specific farming systems that can be verified and certified. If these private sector standards are set too high, smallholders may be excluded from food markets. Additionally, if claims are not certified by a reputable third-party then information asymmetry is an issue.

Little is known about the types of food certifications and claims most valued by Indonesian consumers. Chapter 2 addressed the gap in the literature on demand for credence attributes in Indonesia through analysis of data collected as part of a food consumption study of 1180 urban Indonesian households. In the study, consumers indicated their willingness-to-pay (WTP) for three certified food products. Consumers were on average, willing to pay 17 to 19 per cent more for certified organic horticultural products (chillies and mangoes). WTP data was analysed using a Cragg double-hurdle model. The empirical results suggest the target market for certified organic food products in Indonesia is higher educated females who live in higher incomes households and frequently shop in modern food retail outlets (supermarkets).

Higher food quality and safety requirements are likely to be a challenge for smallholder farmers in Indonesia. Thus, Chapters 3 to 5 provide insights on what can be done to create an "enabling environment" for smallholders. The analysis of survey data from 687 shallot-producing households (Chapter 3) found that conventional farmers are less educated, have fewer production and household

assets, have limited access to modern technology such as computers and the Internet, are more risk averse, and are less likely to join a farmers group. The prevailing attitude towards farmers groups lowers the probability that conventional farmers are exposed to new technologies. Shallot farmers adopting Alternative Pest Management (APM) practices made significant changes to production activities, in particular they used less chemical inputs.

The results of a Best-Worst Scaling analysis (Chapter 4) suggest that the most important attributes for the average Indonesian shallot farmer when considering a new crop or non-conventional farming system are related to relative economic advantage. A Latent Class Analysis identified three segments of producers with unique preferences for technology attributes. Clusters were characterised post-hoc using farmer and farm household characteristics, adoption behaviour, access to credit, participation in farmer groups and sources of production information. Unfortunately the analysis did not lead to a clear story on why preferences for technology attributes differed.

Finally, in Chapter 5, Stochastic Production Frontier (SPF) analysis found that conventional methods of producing shallots resulted in higher productivity compared to APM methods, with significant differences in the productivity of land, chemical pesticides, insect traps and labour. However, the yield loss associated with APM shallot farming systems was only than 1.5 per cent lower. Ultimately, the findings of the study suggest that training programs for smallholders on how to implement APM farming practices will result in improved yields for adopters.

Declaration

I, Wahida, 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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North Terrace Campus, 15 July 2015

Wahida

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