

# **Resettlement Migration: A Case Study in Dulan Tibetan and Mongolian Autonomous Prefecture of Qinghai Province, Western China**

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## **DEDICATION**

A special dedication for

My wife Yujing Qin

My mother Jing Zhang and father Lianshan Zhao

I am here because of you; your endless love and scarifices

To my family members, especially my uncle Peng Zhang

Who have been supporting me in many ways all these years

To my daughter, Zhihan Zhao

You come to light our life, give a whole new meaning to our lives

Daddy always loves you

## TABLE OF CONTENTS

DEDICATION .....	II
TABLE OF CONTENTS .....	III
LIST OF TABLES .....	X
LIST OF FIGURES .....	XI
LIST OF PLATES .....	XII
ABSTRACT.....	XIII
DECLARATION.....	XIV
ACKNOWLEDGEMENTS.....	XV
ABBREVAITONS AND ACRONYMS .....	XVI
Chapter 1 Introduction .....	1
1.1 Research Context.....	1
1.2 Objectives and research questions.....	5
1.3 The relationship between environmental deterioration and poverty .....	7
1.4 The relationship between environmental deterioration and migration.....	10
1.5 The type of environmental migration in Western China .....	11
1.5.1 Government-organised migration .....	13
1.5.2 Spontaneous Migration .....	15
1.6 The role of local government in the process of resettlement migration.....	16
1.7 Organisation of the thesis .....	18
Chapter 2 Literature Review and Background.....	21
2.1 Introduction .....	21
2.2 Conceptual Origins and Research on Environmental Migration.....	21
2.2.1 Defining Environmental Migration.....	24
2.2.2 Discriminating between the concepts used in Environmental Migration ....	27
2.2.3 The Classification of Environmental Migration .....	28
2.3 Environmental migration in western China.....	29

2.4 The background of environmental migration in western China.....	31
2.4.1 The ecological background of environmental migration in western China.	31
2.4.2 The Division of vulnerable environments in China.....	33
2.4.3 The socioeconomic background of environmental migration in western China.....	36
2.4.4 The cultural background of environmental migration in western China.....	47
2.5 The Theoretical Basis For The Environmental Migration project.....	48
2.6 The status and characteristics of environmental migration in western China.....	53
2.6.1 Overview of environmental migration in Western China.....	54
2.6.2 Characteristics of environmental migration in western China.....	56
2.7 The relationship among vulnerable environments, poverty and migration.....	59
2.8 Conclusion.....	63
Chapter 3 Methodology.....	65
3.1 Introduction.....	65
3.2 Research design.....	65
3.2.1 Basic Ideas.....	65
3.2.2 Data Collection.....	69
3.3 The Survey Background and Relevant Demographic Contexts.....	71
3.3.1 Survey Background and Implementation.....	71
3.3.2 Survey Design and Collaboration.....	73
3.3.3 Population Migration in the Xiangba Project.....	74
3.4 Data Collection Approaches.....	74
3.4.1 Questionnaire Design.....	75
3.4.2 Sampling Approach.....	77
3.4.3 Fieldwork.....	78
3.4.4 In-depth Interviews.....	82
3.4.5 Secondary Data: Census, Yearbooks, Policy documents.....	83

3.4.6 The Socio-demographic Characteristics of Respondents .....	85
3.5 The Main Content of the surveys/ interviews.....	86
3.6 Conclusion.....	92
Chapter 4 Why is it Necessary for People to Move: An Analysis of Out-migration Areas .....	93
4.1 Introduction .....	93
4.2 Profile of The Resettlement Migration Project .....	94
4.2.1 Overview of the Project .....	94
4.2.2 Background of the Xiangba Project.....	95
4.3 Background of the Project Area. ....	96
4.3.1 Main Source Areas of Migration .....	99
4.3.2 Main Reasons for Out-Migration from Ledu County .....	100
4.4 Migration Patterns .....	111
4.4.1 Reasons for migration .....	115
4.4.2 The Achievements of Migration .....	116
4.5 Constraints on Resettlement Migration.....	122
4.6 Conclusion.....	125
Chapter 5 The Experience of Resettlement migrants in Dulan County.....	127
5.1 Introduction .....	127
5.2 History of the Resettlement Project.....	127
5.3 The Profile of the Resettlement Area .....	128
5.4 Analysis of Survey Data .....	134
5.4.1 Survey Responses and Demographic Characteristics of Respondents .....	134
5.4.2 Migration Experience of Respondents.....	136
5.5 Analysis of the factors affecting migration .....	146
5.5.1 The Living situation of the entire Xiangba Town, Ledu county .....	147
5.5.2 Analysis of the factors affecting migrant resettlement .....	148

5.5.3 Overall analysis.....	148
5.6 The Analysis Process .....	149
5.6.1 Analytical method and background .....	149
5.6.2 The Formula's Evolution .....	151
5.6.3 Analysis of the Model.....	152
5.6.4 Factors influencing the resettlement of Xiangle residents .....	156
5.7 Conclusion.....	159
Chapter 6 Economic Adaptation and Government Support of Resettlement Migrants .....	162
6.1 Introduction .....	162
6.2 Migrant's Income Sources.....	163
6.2.1 Agricultural Income .....	163
6.2.2 Income from Industrial Sources .....	166
6.2.3 Courtyard Economy Income .....	166
6.2.4 Salaried Income .....	168
6.2.5 Income from capital and Donations .....	169
6.2.6 Government Compensation .....	169
6.3 Key Factors Affecting the Income of Resettlement Migrants .....	171
6.3.1 Institutional Factors .....	172
6.3.2 Social Factors.....	174
6.3.3 The Environment Factors.....	177
6.3.4 Economic Factors.....	177
6.4 Government compensation for resettlement migration .....	181
6.4.1 Previous studies on government compensation for resettlement migration .....	182
6.4.2 Resettlement Migration Compensation Methods.....	183
6.4.3 Measurement of the Quality of Public Services .....	184
6.4.4 Standardisation Treatment of Evaluation Indexes .....	185

6.4.5 Determination for the Weight of Comprehensive Evaluation .....	185
6.4.6 Evaluation and Calculation Method.....	186
6.5 Possible Approaches to Avoid Risks to Incomes in Resettlement Migration...	193
6.5.1 The Principles of Migration that is Development-oriented .....	194
6.5.2 The Ways to Restore Income .....	195
6.6 Conclusion.....	197
Chapter 7 Cultural Adaptation Risks after Migration .....	199
7.1 Introduction .....	199
7.2 The Inevitability of Cultural Change in Migration.....	199
7.2.1 Changes to migrant’s living environments will inevitably cause cultural change. ....	199
7.2.2 Changes in national culture will inevitably take place when migrants blend into their migration destinations .....	200
7.2.3 Acceleration of modernisation in minority areas will inevitably cause changes in national culture.....	201
7.3 Some Problems Generated by Cultural Changes in Resettlement Migration ..	202
7.3.1 Changes in national culture brings certain negative outcomes for the cultural development of each minority .....	202
7.3.2 Changes in religious behaviours of urban Tibetan migrants .....	203
7.3.3 Changes and innovation in daily rites.....	203
7.3.4 The orientation toward privacy and the transfer of special rites.....	205
7.3.5 Transition of culture identification with national culture and impacts on ethnic development .....	206
7.3.6 The transition process of national culture impacts the development of the migration process .....	209
7.4 Cultural adaptation in resettlement migration .....	209
7.4.1 The adaptation of the production mode .....	210
7.4.2 The adaptation to lifestyle.....	213

7.4.3 The adaptation of religious belief .....	214
7.4.4 The adaptation of "identity" .....	216
7.5 Countermeasures and solutions to problems generated by cultural change in the migrant process.....	218
7.5.1 Establish the concept of protecting the rights of minority cultures and value them in the migration process .....	218
7.5.2 Enlarge the subject range of participants and ensure the government, migrants and social organisations participate in the migration process.....	218
7.5.3 Reinforce laws, systems, supporting facilities, and policies to ensure the smooth implementation of migration.....	219
7.6 Conclusion.....	220
Chapter 8 Conclusion.....	222
8.1 Introduction .....	222
8.2 Major Findings .....	222
8.2.1 Reasons for Migration.....	222
8.2.2 Public Compensation for Migration.....	224
8.2.3 Economic Changes.....	225
8.2.4 Cultural Changes.....	226
8.2.5 The relationship between ecological degradation, poverty and migration	227
8.2.6 The government plays an important role in resettlement migration .....	228
8.3 Recommendations for Resettlement Migration Policies .....	229
8.3.1 Ensure population planning takes account of environmental carrying capability, as well as social and economic development.....	230
8.3.2 Incorporate environmental migration planning into national and local adaptation strategies.....	230
8.3.3 Improve the participation of the resettled migrant group in decision-making processes .....	231
8.3.4 Pay attention to fairness and efficiency in environmental migration decision-making.....	231



8.3.5 Protect national traditional culture.....	232
8.3.6 The government is the coordinator of interests in resettlement migration.	232
8.3.7 The government is responsible for resolving social conflicts in resettlement .....	233
8.4 Contributions of this Research .....	234
8.5 Limitations of this Study .....	235
8.6 Conclusion.....	236
Appendix.....	238
Appendix 1: Survey on climate change and adaptation in Dulan 2012.....	238
Appendix 2: Interview with the village officials on the impacts of climate change on migration of rural residents in Dulan .....	256
Appendix 3: Questions and coding of explanatory and control variables .....	259
<b>Appendix 3.1: Questions and coding of measures of household’s economic status in Dulan.....</b>	<b>259</b>
<b>Appendix 3.2: Questions and coding of measures of household’s social status in Dulan .....</b>	<b>261</b>
<b>Appendix 3.3: Questions and coding of measures of households’ cultural status in Dulan .....</b>	<b>263</b>
<b>Appendix 3.4: Questions and coding of measures of households’ symbolic status in Dulan.....</b>	<b>264</b>
<b>Appendix 3.5: Questions and coding of measures of household’s political status in Dulan.....</b>	<b>266</b>
<b>Appendix 3.6: Questions and coding of demographic factors that influence the impacts of climate change on households .....</b>	<b>267</b>
Appendix 4: The policies that consider inequality .....	269
References.....	279

## LIST OF TABLES

Table 1.1 Environment-related migration in five provinces and autonomous regions of western China .....	14
Table 1.2 Spontaneous migration and government-arranged migration.....	16
Table 2.1 Vulnerable environment indexes in China.....	35
Table 2.2 Distribution Areas of Impoverished Counties in Western China and Characteristics of Ecological Environment.....	45
Table 3.1 Data collection and method.....	65
Table 3.2 Summary of the questionnaire content.....	71
Table 4.1 Xiangba Migration Project Statistics.....	98
Table 4.2 Temperature, Precipitation, and Sunshine Time Comparison.....	102
Table 4.3 Industrial Value for Companies Based in the County.....	106
Table 4.4 Main Social Economic Figures of Ledu County in 2002.....	108
Table 4.5 Population and Nationalities in Lednty.....	118
Table 5.1 Ethnic Backgrounds of Survey Respondents.....	136
Table 5.2 Educational Background of Survey Respondents.....	142
Table 5.3 Issues of Concern to Respondents (Multiple Response).....	142
Table 5.4 Expectations of Respondents (Multiple Response).....	142
Table 5.5 Xiangle Country Migration motivation by age of respondent.....	154
Table 5.6 Migration motivation by education level of respondents.....	155
Table 5.7 Migration motivation and ethnic composition.....	156
Table 6.1 Occupation Type of Family Members.....	163
Table 6.2 Labour Output and Income Records of Main Years in Qinghai Haixi Area.....	169
Table 6.3 Public Service Comprehensive Evaluation Indices Qi (W) in Government, Prefecture and County Levels in Surveyed Areas.....	190
Table 6.4 Annual Per Capita Total Expenditures (Yuan) Ci for Public Services in Province, Prefecture and County Levels in Surveyed Areas.....	192
Table 6.5 Per Capita Expenditures Vi/Yuan for Unit Public Service on Province, Prefecture and County Levels in Surveyed Areas.....	193

## LIST OF FIGURES

Figure 1.1 A Vicious Circle of Ecological Friability and Poverty.....	10
Figure 2.1 Distribution of ecologically vulnerable areas in China.....	24
Figure 2.2 Distribution of poor counties in China.....	41
Figure 2.3 Map of China's ecologically vulnerable areas and poor counties.....	43
Figure 3.1 Research Design.....	63
Figure 3.2 Age Distribution of Survey Respondents.....	85
Figure 3.3 Level of Education of Survey Respondents.....	86
Figure 3.4 Suitable financial and technical mechanisms, a policy system and an institutional framework.....	88
Figure 4.1 Geographical Features of Ledu County.....	103
Figure 4.2 Resettlement from 2002-2005.....	146
Figure 4.3 Resettlement from 2006-2011.....	116
Figure 5.1 Dulan County Location.....	129
Figure 5.2 Xiangride Farm Location.....	132
Figure 5.3 Factors influencing resettlement migration.....	149
Figure 6.1 Respondents' Household Annual Income from Agriculture, 2007-2011..	164
Figure 6.2 Respondents Social Security Access.....	171

## LIST OF PLATES

Plate 4.1 Ledu County geomorphic features .....	101
Plate 4.2 Ledu County geomorphic features 2.....	102
Plate 4.3 Local children after school on the way back to home in Ledu County.....	105
Plate 4.4 The main income is sheep graze in Ledu County.....	108
Plate 4.5 The status of Ledu County in 2012 after migration.....	124
Plate 5.1 The main Entrance of Xiangride town.....	131
Plate 5.2 The Xiangride River.....	133
Plate 5.3 Farmland in Xiangride County.....	134
Plate 5.4 Interview by Qinghai normal university student 1.....	141
Plate 5.5 Interview by Qinghai normal university student 2.....	144
Plate 5.6 Cordyceps harvest in Xiangride County.....	144
Plate 6.1 Farmers harvesting in Xiangride County.....	165
Plate 6.2 An Interviewee's Courtyard for breeding sheep in Xiangride County.....	166
Plate 6.3 Interviewee's livestock farm in Xiangride County.....	174
Plate 6.4 High quality farmland in Xiangride County.....	180
Plate 7.1 Local Religious Assembly.....	205
Plate 7.2 The local Holy Mountain.....	209
Plate 7.3 Interviewees' farm for barley.....	213
Plate 7.4 New resettlement migrant house.....	215
Plate 7.5 Local Buddhist Ceremony.....	217
Plate 7.6 The Sacrificial desk in an interviewee's house.....	219

## **ABSTRACT**

Western China is an area which has experienced some of the most serious natural disasters in the world, as it is frequently hit by abnormal and widespread environmental disasters, which has led to increased poverty among its population. This research examines the relationship between environmental deterioration, poverty and resettlement migration. The study focuses on the region of the Qinghai-Tibet Plateau in western China which is inhabited by one of the largest minority cultures in China, specifically the Tibetans. These minorities tend to live in regions that are typical areas of ecological degradation and economic backwardness.

Resettlement migration has been one of the adaptation mechanisms instigated by government to combat environmental degradation and reduce poverty. Two case studies were selected in Qinghai Province, Ledu County as an out-migration area and Dulan County as an in-migration area. A mixed methods approach was used which employed a survey questionnaire and in-depth interviews. Data provided by local government in relation to resettlement migration in both areas of origin and destination, were invaluable to establish the role and function of Government.

In the Qinghai migration area, the survey found that migrants move out of their former place of residence due to poor natural environments and favourable policy conditions. The survey identified some outstanding problems among the migrants, including their changed livelihood and incomes after migration, cultural changes and the adaptation of minorities in the migration process. The economic situation of migrants changed significantly after migration, indicating that the economic recovery of migrant families was largely influenced by their social and economic characteristics. In some settings it was found that the lives of migrants were still impoverished after migration and that many of them failed to adapt to new technologies associated with changed agricultural pursuits. However, overall, this research found that the resettlement migration project in Qinghai province was a good solution to improve the lives of poor rural populations and to promote environmental recovery. Finally, the study proposes possible risk aversion approaches and relevant policies in relation to government subsidies and compensation.

## 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.

I give permission for the digital version of my thesis to be made available on the web, via the University's digital research repository, the Library Search and also through web search engines, unless permission has been granted by the University to restrict access for a period of time. I acknowledge the support I have received for my research through the provision of an Australian Government Research Training Program Scholarship.

Signed

-

Date: 20/07/2020

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APMRC	Australian Population and Migration Research Centre (the University of Adelaide)
ARC	Australian Research Council
BBC	British Broadcasting Corporation
CASMIN	Comparative Analysis of Social Mobility in Industrial Societies
CCPCC	Central Committee of Communist Party of China
CNKI	China National Knowledge Infrastructure
CPAD	The State Council Leading Group Office of Poverty Alleviation and Development (China)
CPC	Communist Party of China
CPG	the Central People's Government (China)
DOEQP	Department of Education, Qinghai Province
ECCNARCC	Editorial Commission of China's National Assessment Report on Climate Change
EDPs	Environmentally Displaced Persons
EFZs	Ecological Fragile Zones
GDP	Gross Domestic Product
GOLCG	General Office of Ledu County Government
GODCG	General Office of Dulan County Government
GOPGQP	General Office of People's Government of Qinghai Province
GOSC	General Office of State Council (China)
HH	Household
HRS	Household Responsibility System
IMARG	Inner Mongolia Autonomous Region Government
ITARG	Inner Tibetan Autonomous Region Government
IMO	International Organisation for Migration
IPCC	the International Panel on Climate Change
ISDR	International Strategy for Disaster Reduction (the United Nations)
MARC	Model of Migration Adaptation to Rainfall Change
LCG	Ledu County Government



LCPC	Ledu County Party Committee
DCG	Dulan County Government
DCPC	Dulan County Party Committee
MEP	Ministry of Environmental Protection (China)
MLogit	Multinomial Logit
MLR	Ministry of Land and Resources (China)
MOE	Ministry of Education (China)
MWR	Ministry of Water Resources (China)
NBS	National Bureau of Statistics (China)
NDRC	National Development and Reform Commission
NGO	Non-Governmental Organisation
OLS	Ordinary Least Squares
PGQP	People's Government of Qinghai Province
PPS	Probability Proportionate to Size
SC	State Council (China)
SCQPC	Standing Committee of Qinghai People's Congress
SCOLGWRD	the State Council Office of the Leading Group for Western Region Development
SEAC	State Ethnic Affairs Commission (China)
SPG	Shaanxi Province Government
SUR	Seemingly Unrelated Regression
TPA	the Theory of Planned Behaviour
UNEP	United Nations Environment Programme
UNESCAP	the United Nations Economic and Social Commission for Asia and the Pacific
UNFCCC	the United Nations Framework Convention on Climate Change
UNFPA	the United Nations Population Fund
UNHCR	United Nations High Commissioner for Refugees
WCDLO	West China Development Leadership Office of the State Council of China

# Chapter 1 Introduction

## 1.1 Research Context

The objective of this research is to analyse the complicated relationship between environmental deterioration, poverty and resettlement migration in western China based on a case study about resettlement migration project. The research focuses on Ledu County as an out-migration region and Dulan County, located in Qinghai Tibetan Autonomous Prefecture, as an area of in-migration. The study focuses on rural areas in western China because this region has been identified as a hotspot, where ecological vulnerability will have its greatest effect on migration (Bardsley and Hugo 2010). The study area has also been experiencing extreme poverty and ethnic conflict. This research combines existing methods with scenarios that determine the relationship between environmental deterioration, poverty and resettlement migration. Specifically, this research aims to investigate human mobility options and to make recommendations for policymakers in the context of a rapidly deteriorating environment. At an institutional level, the study examines multilateral, infrastructural and financial factors that are important drivers of human migration and mobility, as well as the role played by government. This research seeks to generate an understanding of the mediating role that national and local institutions can play in the process of policy formulation in response to environment degradation and poverty.

Western China is an area which has experienced some of the most serious natural disasters in the world, as it is frequently hit by abnormal and widespread environmental disasters (Jin *et al.* 2008). Widespread, harsh climatic conditions have led to increased poverty among its population, which has become a problem that cannot be ignored. Frequent extreme environmental disasters have increased poverty among population living in rural areas, enormously damaging their production, livelihoods, and economic and their social development (Li *et al.* 2013). Unfavourable

environmental conditions have driven the resettlement of population in rural areas in western China, which is one of the adaptation mechanisms instigated by government to combat environmental degradation (Shen and Huang 2003). The Chinese government previously had strategies to alleviate poverty among populations in rural areas stricken by environmental disasters: returning farmland to forest; direct subsidies; carrying out poverty alleviation; and environmental management projects, which were all aimed at improving the ability of families and communities to cope with environmental deterioration. Policies have now shifted to favouring resettlement of poor populations from rural areas stricken by climatic disasters (Wang and Fan 2006). Therefore, it is now better to organise large-scale population migration systematically and to have it directed step by step.

Along with global ecological and environmental deterioration, the conflict between ensuring the survival of populations and the sustainable productive capacity' of the land has been intensifying (Wang and Gao 2008). Over the last decade or so, ecological migration has become an important issue requiring research. China has an exceptionally large population, but low levels of resources per capita. Most importantly, there is an imbalance in the distribution of population and resources (Wang and Fan 2006). This intensifies ecological and environmental deterioration, which is especially pronounced in the western area. In order to solve poverty in areas with scarce resources in the early part of the 21<sup>st</sup> century, China implemented ecological migration, centred on remote relocation, hoping to eliminate poverty, while at the same time improving and preserving the environment. The policy of remote poverty alleviation and relocation has been an important measure for poverty alleviation and environmental preservation in western China. It has been estimated from statistical data that ecological migration has involved up to 10 million persons in western China in the early 21<sup>st</sup> century ( Wan and Yuan 2009).

Previous studies on alleviation of ecological poverty and relocation have focused on

Ningxia and inner Mongolia. This prior research considered the definition of ecological migration, the resettlement mode of inhabitants, the necessity of migration, the feasibility and effectiveness of migration, the transformation of traditional lifestyles by ecological migration, and problems in the migration process and their solutions (Wei and Yu 2009). The region of the Qinghai-Tibet Plateau is an area inhabited by one of the largest minority cultures in China, specifically the Tibetan. The proportion of Tibetans among the whole province of Qinghai is close to 40 percent (Cheng 2006). These minorities tend to live in regions that have fragile ecologies environments which have limited potential for economic development. They have long-term practices sustaining production and their livelihoods and have their own unique culture and traditions (Liao 2007). Migration impacts on their traditional habits, which have been followed for many years, resulting in a fundamental transformation of production and lifestyle, and this often changes their culture (Scudder 2012). Changes in the culture of minority groups who have migrated reveal the cultural adaptation issues faced by them which is a key issue in evaluating ecological migration among them. Given the recent acceleration of migration among minorities, there is a need to conduct a comprehensive and in-depth study on the issue of cultural change.

It can be argued that the government should strengthen the governance, supervision and evaluation of population migration policies and projects to reduce the negative effects brought about by large-scale population migration. Given that the relocation of poor populations in rural areas stricken by environmental disasters is happening in many settings, this problem is both a regional and a global problem (Xu and Ma 2009). In China, most poor populations live in rural areas, so it is imperative to solve this problem. Research is needed to develop migration policies that can provide a better theoretical basis and outline feasible measures for improving population migration in China.

Xun and Bao (2007) have found that deterioration of the environment in ecologically vulnerable areas will exacerbate poverty both directly and indirectly. The populations in vast impoverished rural areas stricken by ecological and natural disasters have limited resilience, leading to a vicious cycle of harsh environmental conditions and poverty (Xun and Bao 2007). Therefore, this study looks at rural areas afflicted by environmental disasters as examples of this cycle. Under the guidance of theories of environmental deterioration and population migration and distribution, there is a consensus on population migration modes in rural areas, large-scale relocation and rational distribution of populations. This consensus is based on the causes and consequences of poverty in areas affected by environmental change, as well as the production methods, livelihood and distribution of rural populations experiencing poverty. Based on these theories, the study focuses upon population migration strategy, relocation planning and policy.

The research combines demography, sociology, politics, ecology, population resource and economics theory, theories of comparative advantage, and a theory of sustainable development as a framework to solve problems related to the migration of impoverished populations. This research combines the analytic hierarchy process, principal component analysis, and index analysis that examines the relationship between ecological fragility, poverty, and migration to allow empirical analysis of resettlement migration.

The research selected Dulan County and Ledu County in Qinghai Province as case-studies to investigate migration, the experience of resettled households and officials involved in areas of out-migration and in-migration, using both in-depth interviews and survey questionnaires. Moreover, the research, combined with data provided by local government on the influence of migration on production and livelihoods, allows an evaluation of their current production and lifestyles, and the expectations of the government.

The study analysed factors driving migration, and populations were classified by age, gender, education, culture and ethnicity, to examine the influences on migration. The analysis basically found that migrants move out of their current place of residence due to poor natural environments, and favourable policy conditions.

It was found that migration issues are complex and exceedingly difficult to quantify. By combining research data with a relevant economic model, this study used the public compensation analysis model. Based on survey data, this research analysed differences in the quality of public services between resettlement areas, states and provinces, as well as changes in the cost of public services, and sought to quantify public compensation. In relation to public compensation services, there were marked variations between resettlement areas in different states and provinces. This research provides some benchmarks for migration compensation and offers some recommendations for compensation management at different government levels, in order to improve the resettlement migration process for those who have been resettled.

The research identified some significant problems among the resettled migrants, including their incomes after migration, cultural changes and the adaptation of minorities in the migration process. The research analysed the main sources of income and livelihoods of migrants as indicated in the household survey. Finally, the study proposes possible risk aversion approaches, and relevant policies. The research outlines the cultural changes occurring among minorities during the migration process and discusses some of the problems they generate, and it suggests countermeasures to resolve them.

## **1.2 Objectives and research questions**

The overarching objective of this study is to provide an insight into the complex relationship between environmental deterioration, poverty and migration at both

community and household levels in rural settings that are hotspots of environmental deterioration that have become targeted by government as resettlement areas. In pursuit of this purpose, the study has some specific objectives:

- To outline the present situation and the factors influencing it, including its problems and the living conditions of migrants in areas afflicted by environmental change.
- To examine the drivers of resettlement migration and to explore the effect of migration on ecological rehabilitation and poverty reduction in out-migration and in-migration areas.
- To explore the adaptability of migrants after resettlement and evaluate the incomes and livelihoods of migrants after relocation.
- To assess the social and cultural adaptation of ethnic minorities in their relocated settings.
- To investigate the role of government in the migration process, including early-stage policy making, overall management of the migration process and placement problems after migration.

To achieve these objectives the following research questions will be addressed:

- What are the main reasons that migrants take up the option to resettle? And what extent does environmental deterioration and poverty influence their migration decisions?
- What are the main linkages between ecological environmental deterioration, poverty, and resettlement migration both in out-migration and in-migration areas?
- What are the main factors impacting migrant incomes and livelihoods, and the adequacy of government compensation for resettlement migration?

- What are the problems generated by cultural change occurring in resettlement migration areas?
- What is the function and role of the government in managing the resettlement migration process?

### **1.3 The relationship between environmental deterioration and poverty**

Western China is one of the country's most poverty-stricken areas and is faced with numerous challenges, such as ecological and environmental deterioration, scarce water resources and socioeconomic development that is lagging behind the rest of the country (Xu 2009). In general, western China is an area with a large degree of poverty. In 2010, China had 26.88 million impoverished people, with two thirds of them living in the western area. Moreover, the average incidence of poverty in China was 2.8 percent, while that of the western area was as high as 8.3 percent, which is not only higher than the Chinese average but almost 17 times that of the eastern area (OXFAM 2015). Although the poverty-stricken, western area has been developed to some extent, the income gap between it and the east midland area has continued to increase. The distribution of impoverished people has been increasingly concentrated in the western area. The proportion of China's impoverished people living in the western area was 48 percent in 1998 which had increased to 65.9 percent by 2010 (IOM 2010, 25-27).

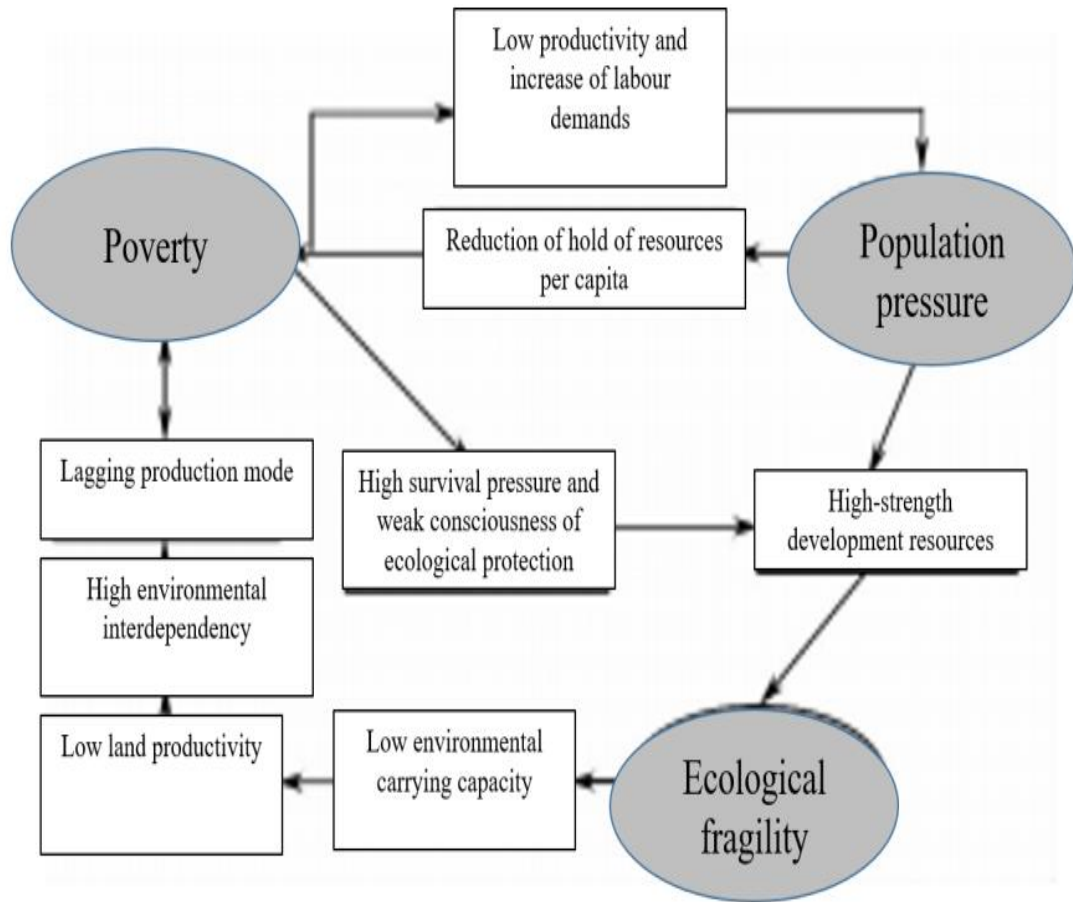
The causes of increasing poverty in western China are complicated, including geography, social history, and the integration of internal and external influences. However, poverty in the Western China area is closely related to the fragile environment. With the reduction of impoverished people, environment is becoming increasingly important as a cause of the region's poverty (Zhu 2010). Impoverished



people in China are overrepresented in these remote areas, which have poor environments, shortages of natural resources, and remote locations. Thus, anti-poverty development within China and ecological construction substantially overlap. Meanwhile, poverty further intensifies environmental deterioration. If local people cannot overcome poverty, it is impossible to eliminate excessive development, or even destruction of the environment (Li *et al.* 2012). It is difficult for ecological protection and government policy, or anti-poverty policy, to realise a virtuous circle of ecosystem sustainability and sustainable anti-poverty measures among impoverished people.

The coupling of environmental degradation and poverty in western China is the product of the fragile environment, which further intensifies ecological friability. Only simple production techniques are used to develop water, land, forests and grasslands, because of ecological friability, poor production conditions, lower carrying capacity, resulting in the interdependency of the region's poverty on the environment and lagging production mode. These can easily be developed to some extent, but difficulties arise in their further development (Yu *et al.* 2011). The relative underdevelopment of the economy and of commodity production will inevitably result in poverty. Lower productivity requires more demand for labour; thus population pressure is continuously increasing. Therefore, more people excessively develop and use natural resources, resulting in ecological degradation which can lead to desertification or destruction of the ecosystem. In this way, the quality of land available for survival is deteriorating and output is reducing, intensifying poverty (Xu and Ju 2009). Under these circumstances, poverty and ecological fragility are caught in a vicious circle. The occurrence of poverty in western China is highly correlated with the degree of poverty and the local environment.

**Figure 1.1 A Vicious Circle of Ecological Friability and Poverty**



Source: Author's Own Construct adapted from Yu *et al.* (2011)

According to **Figure 1.1**, poverty reduction can be seen to start with the environment. The combination of environmental conditions and poverty reduction should be reinforced. Poverty alleviation and environmental action should be jointly implemented to achieve the “win-win” goal of improving the environment in poverty-stricken areas as well as alleviating poverty among impoverished people (Hu *et al.* 2006). Xun and Bao (2007) argue that in recent years, many scholars have proposed the concept of ecological poverty alleviation from different perspectives. These have been based on some case studies in areas exploring the relationship between ecological construction and regional agriculture industrialisation, the influence of ecological disaster on the livelihoods of agro-pastoralists, and the functioning of ecological services in poverty-stricken areas. In this study, the focus is upon the

relationship between poverty and environment in the western area, and ecological poverty alleviation and relocation in the Tibetan area.

## **1.4 The relationship between environmental deterioration and migration**

The relationship between environmental deterioration and migration has been rightly defined as ‘complex and unpredictable’ (Brown 2008). The most frequently cited figures predict that by 2050 there could be as many as 200 million ‘environmental refugees’; people forced to move out of their original places because of environmental degradation (Myers 2002, Stern 2007). It is likely that both extreme weather events (storms, floods, heat waves) and slow changes in mean temperatures, precipitation and sea-levels will in many cases, contribute to increasing levels of mobility (McLeman and Hunter 2011). Liang *et al.* (2005) argue that there are inherent difficulties in precisely predicting how environmental deterioration will impact on population distribution and movement. This is partly because of the relatively high levels of uncertainty about the specific effects of climate change, and partly because of the lack of comprehensive data on migration flows, especially movements within national boundaries, and, more specifically, for low-income countries, which are likely to be most affected by environmental deterioration (Dun and Gemenne 2008). In many cases, mobility not only increases resilience but enables individuals and households to accumulate assets. As such, it will probably play an increasingly crucial role in adaptation to climate change. Policies that support and accommodate mobility and migration are important for both adaptation and the achievement of broader development goals.

The connection between environmental deterioration and migration is assumed to be

obvious in some circumstances, e.g., people will be forced to migrate if severe drought occurs (El-Hinnawi 1985), if land is degraded (Loneragan 1998), or if sea levels rise (Myers 2002). However, Castles (2002) argues that the linkages between the two have not been explicitly demonstrated but have rather been derived from ‘common sense’. Most classical theories of migration are focused on economic and social factors, with environmental factors rarely mentioned. Cheng (2006) points out that most theories of environmental governance have not incorporated standard theories and explanations of migration, therefore, bridging this gap should be the priority agenda of research in this field.

In recent years, there have been different views on the relationship between environmental factors and population migration. Some scholars hold that the environment is only one factor affecting population migration, while others believe that environmental factors directly lead to it (McLeman and Hunter 2011). Therefore, the concept of “environmental migration” is polarising. In China, the definition and practical application of the concept of "environmental migration" is not entirely consistent with ones held by western scholars. Population migration in western China cannot be simply explained and summarised by adopting international practice, because much of the migration is under the guidance and leadership of government organisations and associated with large scale resettlement policy and planning implemented by the government.

## **1.5 The type of environmental migration in Western China**

Hugo *et al.* (2009) point out that in recent decades, China has been experiencing unprecedented environmental deterioration, exacerbating the already serious adverse impacts of environmental problems on its economy and society. Western China is especially vulnerable to environmental deterioration and has thus been identified as

one of the hotspots where environmental deterioration will have its greatest impacts. This is because it includes five of the seven ecologically fragile zones of China, and over 69 percent of its population have been classified as absolutely poor (Du 2000, Bardsley and Hugo 2010). Moreover, Hugo *et al.* (2009) argue that in western China, environmental deterioration will increase the risk of drought, desertification, land degradation, water shortages, and decrease agricultural production. These factors will add to forces already significantly influencing environmental migration within this region.

The migration of rural populations living in poor environmental conditions is one of the adaptation mechanisms to overcome the consequences of environmental deterioration. Natural disasters are another “impetus” for migration, and these are expected to increase with more extreme climate events. Populations living in areas unsuitable for human survival and development are increasingly relocating; therefore, the dual goals of poverty elimination and ecological improvement can be realised. This is also a major reason for the national-level implementation of migration. At present, rural environmental deterioration induced migration has been mostly concentrated in areas of China, such as Ningxia, Gansu, Shaanxi and Qinghai. Environmental deterioration induced migration in China has mainly focused on government-led migration initiatives, in combination with small-scale voluntary migration (Muggah 2003). In order to relieve pressure on the environment, to rehabilitate deteriorating ecosystems and to eradicate poverty, people in western China have been undertaking environmental migration, which has tended to be both spontaneous and government-sponsored (Bao 2006). Although environmental migration in China is largely organised by the government (Cui 2007), many people have spontaneously migrated from ecologically fragile areas in western China (Li and Wei 2005, Tan *et al.* 2010).

### **1.5.1 Government-organised migration**

Environmental migrants in western China, who have been involved in government-organised migration, comprise three groups. Firstly, people who live in areas where a deteriorating environment and poverty co-exist; secondly, people living in water conservation districts, natural reserves and ecologically fragile zones; and, thirdly, people who live in an area that is subject to frequent and severe geologic and natural hazards (Tan and Guo 2008).

In 1983, a policy of resettlement migration was initiated to reduce environment-related poverty in some of the poorest areas of western China, such as the Dingxi prefecture, the Hexi district of Gansu, and the Xi-Hai-Gu district of Ningxia. In 2001, four western provinces/autonomous regions (Ningxia, Yunnan, Guizhou and Inner Mongolia) were selected by the State Council as the first of the pilot schemes encompassing environment-related displacement and resettlement programs. Since 2003, these programs and resettlement have been carried out in 13 Chinese provinces. **Table 1.1** provides details of government-organised environment-related migration programs implemented, or planned, in the five provinces and autonomous regions of western China that have witnessed the most massive environmental migration in the country.

**Table 1.1 Environment-related migration in five provinces and autonomous regions of western China**

<b>Province</b>	<b>Time</b>	<b>Program</b>	<b>Migrants</b>
Ningxia	1983-2000	Diaozhuang migration	345,000
	2001-2006	Off-site environmental migration	194,000
	2007-2011	Environmental migration in the dry zone of central Ningxia	207,000
	2011-2015	Environmental migration in the dry zone of central and southern Ningxia	346,000
Gansu	1983-2006	Anti-poverty migration in the 53 impoverished counties in ecologically fragile zones	649,000
	2001-2005	Off-site environmental migration	65,000
	2006-2010	Anti-poverty and environmental migration	353,000
	2013-2018	Anti-poverty and environmental migration	1,120,000
Shaanxi	2010-2020	Anti-poverty and environmental migration	2,400,000
Qinghai	2000-2010	Three River Sources ecological migration	103,000
	2011-2015	Anti-poverty and environmental migration	100,000
Inner Mongolia	1998-2000	The first round of environmental migration	6,000
Mongolia	2001-2005	Environmental migration	650,000
	2006-2010	Anti-poverty and environmental migration	304,000
	2011-2017	Anti-poverty and environmental migration	367,000

Source: Xinhuanet (2011); SPG (2011);CPG (2012); IMARG (2012); GPC (2014)

In 2002, ‘environmental migration’ was regarded as part of the central government’s policy. The State Council issued a document, ‘*Some Suggestions about Further Improving Reforestation Policy and Its Implementations*’ (SC 2002). It stated that ‘environmental migration’ would be incorporated into national environmental schemes, aiming to promote the rehabilitation of the natural environment. Moreover, ‘environmental migrants’ would be provided with financial subsidies for the purpose of re-establishing their livelihoods and alleviating poverty. Hugo *et al.* (2009:105)

indicate that there are three major financial sources to assist environmental migration in China: (1) the nation's 'aid-the-poor' and 'work-relief' funds; (2) the nation's environmental protection funding, and (3) the government's 'National Bond for West China Development' (3-5 billion Yuan per annum). With this institutional and financial support, western China has carried out many large-scale environmental migration programs since then as indicated in **Table 1.1**.

### **1.5.2 Spontaneous Migration**

Despite the fact that large scale environmental migration is usually carried out on a government-sponsored basis, and is largely involuntary, many people have also spontaneously migrated from ecologically fragile areas in western China prior to and after the implementation of the governmental sponsored migration programs (Li and Wei 2005). These spontaneous migration flows are largely due to the uneven distribution of economic development between the western and eastern parts of China. The underdeveloped economic conditions in western China are partly caused by its fragile natural environment, such that poverty in the region can, in many circumstances, be considered 'ecological poverty' (Chen 2003). From this perspective, spontaneous migration that aims to escape poverty cannot be completely separated from the phenomenon of migration associated with environmental problems. **Table 1.2** summarises some distinctions between spontaneous migration and government-arranged migration. Although both aim to protect the environment and achieve economic development, spontaneous migrants receive little assistance from the government, but rely heavily upon their private social networks, while government-arranged migrants are provided with comprehensive support: housing; agricultural production; off-farm employment; and entitlements to social welfare.



**Table 1.2 Spontaneous and government-arranged migration**

	<b>Spontaneous migration</b>	<b>Government-arranged migration</b>
<b>Reason</b>	Environmental/climate change Poverty	Environmental/climate change Poverty Ecological rehabilitation and environment protection Construction projects
<b>Main migration channel</b>	Relatives and friends	Government and government-authorized companies
<b>Resettlement</b>	Dispersed	Centralised
<b>Support</b>	One-off subsidy No support at all in some places	Subsidy Housing Production and employment Household registration

Source: Xinhuanet (2011); SPG (2011); CPG (2012); IMARG (2012); GPC (2014)

## **1.6 The role of local government in the process of resettlement migration**

The project of resettlement migration in Xiangride, Qinghai Province, is organised and guided by the local government. Their policies, materials and funds help voluntary relocation of impoverished people living in poor natural conditions to areas with better production and living conditions. The migrants in this project are participating voluntarily, but the process is still organised, planned and financed by the government. Therefore, in the whole process of migration, the local government has responsibility for the process. Its role is important for several reasons. Firstly, the local government drew on the lessons from the experience of different regions in formulating its early migration policy, and it paid attention to the adaptation of

migrants. In the process of formulating migration projects, the government invited a large number of experts, scholars and engineering technicians, familiar with sociology, migration sociology and anthropology, to participate in the formulation and implementation of migration policies. Secondly, the local government has actively promulgated policies and regulations on migration and has unified and standardised all forms of migration policies in the region. This standardisation has helped avoid the policy of ‘artificial’ migration that is not responsive to time and regional differences. Thirdly, in the process of policy formulation and implementation, the government established an information exchange mechanism, the “government-migrants” channel, and increased the effective participation of migrants in the policy-making process. Fourthly, the government has implemented various training colleges to improve the professional skills of migrants. At the same time, the government required employers and enterprises receiving migrants to give priority to job-skills training for migrants, so that they could adapt to new jobs as soon as possible, and create value and wealth for these enterprises and for society, while also improving their income levels.

Through investigation of the migrants in Qinghai, the local government hopes to integrate poverty alleviation, development and ecological restoration to achieve poverty alleviation and prosperity. Therefore, in the practice of migration projects, the participants not only pursue the common goal of “development”, but also satisfy demands arising from different interests (Fei 2016). Jia (2012) argues that the interests of the government and the migrant groups are different; the interests of positive migrants and negative migrants are different; and different ethnic groups also have diverse requirements. Therefore, the role of the government is particularly important, given the differences among migrants in different places. Guan (2012) argues that the government has intervened in rural society through the project of poverty alleviation, breaking its “pure” structural order, and, to a certain extent, promoting the development of rural society, which makes the migration process more efficient, and facilitates more efficient decision-making. Secondly, through the system logic of

“pressure mobilisation”, lower levels of government are made more efficient in carrying out the migration tasks arranged by the higher government. Because of the pressure from higher levels of government resettlement is carried out more efficiently. Therefore, top-down and efficient migration is smoothly carried out (Fei 2016). Third, the government and farmers have more interaction and exchanges because of the relocation. Migrant groups, under the influence of “survival rationality”, constantly appeal to the government for help with their own problems, resulting in the continuous adjustment of migration policy by the government, which has been operating in the sphere of “political rationality” (Chen 2012). In the process of solving different conflicts and compromises, the final migration policy can basically guarantee the interests of most migrants. As a result, the whole migration process can be more smoothly carried out. Fourthly, the sustainable development and effective governance of migrant groups in the migrant areas are the focus of ecological migration, which are also the key to the success of migrants in different places (Jia 2012). Forms of direct and indirect compensation that migrants can smoothly pass through the early adaptation stage following relocation. Through direct cash subsidies, the government first guarantees the basic livelihood of new migrants. Then, by providing a variety of skills training, job assistance, and agricultural assistance, the government ensures that migrants can have sustainable lives in their new settings. Therefore, the government has played a decisive role in the whole process of relocation (Chen 2012). In addition, the government's policy formulation, capacity for action, and subsequent resettlement work directly determine the success of the migration project, as well as the quality of the entire migration process.

## **1.7 Organisation of the thesis**

This thesis consists of eight chapters. Chapter 1 outlines the research context, introduces the key concepts that inform the rest of the study, identifies the research

questions, and provides the background to environmental migration in western China.

Chapter 2 is an overview of current literature on the environmental deterioration, poverty and migration nexus and its relationships. This chapter contributes to identifying research gaps that exist in current studies regarding the relationship between environmental deterioration and migration and it establishes the conceptual framework of this study by integrating other theories into current environmental deterioration-migration theory. The key issues are outlined in a framework that conceptualises the relationship between environmental deterioration, poverty and migration. This chapter focuses on describing the background of implementing environmental migration in Western China, the causes of the vulnerable ecological environments in those regions, and division of the distribution areas with vulnerable ecological environment

Chapter 3 begins with a brief discussion of the epistemological and philosophical bases of the study, followed by the justification for choosing a mixed methods approach. The research design is then detailed. Specific quantitative and qualitative methods used to collect and analyse data are also discussed. A discussion of the experience gained, and the lessons learnt from the fieldwork then follows. The chapter concludes with the innovations and the limitations of this study's research methods.

Chapter 4 focuses upon the reasons for migration out of the survey area; specifically, Ledu Area, in Qinghai province, China. The analyse of fieldwork survey data established that local migration from the area was mainly caused by environmental deterioration that influenced their living conditions, and finally, caused the poverty of local residents who could not live a normal life any longer.

Chapter 5 examines factors which influence migration to in-migration areas in western areas with minority populations. Field survey data obtained from Dulan of

Qinghai province in 2012 were used for analysis. Typical characteristics such as age, degree of education and nationality were selected. It was concluded in the analysis that it is necessary to solve migrant resettlement problems and establish an environmental migration compensation mechanism to improve resettlement. In this way, migrants can successfully move out to undertake resettlement.

Chapter 6 outlines the economic adaptation of migrants after resettlement. There are many risks that are analysed and addressed here. Firstly, the major sources of income for migrants such as: revenue from agricultural or industrial products; income earned in the garden economy; income from wages; capital income, and donated income. Ways of avoiding income risk are discussed. This chapter also analyses the role of compensation mechanisms in resettlement migration.

Chapter 7 discusses the cultural adaptation of migrants after resettlement, and the inevitability of cultural change in the process of migration within ethnic minority areas and the problems that arise from these cultural changes. Finally, this chapter debates countermeasures and suggests means of solving the problems of encountered by migrants

Chapter 8 concludes the thesis by summarising its major findings, discussing their implications for migration and resettlement migration policies, considering the contribution to environment-migration theory, assessing any limitations of this study, and providing some future research directions.

## **Chapter 2 Literature Review and Background**

### **2.1 Introduction**

This chapter examines theoretical explanations of population migration in areas with vulnerable environments. It begins by defining the variations in environmental migration and the differences between three kinds of migration. The causes of environmental migration, and the primary theoretical bases explaining it, are then examined. This chapter also summarises the main models and theories related to migration by poor populations living in vulnerable environments, and explores the relationship between the environment, ecology, poverty, population distribution and migration. It also outlines relevant models demonstrating these relationships. The chapter also examines the patterns, regularity and economic problems of large-scale, poverty-induced population migration in areas of environmental vulnerability.

Resettlement migration in China is somewhat different from that in other areas of the world, this chapter focuses on the causes of environmental vulnerability in western China. It can be observed that the relationship between the vulnerable ecology and environment, on one hand, and poverty, on the other, is a major reason for environmental migration of China. After encapsulating the status and features of environmental migration in western China. The chapter also discusses the role of local government in the migration process in western China.

### **2.2 Conceptual Origins and Research on Environmental Migration**

Since the 1980s, the sustainable development of population, resources and

environment has been widely studied. Hugo *et al.* (2009) points out that population migration caused by environmental change has attracted increasing attention over the last decade. The concepts of environmental migration, ecological migration and climatic migration have been frequently used terms in academic research (McLeman and Robert, 2013).

Various researchers have different understandings of the relationship between environmental factors and population migration, although two main themes exist: one where environmental factors are only one of many factors leading to migration and another holding that environmental factors are predominant (Adger 1999). Moreover, there are some differences between Chinese scholars and western scholars in their understanding of environmental migration, and it is necessary to differentiate their conceptual frameworks and analyse the implications of related policies.

Hugo (2008) has argued that there has been environmental deterioration in many developing countries, due to rapid population growth and resource development, which has caused significant population migration. However, some areas have also been influenced by social, political and military conflicts. These factors have given rise to the phenomenon of "environmental refugees", first put forward in the 1970's by Lester Brown, working in the World Watch Institute (Laczko 2003). The United Nations Environment Agency and other international agencies adopted the concept in their research reports, which attracted international attention. However, the concept of environmental refugees does not meet the legal definition of refugees, according to international conventions. In order to promote understanding and international action, the concept of environmental migrants has been adopted and defined by the International Organisation for Migration (IOM)(2007, 98) as:

Persons or groups of persons who, for compelling reasons of sudden or progressive changes in the environment that adversely affect their lives or living conditions, are obliged to leave their habitual homes, or choose to do so, either temporarily or

permanently, and who move either within their country or abroad.

The concepts related to environmental migrants also tend to include climate migrants, environmental refugees and ecological migrants, prompted by environmental change (Reuveny 2007). It is difficult to draw a line between these concepts and the movement of persons. Generally, the concept of refugees stresses the involuntary, or forced, aspects of migration. At the same time, it also suggests that there is a need for such migrants to be provided with humanitarian assistance (Reuveny and Moore 2009). Voluntary or involuntary migration can be induced by ecological or climatic factors such as natural disasters, environmental disasters, ecological damage, environmental degradation and the construction of reservoirs and dams (Wei and Yu 2009). Liang and White (1997) verify the significant correlation between migration behaviours and the factors affecting these behaviours, such as environmental degradation, natural disasters, and environmental change and so on. This suggests that strong ties exist between concepts such as environmental migration, climate migration and ecological migration.

Hugo (2008) points out that ecological migration, defined by some of the same intrinsic drivers of population migration, is considered a type of migration induced by the environment. It is caused by the combined influence of the environment and other driving factors, or by natural disasters. As global environmental change receives more and more attention, population migration that is likely to be induced by environmental change has also received attention. Wei and Yu (2009) show that environmental change can exacerbate environmental problems, which may lead to larger-scale population migration, or conflicts. The *International Migration Report in 2010*, released by the IOM, discussed the influence of environmental changes on population migration and pointed out that there will be between 0.2 billion to 1 billion climate refugees who, by 2050, will need to be transferred or resettled (Baldwin and Gemenne 2013). A more recent report by the Asian Development Bank indicated that, between 2011 and 2012, 42 million people in the Asia-Pacific region had resettled because of



climatic disasters (Bank 2012).

### **2.2.1 Defining Environmental Migration**

The term 'Environmental migration' has gained popularity and become a favoured research topic. In 1985, Essam El-Hinnawi (1985,56), a researcher from UNEP, defined environmental refugees as:

Those people who have been forced to leave their traditional habitat, temporarily or permanently, because of a marked environmental disruption (natural and/or triggered by people) that jeopardized their existence and/or seriously affect the quality of their life.

In this definition, “environmental disruption” refers to any physical, chemical and/or biological change in the ecosystem (or the resource base) that renders it temporarily or permanently unsuitable for supporting human life. These changes can be serious natural disasters, such as hurricanes, tornados, sandstorms, or the degradation of the ecology, including land degradation in arid areas, desertification, or salt-water encroachment. Although the definition given by El-Hinnawi does not completely distinguish various kinds of environmental refugees, it tends to be frequently cited.

Norman Myers, a British environmentalist, who has focussed his research on changes in the environment and the migration of populations over the last few decades, defines environmental refugees as:

...people who can no longer gain a secure livelihood in their erstwhile homelands because of drought, soil erosion, desertification, and other environmental problems (Myers 2002, 79).

Frank Biermann *et al.* (2010, 43) defines environmental refugees as:

People who must leave their homes and communities because of the effects of

environmental disasters that include sea level rise, extreme weather events, droughts, and the shortage of water resources.

Since the concept of environmental refugees first appeared in academia, it has attracted controversy, with the main dispute centred on the status of refugees and their acceptance by Governments around the world (Black 2001). There is an important distinction between refugees and migrants. Although refugees may be received and rescued by international governments, migrants do not have the same rights. Therefore, scholars who support the concept of environmental refugees have tried to expand its definition to include those people who have had to leave their home due to environmental change (Hugo *et al.* 2009). Supporters consider that, with the increasing effects of environmental changes, it has become a major factor influencing migratory behaviour. Researchers have found that environmental change is a factor that frequently influences migration and that, among all the factors influencing migration, environmental change can have the greatest impact (Feng *et al.* 2010). Meanwhile, Bates (2002) argues that only when the terms ‘environmental’ or ‘climatic’ refugees are clearly defined, will decision makers and governments establish relevant emergency measures, thereby lessening social-economic disadvantage and providing migrants with adequate assistance.

Some scholars, opposed to the concept of environmental refugees, are mainly dedicated to the study of involuntary resettlement and refugees (Feng *et al.* 2010). They tend to consider the term environmental or climatic refugee to be inappropriate because the accepted international definition of refugees refers to people who must leave their country for fear of persecution, to seek shelter from other countries because their property, or because their lives and security cannot be guaranteed by their local government (Scudder 2012). By contrast, they consider that migrants moving due to environmental changes are usually moving within their country, so they cannot be considered refugees (Cernea and McDowell 2000). The concept of environmental refugees confuses the classification of refugees, which regards them as

divided into three groups, driven by social, political, or economic factors. Goffman (2006) argued that environmental factors can be grouped under economic factors. Considering only environmental factors as the driver for migration tends to ignore the complicated social processes it entails. Oliver-Smith (2005) considers it confusing to use the term environmental refugee because it may result in accepting that ‘natural’ changes are the cause, when, often, the underlying reason for environmental changes is human activity (Bao 2006). In most cases, governments would prefer the scope of refugees to be as small as possible, to reduce their financial burden (Li *et al.* 2014).

In order to avoid the controversy, in 2007, the United Nations High Commission for Refugees (UNHCR and IMO) developed the terminology, ‘environmentally displaced persons’. This refers to people who are displaced from, or who feel obliged to leave, their usual place of residence because their lives, livelihoods and welfare have been placed at serious risk as a result of adverse environmental, ecological or climatic processes and events (Liao 2007). According to the UNHCR, to avoid confusion with other kinds of refugees, the definition of environmental refugees does not include movement outside their country and does not involve persecution, armed conflicts, or human rights violations. In a report of the UNU-EHS, the concept of forced environmental migrants has been proposed and it refers to people who are forced to leave their home due to environmental pressures. It places an emphasis on the involuntary nature of migratory behaviour, which reflects the influence of environmental changes (ECCNARCC 2007).

In addition, there are many other definitions including climate migrants, ecological refugees, environmental change-induced migration, and disaster refugees. Though the controversy has not been settled and there is no world-wide definition of environmental refugees, the enthusiasm for the study of ecological migration has been maintained by researchers (Cheng 2006).

### **2.2.2 Discriminating between the concepts used in Environmental Migration**

The concept of environmental migration and implementation of related policy is more recognised in China than in many other countries. On one hand, the concept of ecological migration is more complicated; on the other hand, it ignores various factors triggering ecological migration (Ma 2012). Based on this, some researchers point out that environmental migration, ecological migration, disaster migration, project migration and other different migration types should be clearly distinguished (Yu 2010). In fact, climatic and environmental factors are not the only driving forces of population migration. In different regions in the world, the reasons for population migration differ. In some contexts, income levels, social and cultural factors, policies and other factors tend to play a more decisive role than environmental change (Song *et al.* 2006). Compared with economic migration, which is driven by income, the definition of migration related to the environment reflects the fact that climatic, geographical, ecological and environmental factors all have a decisive impact on population migration (He 2002).

Lonergan (1998) analyses five environmental factors driving population migration: natural disasters; gradual or slow environmental changes, such as land degradation, desertification and other forms of environmental change; industrial accidents; development projects, like the construction of reservoirs or rapid urbanisation; and environmental changes caused by conflicts or war.

According to previous literature, and based on the IOM's definition of environmental migration, both ecological migration and climatic migration belong to a sub-type of environmental migration (IOM 2007 ).

Some environmental migration in China can be regarded as ecological migration or climatic migration, and this is located mostly in the western part of the country. Li *et*

*al.* (2012) point out that more than 80 percent of the literature on environmental migration points to the western region of China; these regions are ecologically sensitive, climatically vulnerable, and relatively poverty stricken.

### **2.2.3 The Classification of Environmental Migration**

El-Hinnawi (1985), divided environmental migration into three categories according to cause: 1) Due to natural disasters, such as hurricanes, tornados, or sand storms, which were small-scale and mainly temporary; when environmental conditions recovered, migrants could move back; 2) Due to environmental degradation, which can be either naturally or artificially induced; the degradation may be irreversible, which means migrants cannot move back; and 3) Due to progressively degenerative environmental change, including droughts, desertification, cultivated land degradation; such migration would be permanent (El-Hinnawi 1985). In this case of migration due to disaster, the disaster is unexpected and of limited duration. Therefore, it is regarded as unplanned migration, which can be temporary and contains the possibility of moving back (Bates 2002). The cause of the disaster can be both natural or anthropic including volcanic eruptions, earthquakes, or nuclear leaks, for example.

Migration due to government decisions has two possible dimensions: economic development, such as building a reservoir, or, destruction, such as, in a time of war, destroying the environment of an enemy state to win the war (Li and Wang,2013). This kind of environmental change does not involve a long-time frame, and the environment will be permanently changed, so the possibility of moving back will be close to zero.

Migration due to environmental degradation is mainly due to pollution (industrial waste) and scarce resources (reduced soil fertility) and is a usually slow process. Young and adventurous individuals may migrate to seek a better living place to

improve their quality of life, while older residents may remain in the deteriorated environment (Wang et al. 2013). The scale of degradation may increase to the point, however, where whole communities are forced to move.

Liao (2007) divided environmental refugees into two types: involuntary and voluntary migrants. Involuntary migrants are those who are forced to leave their home due to environmental pressure. Their natural environment threatens their daily life and forces them away from their former residence, while voluntary migrants choose to leave their habitat to seek a better quality of life, in an environment that has richer soil, better ecological conditions, or weather, more conducive to supporting livelihoods. These migrants aim to increase their level of economic development, and this is commonly found in small-scale migration, such as that undertaken by individuals or families (Guo and Riedale 2003).

### **2.3 Environmental migration in western China**

The rapid development of China's economy and society has led to the rapid deterioration of the environment, and the conflict between the size of the population and the environment has gradually intensified (Guo and Shi 2010). Environmental migration, which began in the 1990s, has been an attempt to solve these problems, and has attracted considerable research. Moreover, the research on environmental migration can be seen in all kinds of academic journals.

Tian and An (2011) argue that since the 1980s, environmental migration has become a positive and effective policy because of the problem of poverty and scarce resources in China's west. Xu *et al.* (1996) first introduced the concept of environmental migration to domestic research, and argued that it was one type of population migration caused by the deterioration of the natural environment, including migration caused by natural

disasters, ecological and environmental degradation, and environmental pollution. Guo and Shi (2010) point out that the cause of environmental migration is the destruction, or deterioration, of the natural environment, which affects human livelihoods, by disrupting people's other relevant economic activities.

Dun and Gemenne (2008) argue that environmental migration includes the migration of enterprises, communities or people, which is caused by environmental protection and governance, environmental pollution, or environmental damage. Because of their different research backgrounds and perspectives, Chinese researchers pay more attention to the practical aspects of environmental migration, project migration, livelihood migration and disaster migration and less to the clear classification of related concepts and detailed exploration of related theory (Fan 2005).

Due to the promotion of environmental migration policy and practice in China, environmental migration gets more attention than other forms of migration (Li 2005). Moreover, Tian and An (2011) claim that environmental migration tends to be related to ecological protection, flood control and disaster reduction, poverty alleviation, water conservation and hydropower project development.

In fact, Gai *et al.* (2006) claim that environmental migration is generally considered to have relatively low costs and marked benefits in alleviating the conflict between population and land carrying capacity, as well as between ecological and environmental protection and poverty alleviation in the west of China. Environmental migration, as a way of solving environmental and poverty-related problems, is a top-down, government-dominated environmental policy, and is often incorporated into economic development processes led by local governments (Cui 2007).

Recently, Chinese scholars have undertaken some preliminary research on environmental change and migration. They take drought disaster in the southwest of

China as an example and analyse the impact of extreme environmental events on the migration of rural populations. Yu *et al.* (2010,45) argue that:

Environmental migration caused by natural disasters and gradual environmental changes is largely related to environmental change. Environmental migration to be a result of environmental change and environmental policy, including the migration caused by adverse environmental conditions in western China, as well as forest plantings and the construction of reservoir dams.

## **2.4 The background of environmental migration in western**

### **China**

Chan et al. (1999) argue that environmental migration in western China originated from both environmental changes and poverty. Objectively, it is attributed to this area's vulnerable environment and excessive development. Ecological deterioration over time has resulted in the reduction of ecological carrying capacity. In addition, due to the population increase in recent years, it is difficult to envisage spontaneous recovery of the ecological and economy in western China (Xun and Bao 2007). Therefore, environmental migration becomes one of the most effective measures to promote recovery and stability for the ecology and the economic system in western China.

#### **2.4.1 The ecological background of environmental migration in western China**

Environmental migration in western China mostly occurs in ecologically vulnerable areas, which can be divided according to causal factors and each has distinctive indices (Hu 2013). The factor indexes of vulnerable ecologies and environments can be obtained by analysing the causes of vulnerable ecologies and environments.

Natural factors are the material basis of the ecology and the environment. Hence,



Wang et al. (2013) regard them as the basic classification unit and the basic research object of ecotypes. Generally speaking, geological structures, geomorphic features, surface composition substances, and biotic community types constitute natural factors (Wang et al. 2013).

Vulnerable climatic factors refer to the factors that result in vulnerable ecologies, such as drought, cold and the action of strong winds. Generally, plant growth is easily restricted in arid and semi-arid regions. Frigid temperatures (below 0° of average daily temperature) often lead to the vulnerable environment of fell-fields. In the cold temperature zone of China, the rainfall exerts an important influence. In the north-western part of China and in north-eastern China, the north-west wind prevails in winter and it is dry, cold and strong (Guo and Riedale 2003). The surface soil is often corroded by the wind, intensifying drought and moving sand dunes, which, in turn, intensifies the vulnerability of the ecological system.

The vulnerable hydrological factor of kinetic energy refers to the overland runoff that forms the scouring action on parts of earth's surface, resulting in serious water and soil loss. This is active in southern China and wet areas of eastern China (Liao 2007).

Human survival and development cannot be separated from natural resources and the environment. On one hand, humans gain substances through resource development and can improve ecologies through action on the environment action. On the other hand, human survival and development is constrained by the quality and quantity of resources and by the environment (Dao 2010).

There are many cases of ecological fragility resulting from unreasonable utilisation. For example, in the semi-arid ecozone of agriculture and animal husbandry, and in the farmland in China's eastern grassland plateau agricultural and husbandry practice exceeds the suitable farmland available, so forest and grassland are reduced. In the

limestone mountainous areas of southern and south-western China, cultivation on steep slopes and overdevelopment gives rise to the intensification of water and soil loss and ecological vulnerability occurs (Chen and He 1999).

It is an extremely common phenomenon that overexploitation of meadow and overgrazing results in ecological vulnerability in the wide pasturing areas of China. According to investigation in 2000 of the grass resources in six villages in the northern salt pond in Ningxia province, China, shepherding in this area exceeded 50 percent of the pasture land's carrying capacity. This overgrazing has degraded the area into moving dunes (Zhao 2002).

Energy shortages are still common in northern and southern China which are grassland areas and mountainous areas due to excessive wood chopping and excessive herb gathering. Excessive chopping of wood by farmers results in widespread soil loss, reducing its regenerative capacity. Earth cutting for herb gathering and destruction of the ecology often also happens in China's grassland areas (Luo 2003).

Underground water causes salinisation in southern and northern China, due to drought and excessive exploitation of water causes a continuous decrease in the underground water level. In the Minqin region of Gansu, some underground water levels have been reduced to 130m below ground. In addition, the salinity level of the land is very serious (Wang and Chen 2012).

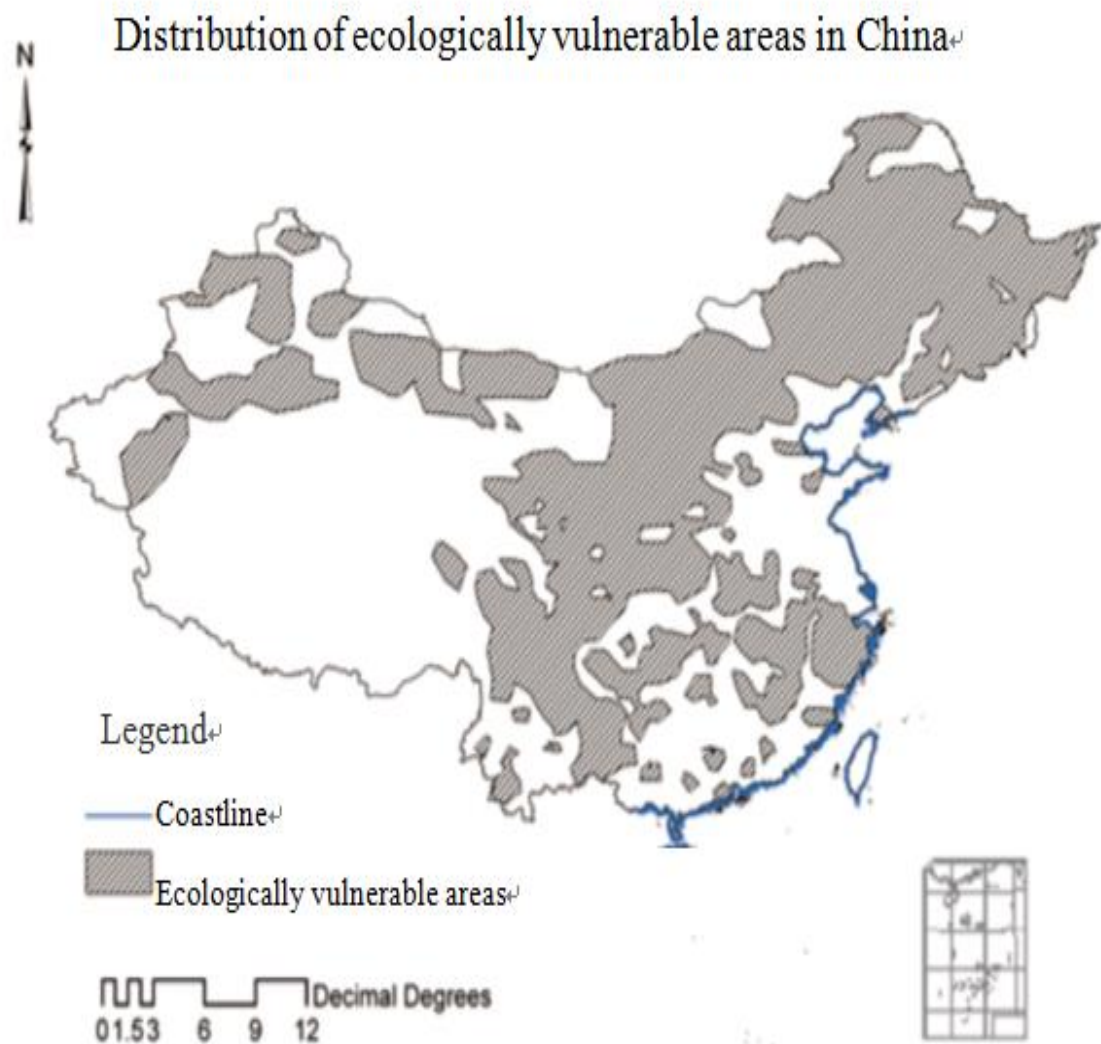
#### **2.4.2 The Division of vulnerable environments in China**

The environment in western China is extremely vulnerable. There is severe land desertification, water and soil loss, as well as vegetation degradation. Cheng and Wang (2011) argue that there are more types of wide ranging and profound ecological damage in this region than in many others. In addition, there are more kinds of man-

made disasters, that are widely distributed, occur frequently and cause serious harm.

Some environmental vulnerability indices and their causes are summarised in **Table 2.1**. These indices also can be used to show the distribution of vulnerable environments in China. The seven vulnerable areas are shown in **Figure 2.1**.

**Figure 2.1 Distribution types of Vulnerable Ecological Environment in China**



Source: NBS 2011

**Table 2.1 Vulnerable environment indexes in China**

Areas	Causes	Indices
Semi-arid—semi-humid areas in the north	Precipitation Unstable rainfall Influence of the relationship between evaporation and rainfall on utilisation	400mm annual precipitation 400mm rainfall assurance rate >50% 350mm rainfall assurance rate > 50% Dryness 1.5-2.0
Semi-arid areas in the north-west	Shortage of water Unstable and unreliable water sources Wind erosion and accumulation Excessive reclamation	Runoff dissipation area Runoff change rate + 50% or -50% Surrounding vegetation coverage < 10% Protection of forest network area <10%
North China Plain	Unsmooth drainage Wind sand and wind erosion	Underground water level > 3m Mineralization of underground water > 2g/L Sand land of the Yellow River old riverway and new sand Vegetation coverage < 30%
Hilly areas in the south	Excessive reclamation, overgrazing, runoff and erosion	Natural vegetation coverage < 30% Hilly mountainous areas of red earth Rainstorm
Mountainous areas in the south-west	Runoff erosion Drought Excessive reclamation, overcutting, and overgrazing	Runoff erosion above medium Dryness >1.5 Vegetation coverage <30%
Limestone areas in the southwest	Corrosion and water erosion	Limestone mountainous areas Vegetation coverage <30%
Qinghai-Tibet Plateau	Indexes are the same as the semi-arid—semi-humid areas in northern China	

Source: NBS 2011

This research focus upon the Loess Plateau, the Qinghai-Tibet Plateau and the karst landform plateau in South-Western China. Even though these areas have different ecological characteristics, they have the most typical and the strongest ecological destruction and also the most concentrated areas of poverty, affecting ecological safety and constraining economic development in China's western areas (Wang et al.

2013). The natural vegetation in these areas are alpine meadow, with an area of 120 million m<sup>2</sup>. The geomorphic features and alpine-cold arid climate results in a vulnerable ecosystem, with the following problems prominent; severe grassland degradation; marked climatic variability, high rate of significant disasters; sharp reduction of forest resources; climatic warming and drying; overgrazing of grasslands; difficulty in restraining the spread of desertification; intensification of water and soil loss; reduction of organic content in soil; thin soil layers, poor agricultural and ecological conditions; severe and widespread geological disasters, including debris flows, landslides, earthquakes, and glacier lake outbursts; and a serious shortage of rural energy sources. The Qinghai-Tibet Plateau and the karst landform plateau in South-Western China accounts for 86 percent of total soil in the whole region (Li 2005).

#### **2.4.3 The socioeconomic background of environmental migration in western China**

Cui (2007) pointed out that in the 21<sup>st</sup> century, poverty and regional development are extreme challenges faced by poverty-stricken areas inhabited by minorities in western China. To understand the development of poverty-stricken areas, populated by minorities in western China, it is necessary to understand resource development and its role in the transformation process of these areas inhabited by minorities, including adjustments in agricultural production and overall economic development. Western China has vast lands and abundant natural resources. However, the population in most areas are living below the poverty threshold, and impoverished people constitute 61 percent of the total population, which is the most uncultivated area in the country (Ma 2012). The main causes of poverty in western China are as follows:

There are a range of different natural conditions in western China and the distribution of agricultural development is extremely imbalanced. Husbandry, triggered by the

diversified climatic conditions, is prominent. There are large distances between villages which have small populations, and it is therefore difficult to achieve unified planning and unified command in production (Song et al. 2006). Moreover, it is difficult to overcome widespread poverty and provide investment in the region.

The existing agricultural acreage in the western China accounts for 38 percent of national agricultural acreage, with 495,700km<sup>2</sup> (Tian and An 2011). Due to vulnerable environments and climate change, agricultural productivity is increasingly unstable, which significantly influences husbandry production, and intensifies the conflict between water supply and demand. From the perspective of agricultural infrastructure in western China, there is insufficient financial investment, insufficient infrastructure, and insufficient capacity to withstand risks to husbandry production (Li et al. 2012).

Urban planning and construction in Western China are lagging behind the rest of the country and have only a weak capacity to drive rural development. Most areas in the west are farming-pastoral regions, with a scattered rural population. Therefore, it is difficult to develop small towns in rural areas. (Yu et al. 2011).

#### **2.4.3.1 Defining the concept of environmental poverty**

What is environmental poverty? The relationship between environmental change and poverty has been discussed by the Fifth Assessment Report of IPCC, the International Organisation for Migration, Oxfam (an NGO), and the Environmental Justice Foundation. They consider the real and potential impacts of environmental change and their risks for ecologically vulnerable areas and impoverished people, who are disadvantaged and marginalised in society and economy. They offer a definition of environmental poverty that include survival-oriented poverty and subsistence poverty (lack of the ability to reach the minimum standard of living).

...the basic living environment that the basic rights of subsistence and development are deprived of, such as the deterioration of natural environment caused by various environmental risks, directly or indirectly, under the influence of global environmental model changes. The destruction of basic living conditions and production conditions in ecologically vulnerable areas caused by the frequent occurrence of environmental disasters and their secondary disasters, increased environmental exposure and vulnerability. (Zhu, 2010, 39-42)

Populations living in poverty caused by environmental change are direct victims of the negative externalities brought about by changes in the global environment and its risks. These populations also intensify the ecological and social vulnerability of the areas in which they live (Zhao 2006), threatening the possibility of basic subsistence and sustainable development in the region. Various environmental risks will not only directly or indirectly affect the living conditions and environmental resources of ecologically vulnerable areas for sustaining human livelihoods, they will also cause obvious or covert changes to the natural environment, further aggravating local poverty and creating new poverty traps (IOM 2007).

Li et al (2012) point out that the direct impact of environmental risk on poverty refers to the destruction, or damage, caused by extreme climatic events or disasters, on agricultural conditions and animal husbandry, people's lives and property security, the profile and maintenance of livelihoods, the dependence on resources and infrastructure, and public service facilities. Moreover, it makes threatened ecological systems, on which the survival of rural communities in ecologically vulnerable areas depend, more fragile and makes the adaptive adjustment of people, seeking to improve their livelihoods, increasingly difficult. Tan et al (2014) argue that it also leads to a further increase in risks to agricultural production and an increased risk of food insecurity. This is mainly reflected in the frequent occurrence and intensity of various extreme environmental risks. It causes devastating impacts on natural ecosystems, which are the base for the survival of people with high levels of environmental exposure and vulnerability in ecologically vulnerable areas. At the

same time, it causes serious disturbances in the maintenance of productive activities and normal social life. Meanwhile, it has a serious impact on these area's natural environment, infrastructure and public service facilities, influencing disaster recovery, reconstruction and subsequent expansion in affected areas, and placing more people at risk of poverty (Yu *et al.* 2011).

The indirect effects of environmental poverty come from the irreversible long-term impacts of environmental change and their impact on regional economic growth and sustainable social development, further slowing the pace of economic development. This, in turn, affects the capacity of poverty-stricken areas to effectively eliminate poverty, and weakens the potential of poverty alleviation programs (Xu and Ju 2009). This is even worse for those developing countries and regions which are most vulnerable to the threats of environmental risk, with impacts on their populations, because agricultural production and social life in these countries depend heavily on local natural environments, natural resources and natural precipitation. They are more vulnerable to changes in hydrology, water resources, conditions, and meteorological disasters, while they are weaker in domains that promote active adaptation to environmental change, environmental risk mitigation through science and technology, financial rationing and systematic policy responses (Hu *et al.* 2006).

Tan and Wang (2004) argue that ecologically vulnerable areas are more exposed and are more highly sensitive to environmental change, which have great impacts on natural and human systems. Areas of poverty and ecological vulnerability are often geographically coupled. The environment and people's resources in these areas are limited, so their ability to mitigate environmental change is relatively poor and their ability to adapt to environmental change is weak (Hu 2013). In the face of environmental change and its risks, it has been found that poverty increases, and poor people fall into poverty traps and cannot extricate themselves. This also exacerbates developmental inequality, thus putting social security and stability at risk (Xun and



Bao 2007).

Pan and Zhang (2011) point out that although populations experiencing environmental poverty contribute extraordinarily little to global environmental change, they are its biggest victims. This is not only closely related to the frequent occurrence of meteorological and natural disasters caused by environmental risks, but is also related to their lack of adequate and effective response to natural disasters, the inadequate implementation of relevant policies for the protection of their environments and their inadequate adaptation to environmental change (Tian *et al.* 2012). Environmental change has resulted in the destruction of traditional livelihood patterns, natural and material capital, as well as the social and cultural capital of the poor in vulnerable ecological areas. Meanwhile, it also makes the problem of long-term and repeated poverty more pronounced and serious in many areas.

#### **2.4.3.2 The causes and evolution of environmental poverty in China from the perspective of environmental risk**

Environmental poverty is the result of the co-occurrence of environmental risk and ecological fragility. In the context of the increasing impact of environmental change on global ecology and human social systems, the vulnerability of the natural environment in some areas has increased. Ma *et al.* (2011) argue that the problem of environmental poverty, concentrated in ecologically sensitive areas with high numbers of poor people, has become a new phenomenon and is a challenge for social development. Environmental poverty is attracting increasing attention from governments and non-governmental organisations, such as the IPCC and Oxfam. The international community aid organisation, Oxfam, has noted the link between environmental change and poverty in China, and its research report on environmental change and poverty, pointed out that environmental change will directly or indirectly exacerbate poverty (OXFAM 2015, 110).

In China, poor areas are highly concentrated in ecologically vulnerable areas and those with high climatic risk. **Figure 2.2** shows the distribution of poor counties in China. It includes 505 key counties for poverty alleviation, concentrated in 11 poverty-stricken areas, and 128,000 poor villages. These are identified by the Outline for Development-Oriented Poverty Alleviation for China's Rural Areas (2011-2020).

**Figure 2.2 Distribution of poor counties in China**



Source: NBS 2011

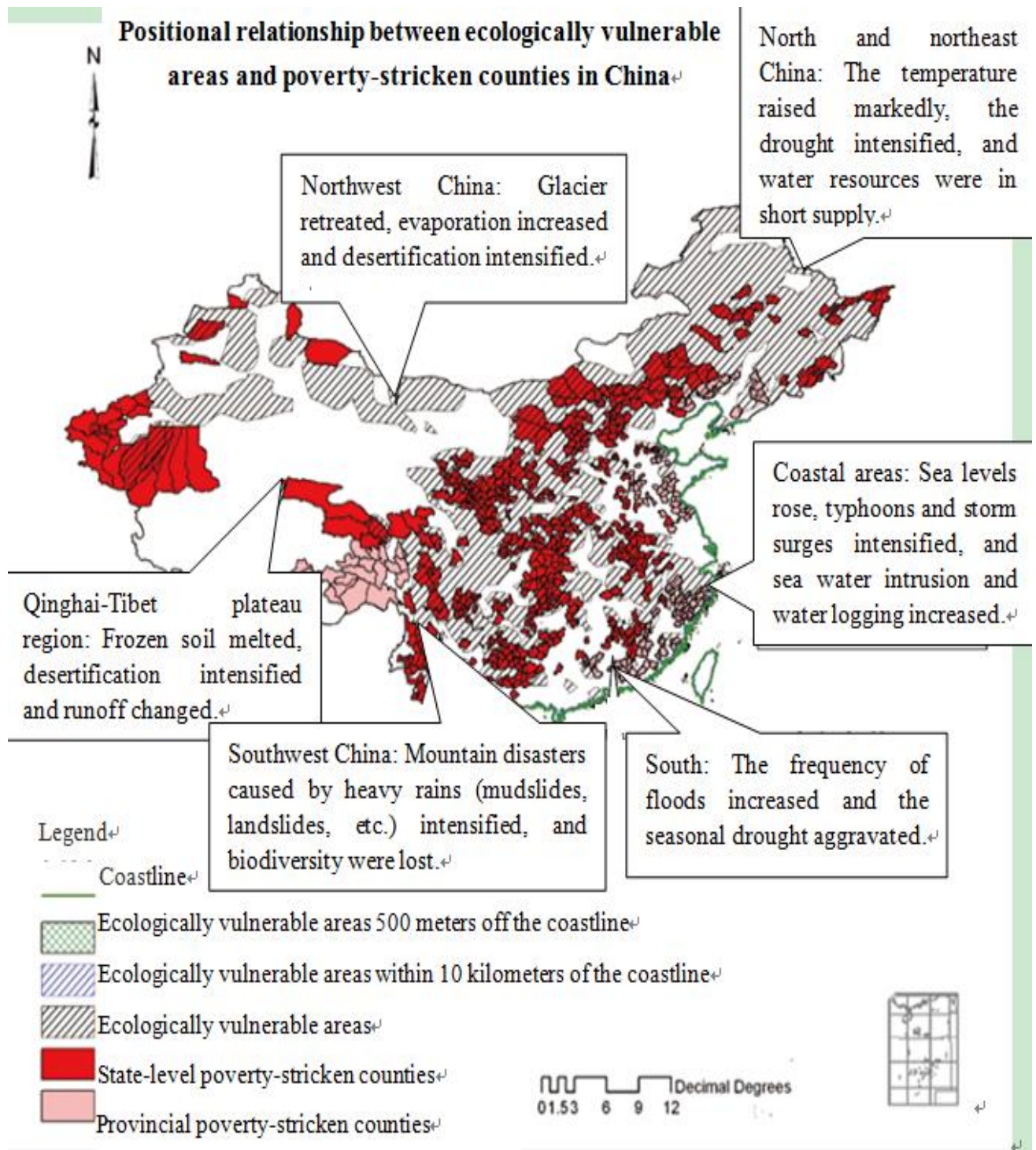
Natural conditions in these areas are harsh and natural disasters take place frequently due to global environmental changes. As a result, the deprivation of people's basic right to survival, including basic living and production conditions, can be deemed to

be pushing them into poverty (Dong *et al.* 2008). Chen (2003) argues that environmental deterioration is one of the most important reasons for the generation of poverty in China's poor areas. Jiang (2006) also claims that 95 percent of Chinese people experiencing absolute poverty live in areas with extremely poor ecologies and environments.

In China, poor areas are highly concentrated in ecologically vulnerable areas and those with high environmental risk. These include ecologically vulnerable areas such as Xihaigu region, the arid and semi-arid desert region of the Loess Plateau in Northwest China, and the karst rocky desertification area in the Yunnan and Guizhou Plateau, including 505 key counties for poverty alleviation, concentrated in 11 poverty stricken areas, and 128,000 poor villages. These are identified by the *Outline for Development-Oriented Poverty Alleviation for China's Rural Areas (2011-2020)*. This map shows that China's ecologically vulnerable areas (such as desert areas, stony mountainous areas, minority nationality regions, partial inland border areas, loess plateau and alpine areas.) are related to people living in poverty. There is a surprising coupling of population by distribution region, and geographical distribution, which shows a high degree of consistency. Moreover, about 80 percent of the poor live in ecologically vulnerable areas (Pan 2009).

So, when put **Figure 2.1** and **Figure 2.2** together in **Figure 2.3**, it shows that China's ecologically vulnerable areas (such as desert areas, stony mountain areas, minority nationality regions, partial inland border areas, the Loess plateau areas, alpine areas, etc.) are related to people living in poverty. It shows a correspondence between impoverished regions and geographical location, and both of which had a high degree of consistency. Moreover, Pan (2009) claimed that about 80 percent of the poor lived in ecologically vulnerable areas.

**Figure 2.3 Map of China's ecologically vulnerable areas and poor counties**



Source: NBS 2011

**Figure 2.3** shows that most of the poor areas in China are currently characterised by poor and vulnerable natural environments. Moreover, most of them are highly

exposed to environmental change and are deeply influenced by, and sensitive to, environmental risks. According to the survey and the statistics of the Ministry of Environmental Protection of the PRC on ecologically vulnerable and poor areas, at present 95 percent of the population in absolute poverty live in an environment that is extremely fragile and is deteriorating. These regions are more sensitive to environmental change and environmental risks, and their resilience is fragile. Among the existing population living in ecologically vulnerable areas, 74 percent live in the key counties of national poverty alleviation and developmental work designated by the state. This section of the population accounts for about 81 percent of the total population of the 592 poor counties in China (Tian *et al.* 2012).

**Figure 2.3** indicates that in the areas where poverty and ecologically vulnerability overlap, the population's incidence of poverty is usually over 40 percent. Moreover, Tan and Hugo (2013) point out that China's ecologically vulnerable areas are mostly in the alternate transition zones of different ecological and climatic regions, such as dry and wet, grassland farming, mountain plains, so their environment is unstable and has little capacity to withstand ecological or other shocks. The unsustainable exploitation and utilisation of land resources in arid and semi-arid areas of northern China can easily lead to desertification. Deforestation of forest vegetation in the southern karst geomorphic area is also likely to cause soil erosion and intensify torrents of mud and debris (Zhu and Luo 2010).

By analysing the relationship between vulnerable environment and poverty and combined with the fact that Chinese statistical information regards the administrative county and city as the unit, it is convenient for computational analysis. With the precondition of not destroying the county territory, the county with the area over 50 percent in the vulnerable ecological zone is divided as the vulnerable ecological county. The number of vulnerable ecological counties in each province and district can be counted from **Table 2.2:**

**Table 2.2 Distribution Areas of Impoverished Counties in Western China and Characteristics of Ecological Environment**

	number	Areas of Distribution	Ecological characteristics
Northern farming-pastoral zone	60	Hebei, Inner Mongolia, Shanxi, Shaanxi and Ningxia	Serious grassland degradation and land desertification. This is the traditional water and soil loss area in China. This zone is characterised by agriculture and animal husbandry, alternating with farming and husbandry. The agricultural system has the high fluctuation.
Loess Plateau Severe water and soil loss areas	130	North of the Qinling Mountains—the Funiu Mountains, south of the Yellow River Hetao Plain and Yinshan Mountains, west of the Taihang Mountains, and east of the Riyue Mountains, north of Shaanxi, west of Inner Mongolia, south of the Ningxia, East and Gansu and Hexi regions, east of Qinghai, as well as most areas in Shanxi	The biggest loess plateau area in the world. Fragmented terrain, lots of valleys, loose soil, and drought result in the severe water and soil loss. It is the main source area of sediment for the Yellow River.
Qinling-Daba Mountain	50	The junction of Sichuan, Shaanxi, Henan and Hubei	High mountains, deep valleys, ecological environment deterioration, and severe water and soil loss
Plateau hilly areas of karst in south-western	130	The centre of Guizhou, including Guangxi, Yunnan, and Sichuan, and some areas in Hubei and Hunan	The biggest karst plateau in the world; it has wide limestone distribution, high karst degree, a thin soil layer, severe water and soil loss, deficient cultivated land, limited environmental capacity, and severe stony desertification
Alpine and canyon region of the Hengduan Mountain	40	Some areas in Sichuan and Yunnan in the west of the Yalong River—the Yuanjiang River, and alpine and valley closed areas in three-river parallel flow zone of the Nujiang River, the Lancang River and the upstream Jinshan River	High mountains, steep slopes, traffic blockages; cultivated land gives priority to steep slope (slope above 25°); more precipitation, loose rocks, complicated structure, frequent occurrence of landslide and mudstone, and severe water and soil loss
Qinghai-Tibet Plateau Ecologically vulnerable area	40	Xinjiang, Qinghai and Tibet	High elevation, with cold environments, extremely deficient water sources, constant expansion of desertification area, severe wind sand disasters, remote area, and inconvenient for traffic

Source: NBS 2011

Many kinds of natural and human factors interact and interweave with each other. In addition, people in poor areas have made unlimitedly use of natural resources all their

lives, which has exacerbated the continued deterioration of the local environment, thus making it more vulnerable to environmental change. Under the influence of climate warming, the global environment has changed and the environment has started to become extremely volatile, so many of the ecologically vulnerable areas that people have relied on for survival are now short of resources and people's livelihoods have become unsustainable (Shi *et al.* 2008).

In reviewing the social facts related to China's environmental poverty, it is evident that the arid and semi-arid areas in the interior of China are the most affected. Meteorological drought has become one of the major causes of poverty in the ecologically vulnerable areas of northwest China. For example, Liu and Wang (2010) identify in "three western regions" in north-western China, Hexi, Gansu, Dingxi and Xihaigu, Ningxia, and Tibetan, concentrated in Qinghai, due to the decline of land productivity and the decrease in environmental carrying capacity caused by drought, land desertification and water scarcity. These have seriously damaged local people's livelihoods and resource base.

The warming and drying effects of environmental change have had a serious impact on the local atmospheric and water cycle system, resulting in an increase in local water vapour evaporation, decreased rainfall, a serious imbalance between precipitation and evaporation and lack of water resources (Hugo 2008). Meteorological drought has led to difficulties in local resident's productive and domestic water use, intensifying the conflict between people and land, reducing the natural capital of poor areas, and further increasing the exposure and vulnerability of the local natural environment, making the problem of "environmental poverty" increasingly apparent (Shi 2001). The fragility of the natural environment tends to exacerbate the fragility of the self-sufficient agricultural economy in Haixi, Qinghai. It was already fragile, but the intensification of drought and the delay of the rainfall season has a direct influence on agricultural production, which makes it difficult for

seasonal crops to be sown in time, causing crop growth cycles to be disrupted, and causing damage to grain production, resulting in reduced grain production and even, in some circumstances, no harvest (Shi *et al.* 2008). Poor people who relied on rain-fed agriculture as their main income source have difficulty increasing their income (Tan and Wang 2004). Furthermore, the resources used by poor areas to fight against natural disasters are scarce, and the infrastructure seriously inadequate, so already poor people in vulnerable areas, in the event of drought, often suffer further episodes of poverty, after already reducing poverty.

#### **2.4.4 The cultural background of environmental migration in western China**

The cultural background of the area plays a decisive role in the migration process. It is necessary to understand the cultural background and production methods of each nationality and then focus on arranging suitable work for them in the project of environmental migration and thereby resolve some of their problems.

In implementing environmental migration, many new problems and contradictions emerge, particularly concerning the cultural changes experienced by migrant groups.

Pan and Zhang (2011, 12) claim that:

“from the perspective of internal cultural factors, cultural contact and communication, new inventions and discoveries, and conflicts over values are the primary causes of cultural change. Conditions external to the culture, such as social relationships, structural change, and changes in population and natural environments are the primary causes of cultural change”.

The content of cultures changes because of changes in consciousness, opinions and mentality generated by the new cultural orientation. Such culture-oriented change affects social relations and interpersonal contacts, resulting in changes to the content of cultures (Zhao and Guo 2007).



Cultural change associated with environmental migration in western China involves the characteristics of a husbandry-based culture, which is determined by the distinctive natural environment. Wu (2004) claims that environmental migration in minority areas is inevitably involved in changes to national culture and national life. Taking environmental migration in the Qinghai region as an example, its natural conditions determine that husbandry is the only industry in this region which is the mode of survival for most of this region's population. In this form of production, the grass—livestock—people relationship not only constitutes a special food chain operating in the ecology and environment, it also forms the methods of production which shape social activities. These are supported by the natural environment of the Qinghai region and depend, in turn, on the nature and health of the ecology.

## **2.5 The Theoretical Basis for The Environmental Migration project**

Resettlement migration constitutes a new migration mode, which integrates anti-poverty projects, regional development and ecological protection. Its theoretical basis integrates multiple theories, such as population migration theory, population and resources theory, harmonious environmental development, (man-earth relationship), and regional science theory.

### **Population Migration Theory**

Population migration has generally been seen to be influenced by negative factors in out-migrating places and positive factors in migration destinations. Based on analysis of the migrant's perspectives, the finding is that migration from Ledu was due to pressure from lagging social and economic conditions, as well as poor natural and ecologic conditions, particularly in some high mountainous areas. Migration was also driven by the economic strength and the superior natural and regional conditions of the destination region, Dulan. The population migration theory proposed some time

ago by Lee (1966) posits that the migration activities of humans are influenced by factors at the place of origin, major factors at the place of destination, intermediary obstacles and migrant's own factors. In other words, migration behaviour is made up of community and environmental factors and personal characteristics. Objectively, each migrant may compare his/her community with the destination community before making a decision. Subjectively, the migrant may calculate the probability of him/her obtaining a higher income and standard of living by moving to the destination (Wilmsen 2015). As for the migration of the Ledu population, the differences in natural, economic and environmental conditions, between the place of origin and the destination community will inevitably stimulate migration. Subjectively, the reality of poverty and inadequate survival conditions encountered by generations has become a major motivation to migrate. Migrants who migrated to Dulan at an earlier period have moved out of poverty and achieved prosperity, demonstrating migration's benefits. In addition, organisations, aid and economic help from governments have transformed many intermediary obstacles into factors promoting migration. All these factors have been the premise and the foundation for continuous successful out-migration in Ledu during the last 15 years.

### **Harmonious Population and Resource Environment Development Theory**

Regional resources and the environment can only support a certain population, as well as certain forms of activities. In the resettlement migration of Ledu, migration is adopted to achieve the re-allocation of population and resources, as well as the unification and coordination of population and the environment. In this way, economic and environmental systems in the area can undergo benign development (GOLCG 2013). On one hand, the implementation of resettlement migration relieves pressures on the environment created by populations in mountainous areas, so that 'overloaded' areas have the conditions to reallocate resources, adjust "grain for green" in the agricultural structure, and implement better environmental management

(Wilmsen 2015). On the other hand, due to population increase at the migration destination, development of what was originally wasteland becomes promising (LCPADB 2013). Hence, resources and the environment can be utilised more effectively. A new oasis of ecologic-economic systems can be formed.

### **Regional Science Theory**

From the perspective of economics, resettlement migration conforms to regional science theory, which refers to theory involving the regional division of labour and economic space structure optimisation. An area such as Xiangride, which has experienced resettlement migration, has irrigated agriculture as a solid foundation and also has some energy-type industries, also serving as economic pillars. Some areas have broad wasteland resources and water sources (DCAB 2009). Other migration areas are also supported by convenient transport conditions and densely populated cities and towns. Based on economic development conditions and, in view of preferential economic growth cores in non-developed areas, it is necessary to involve northern areas in key developments (DCAB 2009). Migration destinations require development and an adequate labour force. However, it is feasible to implement resettlement migration in mountainous areas of Ledu. Such practice conforms to the demand for poverty relief, as well as the demand for regional development. Resettlement migration can effectively realise the horizontal transfer of poverty-affected populations and a surplus labour force from mountainous areas to newly developed ones (McDonald 2009). In this way, populations in mountainous areas, originally deemed to be a heavy burden, can be organically combined with lands to be developed in irrigation areas. In addition, the labour force in mountainous areas can be motivated to realise a long-term transfer to secondary and tertiary industries. In this way, optimal regional divisions of labour can be gradually formed (LCPADB 2003).

## **Characteristics of Resettlement Migration**

In 2002, Ledu County was listed as a Key County for National Poverty Relief and Development. In order to realise continuous, rapid and healthy development of the economy, local governments decided to organise centralised resettlement and provide compensation for voluntary resettlement, in order to transfer extremely poor populations, from poor environments, to regions with better environments (LCPADB 2003). In this way, ecologic and poverty problems can be solved once and for all. The new migration method of resettlement in Ledu features a combination of population migration and poverty relief, a combination of population migration and rural regional development, as well as a combination of population migration and environmental protection and development. In comparison with traditional population migration, it has outstanding features and characteristics.

## **Human Activities, Ecology and the Environment**

The root cause of poverty in Ledu's mountainous areas is that local resources and the local environment can barely support their residents in maintaining normal livelihoods. Due to poor environments and climates, and frequent natural disasters, local residents suffer huge living pressures (LCPADB 2003). Resettlement migration ensures that population and resources can be re-allocated, and the interaction between the population and the ecology can be improved. On one side, overloaded population pressure in mountainous areas is relieved by migration. Specifically, the per capita resource occupation of farmer households staying at their native place increases (LCPADB 2002). Contradictory tensions between the population and water supply, soils, and forest and grass resources are also relieved. Hence, land utilisation and rural industrial structures can be more effectively managed. In this way, the original lack of food, combustion, fertiliser, grass and water can be improved, natural vegetation can be protected, and the man-earth relationship can be better sustained. Migration

resettlement in Ledu can protect against local adverse ecologic effects (LCPADB 2011). On the other hand, through a combination of migration and resources at the migrants' destination, the regions, which were originally deserts, can be transformed into oases. In this way, the ecologic system which originally suffered from gradual degeneration and desertification can be rebuilt into a sustainable, ordered and efficient ecological system.

### **Poverty Relief and Regional Development.**

As reported in Qinghai government reports, for a long time, poverty relief has been an important part of national economic and social development plans for Qinghai. Resettlement migration is a new plan for poverty relief. It changes the original “blood transfusion” poverty relief mechanism, as well as ‘negative’ ideas, such as “wait, depend and demand” characterising the old mechanism. It forms a method of poverty relief; that seeks to “create blood”, as well as a new style of making progress and prospering through hard work (LCPADB 2013). In this way, the traditional remediation type of poverty relief was transformed into the new development-type of poverty relief, which has lead to outstanding achievements.

### **Close Links with National Prosperity in Minority Areas**

The population and nationalities in Ledu County, Qinghai is a major gathering place of the Tibetan peoples, which plays an important role in China's population, being only second to the Han population. For historical reasons, most Tibetan people live in poor conditions in mountainous areas. For a long time, it was important to support poverty relief and the prosperity of minorities, and to develop the national economy during the social development of Qinghai. Minorities in mountainous areas migrate to the plains, seeking better conditions and their living conditions are fundamentally improved. They obtain good production conditions, and benefit from various funds

and subsidies, and preferential policies (LCPADB 2003). All these measures play an important strategic role in promoting prosperity and the development of minorities, especially Tibetan.

### **Support from Governmental Organisations and Services**

Resettlement migration is a measurable social system project. From planning to implementation, the regional government has formulated planning schemes and a series of matching policies. These policies involve planning for infrastructure, such as construction for water conservation, village construction and farmland construction, as well as multiple preferential policies for migrant support in areas such as capital, finance and tax credits, traffic, science and technology. In addition, because of the powerful government organisations and services operating at different levels, migration is implemented in an orderly and smooth fashion, and with a high degree of satisfaction. According to a local government survey in 2011, after migration : 85.8 percent of migrants thought that production conditions were good; 82.6 percent of migrants thought their living conditions had been improved; 81.2 percent of migrants thought that cultural and educational opportunities were good, and 87.2 percent of migrants thought that the environment in resettlement community was good (GOLCG 2011).

## **2.6 The status and characteristics of environmental migration in western China**

Since the 1980s, environmental migration in western China has experienced three stages: developmental migration; resettlement anti-poverty migration; and comprehensive development. It has gradually developed into the national-class

livelihood construction project which regards good natural environments as the foundation for socioeconomic development in western China (Hu et al. 2006). In this process, it shows the dominance of the government and its efficiency, nationalism and comprehensiveness, with Chinese characteristics and forms.

### **2.6.1 Overview of environmental migration in Western China**

Environmental migration policy is the measure supporting the environmental policy of the Chinese government. Such a policy was initially implemented in 2000 in Alxa League and Heihe of Inner Mongolia. From the national perspective, the State Council firstly aimed to:

“encourage implementing the environmental migration in the process of returning the grain plots to forestry and giving the suitable subsidies to production and life facilities of environmental migration households” (NDRC, 2000)

In the ‘Regulations on Returning the Grain Plots to Forestry’ of December 14, 2002, the concept of “environmental migration” was explicitly mentioned. Subsequently, “environmental migration” is used as an important measure to undertake economic development in western China, gradually leading to its promotion and widespread application. In 2010, the National Development and Reform Commission (NDRC) issued the ‘Suggestion on Promoting the Coordinated Development of All Regions in the 12<sup>th</sup> Five-year Plan’. This considered the construction of compensation mechanisms for ecological and environmental change and the encouragement of environmental migration as one of regional policies to target restricted development and forbidden development zones (Hu 2013). Nowadays, the environmental migration strategy has the important strategic objective of improving the ecological and environment and eliminating regional poverty.

Environmental migration practice in Western China has undergone the developmental

migration stage (exploratory stage), the resettlement anti-poverty development migration stage (pilot stage) and the comprehensive environmental migration stage (comprehensive implementation stage) (Yu et al. 2011).

In the early 1980s, China's environmental migration project was instigated together with the "remote poverty alleviation" project. In other words, the main goal of environmental migration was to realise anti-poverty development. Considering the extreme environmental deterioration in the south mountains of the Ningxia Hui Autonomous Region, local farmers and herdsmen could no longer produce and live normally. From 1983, farmers and herdsmen in the south mountains of Ningxia were forced to move to other places, starting the famous "Diao Zhuang resettlement" (Xu and Ju 2009). This was the beginning of this practice in China.

By the early 1990s, about 300,000 people had moved as part of environmental migration in western China. Between 1980 and 1986, 154,102 farmers and herdsmen in the Ningxia Hui Autonomous region had moved. There is no doubt that environmental migration greatly relieved the ecological stress in this vulnerable ecological area. Because environmental migration in this period was only developed in several provinces and regions with minorities, migration practice was still in its exploratory stage. Therefore, there was no history as a reference point.

In order to further solve rural poverty, in 1994 the Chinese government started implementing the "Seven-year priority poverty alleviation program". Resettlement, anti-poverty development migration was developed in the western areas populated by minority groups. Due to the poor natural conditions in Ningxia, Inner Mongolia, Yunnan, Qinghai and Guizhou, these areas had poor natural environments and areas that were continuously poverty-stricken. The state listed these areas as the pilot areas for environmental migration (resettlement, anti-poverty development), with the purpose of overcoming poverty, achieving prosperity and protecting the environment



(Tan and Wang 2004).

By the end of 2000, 2.58 million people in 17 provinces and regions in western China had been brought into the environmental migration project. During this stage, environmental migration, with the purposes of overcoming poverty and protecting the environment, had gradually developed from the pilot phase, implying that the practice was becoming standardised and institutionalised (Xun and Bao 2007). The ecological consciousness of governments, at all levels, as well as that of migrants, was gradually increased.

In 2001, the Chinese government issued the 'Outline of Rural Poverty Alleviation in China (2001-2010)' and the State Development Planning Commission (SDPC) issued the *'Opinions of Implementing the Pilot Project of resettlement Anti-poverty'*.

Development Migration to conduct the strategic deployment for China to develop environmental migration in Western China. This was undertaken to facilitate farmers and herdsmen overcoming poverty in areas with poor conditions, poor natural environments and insufficient natural resources, and to promote recovery and governance of the environment in places of out-migration. From 2001 to 2005, 1.22 million people moved out, and 1.5 million rural poor moved out between 2006 and 2010 (Pan and Zhang 2011).

### **2.6.2 Characteristics of environmental migration in western China**

Western China is an agglomeration of minority groups and it is the last space for interaction between the Han nation and minorities. The Chinese government implemented plans to move 7 million farmers and herdsmen, and to subsequently develop industry, so that they could overcome poverty and facilitate development (Ma et al. 2011). There are several areas that require environmental migration in western China: areas with poor ecologies; ecologically vulnerable areas; natural reserves; and

natural disaster areas. Yu et al. (2011) argued that priority should be given to deep mountainous areas, stony mountainous areas, desert areas, cold highland areas, loess plateau areas, and areas with endemic disease. Large-scale and sustainable environmental migration is required over a wide area. The number of migrants is considerable, involving multiple cultural groups. Therefore, implementing and gradually developing environmental migration to take account of all these factors needs to be a priority.

The government has assumed a leading role in environmental migration, which is the product of national regional assistance. Without the support of the government, it is impossible to commence environmental migration projects. From the government's perspective regional development assistance is necessary, because in areas with severely constrained economic development, there is a lack of conditions necessary for development (Bakewell 2009). Wang et al (2013) argue that without the assistance of the government, it is difficult to realise development just by depending on people's capacity for self-development. From this perspective, environmental migration in western China needs the assistance of the government. Moreover, the government should take a leading role, in order for these areas to overcome the dilemmas they face.

According to people's subjective aspirations, migrants can be divided into voluntary migrants and non-voluntary migrants. Voluntary migrants are local people willing to resettle, because they have the higher expectations of their surroundings or they are dissatisfied with the level of existing economic, political and cultural in their current setting. Non-voluntary migrants are those people forced by the government, or other organisations, to move to another place for some specific reason. It is important to stress that migration governance involves limited capital expenditure compared to other government measures. On the one hand, it can, to some extent, be seen to solve the problem of impoverished people in China's west. On the other hand, it can

promote the self-recovery of environments in western China (Xu and Ju 2009).

Wang et al (2013) argue that environmental migration goes beyond the improvement of ecologies and environments and issues of economic development; it also involves political, cultural, educational, religious and national issues between regions. It is a complicated and systematic project. For most migrants, migration will impact on the traditional habits they have been following for thousands of years, resulting in a fundamental change in their production methods and lifestyles. Li et al. (2012, 42) argue that:

The particularity of environmental migration in Western China differs from the general environmental migration. It firstly faces the impact of the influences of national culture and national personality on the integrated system of environmental migration.

There are many minority ethnic groups in these migration zones. These minorities suffer from changes in production and lifestyle associated with resettlement, thus their traditional national psyches are impacted and challenged (Wei and Yu 2009). After migrants enter new migration areas, they often keep themselves relatively isolated from local people and they fail to adapt to their new lives.

As a result, the government need to solve migrants' lifestyle problems and also provide for their long-term survival and development. Environmental migration is characterised by uncertainty and risk; thus, it is essential to carefully manage it and try to reduce various potential losses and social problems. It is necessary to focus on protecting the political, cultural and economic development rights of minorities in the migration process and simultaneously advance the national culture via ecological protection and economic development.

## **2.7 The relationship among vulnerable environments, poverty and migration**

Xu (2009) argued that due to environmental risks, the emergence of environmentally-poverty-stricken populations in ecologically vulnerable areas has become the greatest threat to the sustainable development of human society in the twenty-first century. The issue of poverty, due to environmental risk, saw the international poverty alleviation organisation, Oxfam, launch a case study on environmental change and poverty in China in 2009. Later, in 2015, taking "environmental change and accurate poverty alleviation" as the basis for research, it found that the poverty levels of 505 poverty-stricken counties in 11 areas of China were closely related to local environmental vulnerability and a limited capacity to practice environmental adaptation (OXFAM 2015, 136). Moreover, the Intergovernmental Panel on Environmental change (IPCC 2014) devoted a special chapter in *Environmental change 2014: Impact, Adaptation and Vulnerability* to explain, for the first time, the relevance of factors influencing environmental change and poverty. Environmental change and its environmental risks are the major causes of hardship and poverty for people in environmentally vulnerable areas. Socially and economically disadvantaged, and marginalised and vulnerable, groups are disproportionately affected by the adverse impacts of environmental risk. Environmental risk and other non-climatic factors interact together, which not only intensifies the difficult living conditions of the poor in ecologically vulnerable environment, but also leads to declines in their livelihoods and traps them in poverty (IPCC 2014, 545).

The increase in environmental-change induced environmental vulnerability in some areas and the increase in the degree of exposure, as well as environmental- poverty, caused by the consistent geographical concentration of poor populations in ecologically vulnerable areas have some important implications. People in these areas

experience continuous or cyclical poverty influences (Wang and Chen 2012). If environmental change cannot be effectively curbed, the continuous warming and drying, caused by global warming, will further aggravate the degree of drought in arid and semi-arid areas, affect agricultural production and food security, intensify the struggle for natural resources, reduce residents' s living standards , and keep them in poverty. As a result, more regions and populations in the world will face environmental risk threats and poverty. It is estimated that by 2050 more than 375 million people worldwide will be forced to become " environmental migrants" (IOM 2009, 25-27).

Environmental change, and its risks, makes the relationship between environmental poverty, environmental migration and the change in the environment very complex. The problems of food shortages, lack of living resources and soaring prices, caused by environmental change leads to changes for these populations because of threats to their livelihoods. To cope with environmental change and risk, and to mitigate and adapt to the environmental risks, and the adverse effects of environmental variability over longer periods, people have gradually moved away from areas with high environmental risks and extremely ecological vulnerability. Chen (2014) argued that at present, there were 31 million environmental migrants in the world, and the number would exceed 200 million by 2050. When environmental risk increases, environmental vulnerability increases, and exposure also increases in some areas. The current prediction of large-scale migration of "environmental refugees" or " environmental migration" will become a reality under the stress of environmental risks, such as drought and extreme weather events (Shi 2011).

Due to the lack of natural and social resources for permanent migration, short-term domestic migration and seasonal flows have become coping measures to adapt to environmental change for people living in vulnerable environments, which are most strongly affected by environmental change (Chen 2014). For example, more than 25

percent of the population in Qinghai, China, have participated in seasonal flows in poor rural areas where the environment is threatened all the year round. Shi (2011) found that during the drought season, many poor families, which depend on agriculture, will begin to selectively send family members to nearby towns to work as migrant workers, to supplement household income, or they will entrust their older family members and children to relatives and friends who have better resources and conditions to ensure their survival.

In the face of gradual-onset, environmental risk, people in vulnerable environmental areas, once impoverished, are unable to cope with further poverty due to climatic factors, regardless of their inherent nature, human capital, social and material conditions. They will face more prolonged migration options, and many will be forced to become the first of their family or peers to move away— about 10 percent to 30 percent of the population will be affected (Burton, 2000). For example, due to environmental deterioration in Ledu County, Haixi Prefecture, and Qinghai, with frequent natural disasters and little rain, there have been nine droughts in ten years (some areas, have had ten droughts in ten years). "Dry wells, reservoirs and rivers...." have become the norm (Xu, 2009). The basic conditions for rain-fed agriculture have been seriously damaged. The agricultural harvest is greatly affected by environmental change and poverty levels among the affected population is high. Moreover, most of these poor people live in arid mountainous and rocky mountain areas with extremely harsh natural conditions, so it is difficult to increase agricultural production and farmer's incomes. Owing to these difficulties, they gradually become an absolutely poor population, because of environmental change. To remove people from exceptional poverty, worsening climatic conditions and ecologically vulnerable areas, and to speed up poverty alleviation for them, Ledu County has re-settled them. Therefore, environmental migration has become a strategy for local governments and for residents to cope with environmental change (DCPADB, 2011).

Western China's experience of harsh natural conditions and frequent disasters has seen the government take necessary investment measures, so as to rebuild production, rebuild homelands, and solve the urgent productive and lifestyle problems of the masses. Natural disasters have resulted in repeated investment in infrastructure, resulting in delaying the progress of socioeconomic development. The constant "transfusion" of the state forms the severe contrast with the "hematopoietic function" (Hu 2013).

The implementation and promotion of the western development strategy has already produced some effects. However, there are still obstacles to consolidating its achievements. Farmers generally have lower education levels and inadequate training to face change. The proportion of illiterate and semiliterate labourers is high. Furthermore, the education of rural labourers cannot adapt to the requirements of achieving rural modernisation. New technologies and new measures in agriculture have slower promotion speeds and longer promotion periods among these populations the low technology associated with agricultural production is closely linked with insufficient agricultural technical training. Also, rural areas have poor sanitary conditions, creating difficulties for rural medical care and the availability of medical care is low, thus making it difficult for people to withstand major disease risks. The problem of poverty and re-poverty caused by diseases is relatively pronounced (Yu et al. 2011) .

Living in poverty with limited regional development can result in the contradiction between environmental migration objectives and other areas. Because of geographic restrictions, transportation in these areas is extremely difficult. Improving material living conditions is expensive and it is also difficult to implement (Xu and Ju 2009). Therefore, environmental migration is the best way to aid these populations. The implementation of environmental migration can help migrants engage better in production and higher levels of education.

## 2.8 Conclusion

At the international level, the understanding of the relationship between environmental factors and population migration differs. Some scholars suggest that the environment is only one of many factors affecting population migration, while others believe that environmental factors directly lead to population migration. In China, the definition and practical application of the concept of "environmental migration" is not entirely consistent with the one held by western scholars. Wang and Chen (2012) argue that population migration in western China, specifically, cannot be explained and summarised simply by adopting international practice.

Given the international and Chinese background to the relocation of poor populations in vulnerable environments, this problem is not only a regional problem, but a global one. In China, most poor populations live in rural areas, so it is imperative to solve this problem. Research on migration models and migration theory can provide a theoretical basis and feasible measures for population migration in China.

The purpose of environmental migration in western China is to improve poor ecological conditions and poverty reduction. As a result, the Chinese Government considers environmental migration as an important political project. After more than 10 years of environmental migration projects in western China, which have already achieved preliminary results and have shown the unique morphology and characteristics of China, they provide the effective experience and reference for further development and promotion.

Unfavourable environmental conditions, which drive the resettlement of population in rural areas in western China, is one of the adaptation mechanisms to environmental change, about which scholars in China and abroad have reached a consensus. The Chinese government and Chinese scholars have realised that the strategies to alleviate



the poverty of populations in environmental disaster-stricken rural areas have shifted away from returning farmland to forest, direct subsidies, carrying out poverty alleviation and undertaking environmental management projects. Such policies were designed and implemented to improve the ability of families and communities to cope with environmental deterioration. Policies now have shifted to resettlement, by encouraging the migration of poor populations in vulnerable environmental areas to more productive ones.

# **Chapter 3 Methodology**

## **3.1 Introduction**

This chapter begins with a brief discussion of the epistemological and philosophical bases of the study, followed by the justification of a mixed methods approach. The research design is then detailed. Specific quantitative and qualitative methods used to collect and analyse data are explicitly discussed in the subsequent sections. A discussion of the experience gained, and lessons learnt, from the fieldwork then follows. This chapter concludes with a reflection on the innovations and the limitations of this study's research methods.

## **3.2 Research design**

### **3.2.1 Basic Ideas**

The objective of this research is to analyse the complicated relationship between environmental change and migration in western China through two case studies in Qinghai province. The research focuses on Ledu County as an out-migration area, while Dulan County, located in Qinghai Tibetan Autonomous Prefecture, an area of in-migration. The study focuses on rural, western China because this region has been identified as a hotspot, where environmental change will have its greatest effect on migration, and it has also been experiencing extreme poverty and issues associated with ethnicity.

Specifically, this research aims to investigate human mobility options and make recommendations for policy making in the context of environmental change. Institutional, multilateral, infrastructural and financial factors, which are examined as

important drivers of migration. This research seeks to generate an increased understanding of the mediating role that national and local institutions play in the process of policy formulation in response to environmental change.

Guided by theories related to environmental change, population migration and population distribution, the thesis will examine poor rural areas, where environmental disasters frequently occur, as examples of these phenomena. It investigates issues related to the formation, production, livelihood and distribution among rural populations affected by environmental poverty in order to anticipate population migration and promote a reasonable distribution of the population. The study also examines migration strategies, planning and policies, as well as migration patterns, among impoverished rural populations in areas of environmental disasters, to understand their migration and to provide feasible policies and measures. **Figure 3.1** outlines these issues.

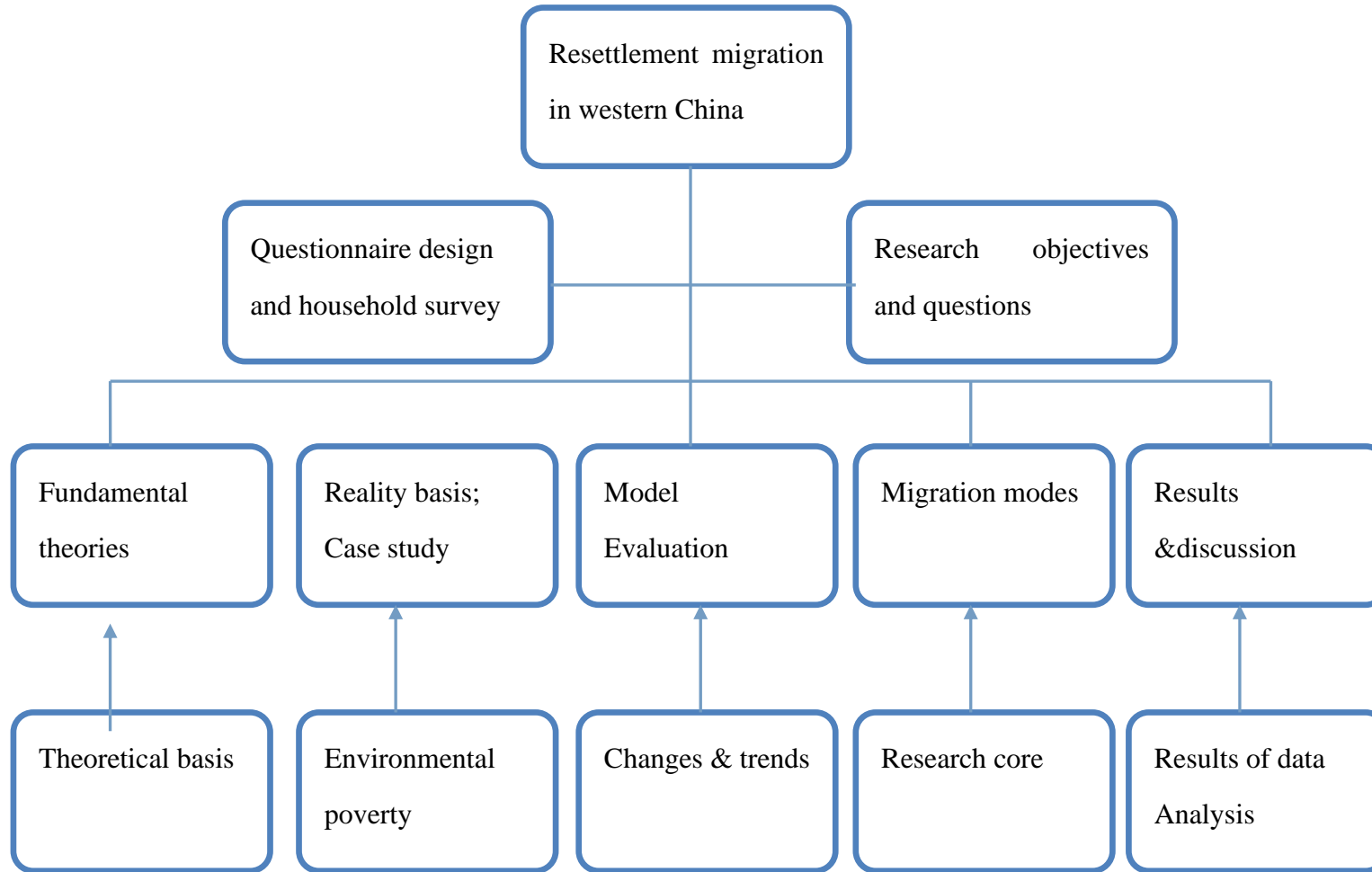
First, the research objectives and questions were established. Then, to answer the research questions, some models were devised to analyse the survey data. Therefore, it is necessary to design a questionnaire that conforms to the research questions. In addition to analysing data through models, in-depth interviews were also important to answer the research questions. The design of questionnaire and the collection of data are the key of the whole research.

The analytical method of this research aims to combine intensive and extensive study of empirical findings, along with mathematical data analysis, to further investigate the vulnerability, stability and sustainability of the environment in relation to migration. Contextual factors have been discussed, while the research will emphasise the causes of migration and the environmental conditions in the areas of out migration. Statistical regression models have been employed to analyse the quantitative data collected through the household survey. Regression models were developed to measure the

effects of environmental change on migration in the different areas, while controlling for other variables. The models of environmental change and migration were estimated separately for different areas, seeking to understand whether, and to what extent, environmental change has differential effects on migration, including minority populations in specific areas and contexts.

The application of this method is of vital significance to providing innovative outcomes. It pays attention to theory and to the policy of population migration in areas at risk of environmentally induced poverty areas, especially in respect to international and domestic practice. Comprehensive comparisons are made of the distribution of populations affected by environmental poverty and the method, scale and destination of their migration. In order to formulate better strategies and measures, information was needed about policy implementation and the conditions among migrants who were surveyed.

**Figure 3.1 Research Design**



Source: Author's Own Construct

### 3.2.2 Data Collection

The research employs a multilevel model as the basis for data collection. Theoretical issues about the determinants of migration are explored at either the household or community level. It is increasingly recognised that a multilevel model is an appropriate way to explore the determinants of migration because it simultaneously considers household and community-level factors. This study collected household and community-level information through a household survey, and utilised a literature review, interview data, and secondary data sources. **Table 3.1** illustrates the stages of the data collection process employed in this study.

**Table 3.1 Data collection and method**

Methods		Data sources	Data processing
Literature Review		Academic reports, journals related to environmental change and migration	Content analysis
Three Types of Survey	Observation (Dulan county)	First-hand information from surveys & questionnaires of areas left or moved into by migrants.	Analytic induction: <ul style="list-style-type: none"> <li>• Definition of problems</li> <li>• Hypothetical explanation of problem</li> <li>• Examination of cases</li> <li>• Reformulating hypotheses</li> <li>• Test of assumptions</li> <li>• Cyclical data analysis</li> <li>• Content analysis</li> </ul>
	Structured interviews (Ledu and Dulan county)	Interviews conducted to document viewpoints of residents, community representatives, and local officials.	
	Group samples (Ledu and Dulan county)	Specific discussions focused on affected communities, which have encountered differing effects caused by environmental change.	
Secondary data (Main data collection from Ledu county)		Statistics, reports, and policies produced in response to environmental change and migration	Secondary analysis

The research also systematically investigated data from government reports on specific issues, such as GDP and population changes in the areas both in-migration and out-migration, geological reports on changes in the environment (including landscape construction & purposes, water and soil levels), and changes in local and national policies. Reports and journals related to target areas published by the Chinese National Committee for the International Human Dimensions Programme on Global Environmental Change (CNC-IHDP) are considered and complement the analysis. The research methods are designed to construct reliable and consistent information using a literature review, survey, and secondary data.

The survey addresses two target areas: those that lose migrants and those that receive them. For areas of population loss, three types of households are affected: households in which all members have permanently migrated to the receiving area ; households in which individual members have temporarily or permanently migrated, and non-migrant households, in which no one has migrated. In the receiving area, two types of households are recognised: those with original residents and those with new migrants.

### **3.3 The Survey Background and Relevant Demographic**

#### **Contexts**

##### **3.3.1 Survey Background and Implementation**

Qinghai is the cradle of the Yangtze, Yellow and Lancang rivers, which influence fresh-water resources for nearly 0.7 billion people in 20 provinces and areas along the middle and lower streams of the Yangtze and Yellow rivers. They also influence fresh water resources for 6 southeast Asian counties along the Lancang River basin (Wilmsen 2016). This region plays an important role in the environment's ecology. In



order to better protect the environment, ecological migration projects have been implemented in the source regions of the three rivers. From 2000 to 2010, 10,773 households, containing 55,773 herdsmen, migrated from the source regions of the three rivers to new communities and were settled in 86 migrant communities (CPG 2012). According to material provided by Qinghai Province, ecological migration in the source regions of the three rivers produced outstanding effects.

In 2012, the researcher surveyed the status quo of ecological migration in the three-river source region in Qinghai Province to document the opinions of migrants and to provide a basis and reference point for governments to formulate relevant policies. The survey was undertaken between August and October 2012. The researcher was assisted by other postgraduates (one of them a Tibetan person) from Qinghai Normal University. Teachers from the University of Adelaide and Qinghai Normal University carried out concentrated training for research assistants over 3 days to help them master survey skills and understand the context of the migration project in this region.

The survey was carried out in both the Tibetan language and in Mandarin. Survey tools included questionnaires (community survey and home-entry survey), home-entry interviews and photos taken at survey sites. The researchers conducted the questionnaire survey in 17 communities, at 5 migration sites which had lost or gained residents. Survey participants were classified into two types: firstly, leaders and cadres in communities, who completed the questionnaire on the community's situation, and, secondly, ecological migrants, who undertook the home-entry questionnaire and interview survey. In this survey, 404 valid home-entry questionnaires were completed, together with 4 community questionnaires and 22 interview reports. Over 600 photos were taken on site. Questionnaires were processed, and statistical analysis undertaken using SPSS version 18.0.

### 3.3.2 Survey Design and Collaboration

In designing and conducting the survey, the large survey and in-depth interviews in Qinghai province were part of the major research project funded by the ARC Discovery project (2011-2015). There was collaboration with an Australian Research Council (ARC) Discovery project of the Australian Population and Migration Research Centre (APMRC) titled, '*Climate change and migration in China: Theoretical, empirical and policy dimensions*' (DP110105522). The study was part of the overall ARC discovery project led by Dr. Yan Tan. This project explored the relationship between environmental change and migration in both urban and rural settings; therefore, two surveys were carried out, one in the urban Yangtze River delta region and the other in rural western China. The survey instruments were designed by Dr Yan Tan and the project research team of which I was a part of this project. The questionnaire survey (face-to-face) and in-depth interviews were intellectually guided by Dr Yan Tan and were conducted in cooperation with Qinghai Normal University, China. This research team participated in the whole process of the survey in Qinghai. A relevant part of the survey data was used for the analysis of specific questions in this PhD study. The western China survey covered six counties/districts across three provinces/autonomous regions: Minqin county in Gansu province; Huanxian county in Gansu province; Zhangxian county in Gansu province; Xiji county in the Ningxia Autonomous Region; Hongsipu district in the Ningxia Autonomous Region, and Dulan county in Qinghai province. Among the six counties, Dulan County was selected as the study area for collaboration of data between this doctoral thesis and the ARC project.

There was collaboration in the questionnaire design, by merging the research questions of the ARC project with those of this study. The ARC project collected comprehensive data that met the research needs of this study. There were similar interests in obtaining information on four major topics: environmental change and its

impacts; household conditions; public interventions together with migration and adaptation. This study pays specific attention to ‘poverty’, which should be investigated from five perspectives: economic, social, cultural, reputational and political status. The ARC project collected data on these aspects, except reputational status. Therefore, in the final questionnaire, a series of questions were added to obtain information on households’ reputation in their local communities. The ARC project cooperated with a local research partner, Lanzhou University, to establish a survey team for the rural western China survey. As one of the researchers involved in the questionnaire design, the author provided training to the survey team, and joined the team to carry out face-to-face interviews.

### **3.3.3 Population Migration in the Xiangba Project**

The project examined the resettlement of migrants in an orderly and hierarchical way, working on the principles of “labour first and family last”, which adopted the principle of independent and voluntary migration. To ensure smooth implementation, the Xiangba authority was set up to manage the whole project. By the end of 2003, the total migrant population managed by the Xiangba authority was 3,520 families, totalling 16,131 persons. Local integration was provided for 1,957 persons, who came from Dulan, while the rest came from the drought-affected mountainous area of eastern Qinghai. The project rebuilt a town, built 8 new administrative villages and 26 natural villages, with a total investment of 9,481,800 Yuan (1 Yuan= 0.2 Australia dollar).

## **3.4 Data Collection Approaches**

This study collected a range of data: economic, social, and demographic characteristics about individuals and households, migration and adaptative behaviours,

and attitudes in relation to households' perceptions of the impacts of environmental change and public support for adaptation. The household survey was considered the most appropriate method to collect quantitative data for this study.

### **3.4.1 Questionnaire Design**

The questionnaire was initially produced in Chinese, which was used by the Qinghai Normal University survey team in a pilot test that assessed the feasibility of the questionnaire, to gain local knowledge of the study area, as well as to practice survey skills. The feedback from the pilot survey was incorporated into the final Chinese version, which later was translated into English and is included in **Appendix 1**. The questionnaire is divided into three major parts: (1) family background and movement; (2) impacts of environmental change and adaptation; and (3) aspects of household's conditions. **Table 3.2** provide details regarding the content of the questionnaire.

**Table 3.2 Summary of the questionnaire content**

Part	Section	Information sought
Family Background and Movement	Family members	Individual information: gender; age; marital status; Hukou (household registration) status; ethnicity; education level, and political affiliation.
	Movements between 2008-2012	Individual movements: time; timeframe; type of movement, destination, method of movement, and support for movement.
		Household movements: time; origin and destination; method of movement and resettlement, and support for movement.
Movement plan for next two years (2014 to the present)	Individual and household plans: possibilities and destination.	
Environmental change impacts and adaptations	Environmental change impacts	The extent of environmental change's impacts on: production; health; land; water; living costs; employment; income; housing; transportation, and communication.
	Adaptation to environmental change	Respondent's perception of the outcome of in-situ adaptation and of migration
		The measures adopted by the household to improve water and irrigation use; water-saving technology; drought and heat resistant crops and cash crops; soil fertility; housing; air-conditioning, and energy saving.
		The degree of benefit from public intervention programs.
	Participation in public decision-making and government projects	The degree of willingness to participate in public decision-making.
		The extent of satisfaction with the social security and medical insurance system
Public migration and in-situ adaptation projects conducted in the community and participated in by households.		
Conditions of different aspects of households	Employment and social security	Individual conditions: employment; type of work; annual income; job satisfaction, and social security.
	Production and land use	Type and quantity of land, usage of land, production types, access to public land.
	Economic conditions	Household economic conditions: annual income; annual expenditure; savings; debts, and loan sources.
	Housing and transportation	Property: source; construction's structure; areas; facility, and household satisfaction.
		Transportation: the time taken to go places such as, workplaces, schools, markets, water resources, and public transportation, etc.
	Social capital	The people and organisations that provide help to households, the types of help, social relationships, local reputation, spatial distribution of social networks, and means of communication.
	Health	Individual health: health rating; health problems; time spent, and in caring for unhealthy family or community members.

Source: Author's Own Construct

### **3.4.2 Sampling Approach**

The sample survey consisted of both migrants and non-migrant households. The migrant households can be further divided into two sub-groups: the households which moved out in their entirety and those with individual members who had moved out. The household survey in the out-migration community included those households which had never migrated, those households with individual migrants and those households which had previously left but then returned. The households which left permanently can only be reached within destination communities. However, due to budgetary and manpower limits, this study could not reach migrant households not living in Dulan at the time of the survey. One limitation of the study is therefore that the information about the households which have permanently and entirely moved beyond Dulan County is not available.

According to the statistical sample size calculator tool, 384 surveys in Dulan County, with a population of more than 310,000, provided valid results, with a 5 percent margin of error, and a 95 percent confidence level. This study selected 445 households to provide a valid result. The survey used a combination of sampling methods to select two levels of sampling units: villages and households. Firstly, the total sample size (N=445 households) was proportionately distributed to each selected township in terms of its 2012 population. The survey then used a Probability Proportionate to Size (PPS) sampling method to select 3 villages in each township. The PPS method ensures that each household in the sample has the same probability of being chosen, regardless of the size of clusters involved in the sampling. As a result, 15 villages were selected as the survey locations in Dulan and the sample size of each township was proportionately distributed to the 3 selected villages in the township, based on their population size.

In each village, a systematic sampling method was used to select sample households.

For example, in attempting to sample 20 households in a village with 400 households: (1) obtain the list of house numbers from 1 to 400; (2) then calculate a regular interval, which is 20 ( $= 400 / 20$ ); (3) then randomly select a start number between 1 and 20 by drawing lots, 8 for example, and (4) then select 20 households whose house numbers are 8, 28, 48 and so on, up to the last 388. If a selected household was unavailable at the first visit, it was visited again at another time. If it was still unavailable at the second visit, or it refused to participate in the survey, the households with a house number that is 1 less or 1 more than the number of the originally selected household were chosen as the first and second substitute, respectively. Houses in these villages are all clearly labelled with house numbers on their doors, which made the sampling procedure feasible and efficient.

### **3.4.3 Fieldwork**

**Research ethics:** The ARC project obtained ethical approval in March 2011 from the Human Research Ethics Committee of the University of Adelaide. The study provided the committee with detailed information on the qualifications of the researchers, the rationale for the survey, sampling and interview procedures, confidentiality and safety guarantees.

The survey team provided each respondent with a separate information sheet at the beginning of the interview, which detailed important information on voluntary participation in the research, general details about the study, what they were expected to do as part of the research, and confidentiality. The feedback from the pilot test suggested that respondents had low literacy levels and could not therefore fully understand the information sheet. The contents of the information sheet were then revised to condense it and to employ local language, without altering its original meaning. The information was read by interviewers to the respondents at the beginning of the interview, and the respondents signed their names, or ticked if they

were illiterate, to indicate consent for the interview.

It was assumed that participants might find some questions intrusive, particularly ones about their income, their perception of public policies and the government's capacity. To avoid 'no comment' answers, the confidentiality of the survey was emphasised, and the interview was conducted without the presence of third parties, such as neighbours, village cadres, etc. Most of the respondents were willing to answer such 'sensitive' questions, and, while several respondents hesitated, they provided the information eventually. At the end of interview, some little gifts, such as towels, soap and toothbrushes, were given to participants to compensate them for their time.

To protect respondent's confidentiality, their names or any information that could reveal their identity did not appear in any research output without their consent. The audio and written information on the survey was always kept in a locked cabinet, in a locked office, in the Lanzhou University before the data was transferred to electronic storage. All tapes and papers were destroyed as soon as data were electronically stored on the researcher's password-protected computer at the University of Adelaide. Storage will be for a minimum of five years, or longer if the information is useful for further analysis.

**Organising and Training Interviewers:** Fowler and Mangione (1990) point out that interviewers are more diligent and serious about surveys when they recognise their significance and have a good understanding of their role. The local research partner, Lanzhou University, recruited 8 postgraduates who were majoring in Geography and Environment, and who had some fieldwork experience. In early August 2012, they underwent training for two days. The training focused on introducing the research aims and questions, analysing the survey structure, clarifying ambiguous questions, enhancing interview skills, and ensuring ethics and safety. The questionnaire was very complex and comprehensive, and it required quite a long time to complete. To



promote efficient interviewing, two students practised together with one asking questions and the other answering. At the end of training, it was expected that each interviewer would finish an interview within 30 minutes.

**Contact and Cooperation with Government Institutions:** The Qinghai Normal University established a good relationship with the Dulan government. A member of the survey team, who is also a staff member of Lanzhou University, visited the Dulan County Government with an official letter issued by the University. It introduced the aims and contents of the survey. The county government consented to the survey and informed the governments of the townships selected for the survey. Meanwhile, the county government referred the researchers to some of the most relevant departments for in-depth interviews and from which to collect secondary data. These included the Bureau of Water Resources, the Office of Reform and Development, and the Bureau of Social Welfare and Anti-poverty. The interviewers visited the townships, the governments and village committees before conducting the interviews with households. It was important to obtain consent for the survey in advance from different levels of government, otherwise it could have been terminated by local authorities at any time.

**Face-to-face Interviews:** Face-to-face interviews in the respondent's community helped the researchers gain a broader and deeper local knowledge of the study area and established a closer connection with respondents. This was especially important for the researchers who were from outside the area and who did not have a developed understanding of the community and its people. Although this method is considered less cost-effective than mail and telephone interviews, it is necessary in interviews with people who are illiterate or who have low levels of literacy (Gray 2009). This method was considered fitting in Dulan's rural areas because most people had low literacy levels. Although Dulan is famous for the quality of its education and it is a major source of college students in Gansu province, this did not ensure functional

literacy levels in rural areas because most people with higher educational attainment do not return to rural areas. Face-to-face interviews also can increase the response rate and decrease 'no answer/comment' responses (Babbie 2004). The face-to-face interview method, of course, entails some risks. For example, some villagers were conservative, suspicious of strangers and acted abusively towards interviewers. To ensure the safety of researchers, it was suggested that all selected respondents should attend the interview in a public place next to their houses rather than inside their homes. If respondents insisted on having the interview in their homes, their choice was respected. In these situations, two interviewers worked together as a team to conduct the interviews, ensuring that no one was alone in a participant's home. Most of the villagers were very friendly and cooperative when they knew the interviewers were college students because many local families had children studying in high schools and universities.

**Interviews:** The survey was undertaken in Dulan in August 2012. A structured questionnaire was used for the face-to-face interviews (Appendix 2). The 10 interviewers (2 from the University of Adelaide and 8 from Lanzhou University) were divided into 5 groups and conducted surveys in the 5 selected townships. The interviewers lived in the homes of villagers during the survey period for the following reasons: (1) many selected villages were located far from township centres; (2) local transportation was inconvenient for the researchers (privately owned motor tricycles were the only transportation the interviewers could use); (3) August is harvest time in Dulan, and many respondents, therefore, could only be reached early in the morning or late in the afternoon, as they were working in farmlands during the day, and (4) living in villages enabled the interviewers to have a closer connection with the local people and to gain a broader and deeper understanding of the local community. Accommodation was found with the help of members of the village committees who knew which families had extra rooms and who were willing to accommodate two interviewers. Having the local authority involved in finding accommodation helped

gain the trust of the local families, as well as ensuring the interviewer's safety. Although the village committees were informed about the survey and assisted with accommodation, this did not mean that all the respondents could be traced.

The household head responded to the questionnaire; however, when unavailable, their spouse, or another household member who had the best understanding of the household's situation, answered the questions. People who were 65 years old or older and children younger than 18 years were not invited to participate in the survey. Some respondents gave consent to audio recording, while some refused, regardless of explanations about confidentiality. Most respondents finished the questionnaire during the first interview. Respondents, who did not manage to finish the interview the first time, were re-visited to complete the interview. Only one respondent terminated the interview halfway. The high response rate proved to be an advantage of face-to-face interviewing.

#### **3.4.4 In-depth Interviews**

The household survey did not provide comprehensive community-level data, nor information on the households that had migrated out of the county. In-depth interviews were then undertaken to gather information on these topics from key informants, including government officials and community leaders. These interviews also helped discover respondent's subjective meanings and their interpretations of facts and behaviours (Liamputtong and Ezzy 2005). As stated above, the most important and relevant government departments participating in the in-depth interviews included the General Office of Dulan County Government, the Bureau of Water Resources, the Office of Reform and Development, the Bureau of Social Welfare and the Office of Poverty Alleviation. Community leaders, such as the secretaries of village CPC committees, heads and treasurers of village neighbourhood committees, and principals of primary schools, were also interviewed in each selected

village. The in-depth interviews with government officials were carried out by an ARC senior researcher, and the ones with community leaders were conducted by the research students in the survey team.

A semi-structured interview, as shown in Appendix 2, was used to collect the following information from the key informants: (1) the environment, environmental change and its impacts; (2) government-organised adaptation measures in response to environmental and environmental change; (3) population and migration; and (4) development within the community, related to economic, natural, physical, human and social capital and institutional capacity. The in-depth interviews were carried out prior to the household survey, which gave the interviewers background knowledge of the survey locations. The information collected from the in-depth interviews proved very valuable in validating the study and improving the interpretation of the results. For example, information about the specific impacts of environmental change on each village, which was not captured by any secondary data, helped the study validate the selection of survey locations, because it proved that all selected villages had experienced significant, adverse impacts of environmental change. Moreover, the information about public preparation and adaptation to environmental change enabled the study to accurately interpret household's participation in public programs. Answers of '*no participation*' from the household surveys were divided into three categories, based on information from in-depth interviews. These were: '*public adaptation was not carried out in the village*'; '*public adaptation was carried out in the village, but the respondents did not know*'; and '*adaptation was carried out in the village, but the respondents did not participate, despite knowing*'.

### **3.4.5 Secondary Data: Census, Yearbooks, Policy documents**

The primary, multi-levelled data gathered through fieldwork was supplemented by secondary, contextual information collected from census data, yearbooks and

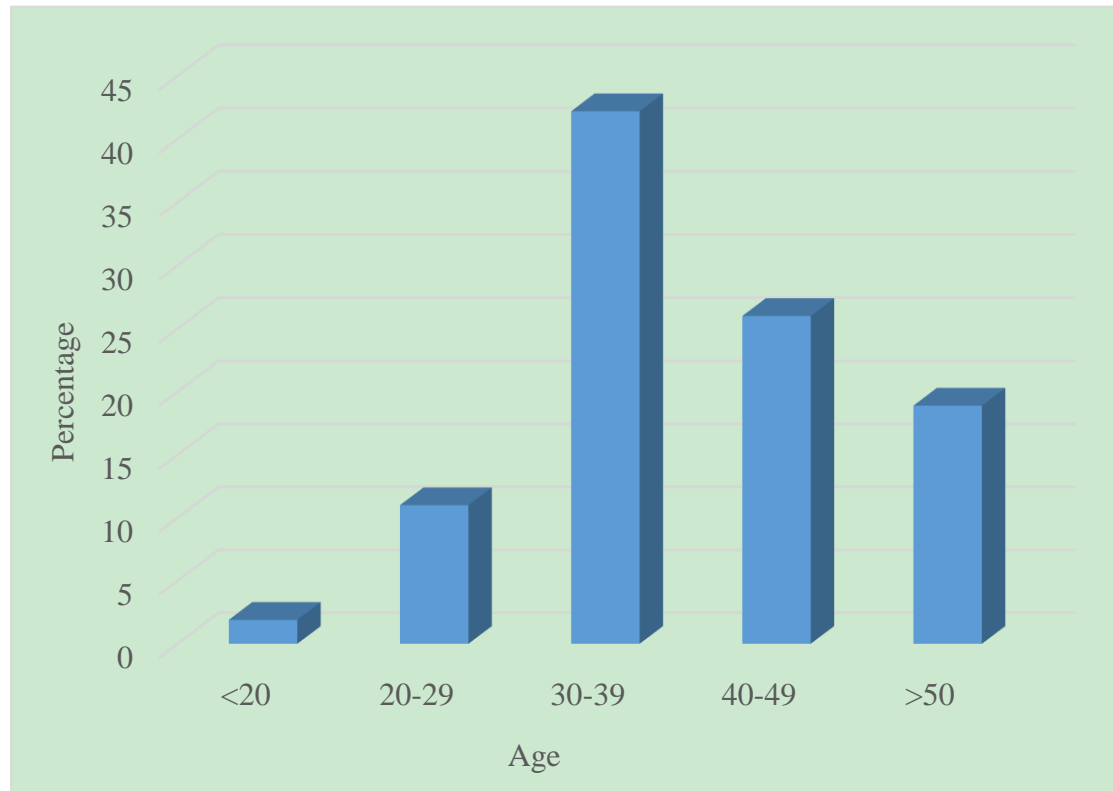
government documents. The *Sixth Population Census of Qinghai Province, 2010*, provided the most recent information on the demographic, economic and social characteristics of the study area (CPG 2012). These data provided a good understanding of the context of the study area and enabled testing of the representativeness of the sample. The study also sought contextual information on the environment, environmental change and socio-economic development from yearbooks. This information helped to describe the study area systematically and comprehensively and justified the selection of the study area. Census data and the yearbooks are all available in the CNKI database subscribed to by the University of Adelaide.

The study collected secondary data from government documents, identified through online searching, to investigate to what extent current migration and adaptation policies consider inequality. The study gathered 86 policy documents, drawn from 8 policy categories: environmental change; ecology and environment; water and land; agricultural development and adjustment; migration; education; disaster preparation and alarm; and new energy. These documents were collected from the official websites of the three levels of government. First, the national government (e.g., the Central People's Government of the People's Republic of China, the State Council of the People's Republic of China, the General Office of the State Council of the People's Republic of China, the National Development and Reform Commission, the Ministry of Environmental Protection, the Ministry of Education, and the Ministry of Water Resources). Second, the regional government (e.g., Qinghai Province Government, Qinghai Province Government General Office, Qinghai Province Department of Education, Qinghai Province Department of Finance, Dulan City Party Committee, and Dulan City Government), and, third, local government (e.g., Dulan County Party Committee, Dulan County Government, and Dulan County Government General Office).

### 3.4.6 The Socio-demographic Characteristics of Respondents

In total, 404 people, comprising 51.4 percent of males and 48.6 percent of females, accepted the home-entry questionnaire survey. **Figure 3.2** shows the age distribution of the respondents and it is evident that most of the respondents (42.2 percent) were aged between 30 and 39 years old. This was followed by respondents aged between 40 and 49 years (26 percent), while about 19 percent of them were aged 50 years and above. The least represented group were those aged 20 years and below, which constituted only 2 percent of the respondents. About 12 people participated in the community questionnaire survey; they were males in charge of 10 communities, at 2 migration sites. Seventy-two people participated in the in-depth interview survey, males accounted for 53.8 percent and females accounted for 46.2 percent of respondents.

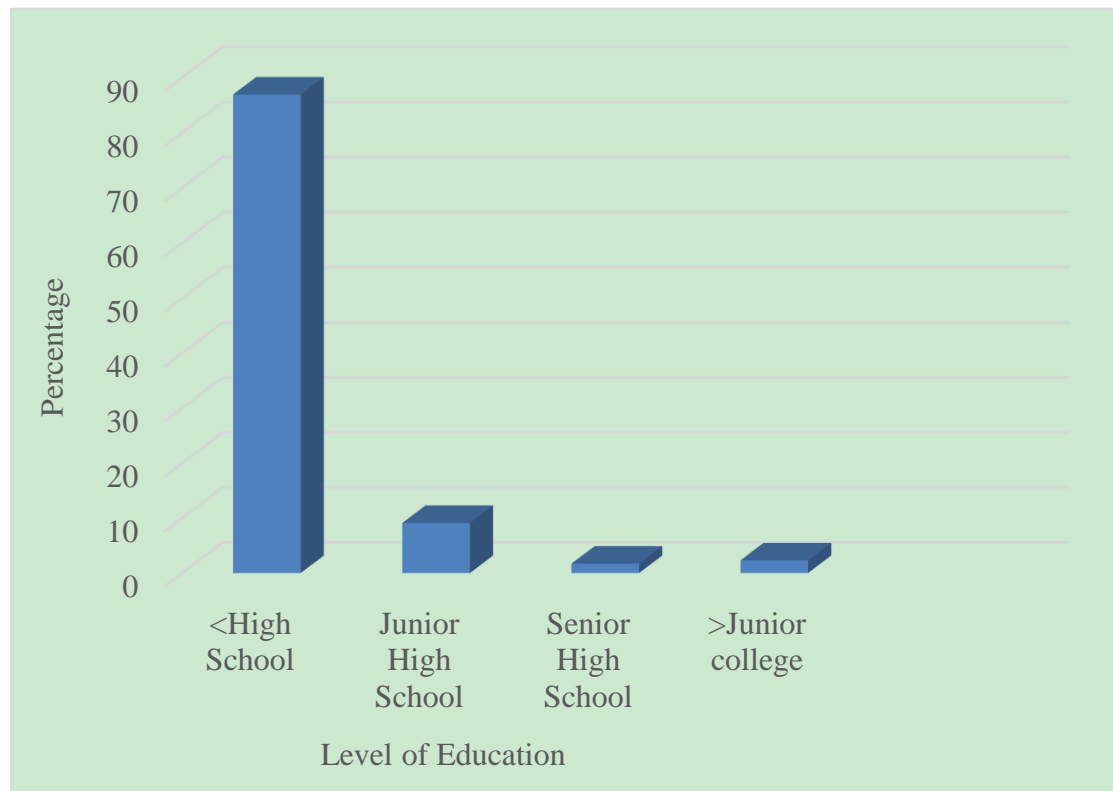
**Figure 3.2 Age Distribution of Survey Respondents**



Source: Field Survey (Household Questionnaire) 2012.

**Figure 3.3** shows the education level of respondents and overwhelmingly respondents had low levels of formal education, with about 87 percent of them having formal education up to High School level (include illiterate, primary school, middle school and did not finished high school). This was followed by those with Junior High School education (9 percent) and Junior College (2.3 percent). Only 1.7 percent of the respondents claimed to have Senior High School level education.

**Figure 3.3 Level of Education of Survey Respondents**



Source: Field Survey (Household Questionnaire) 2012.

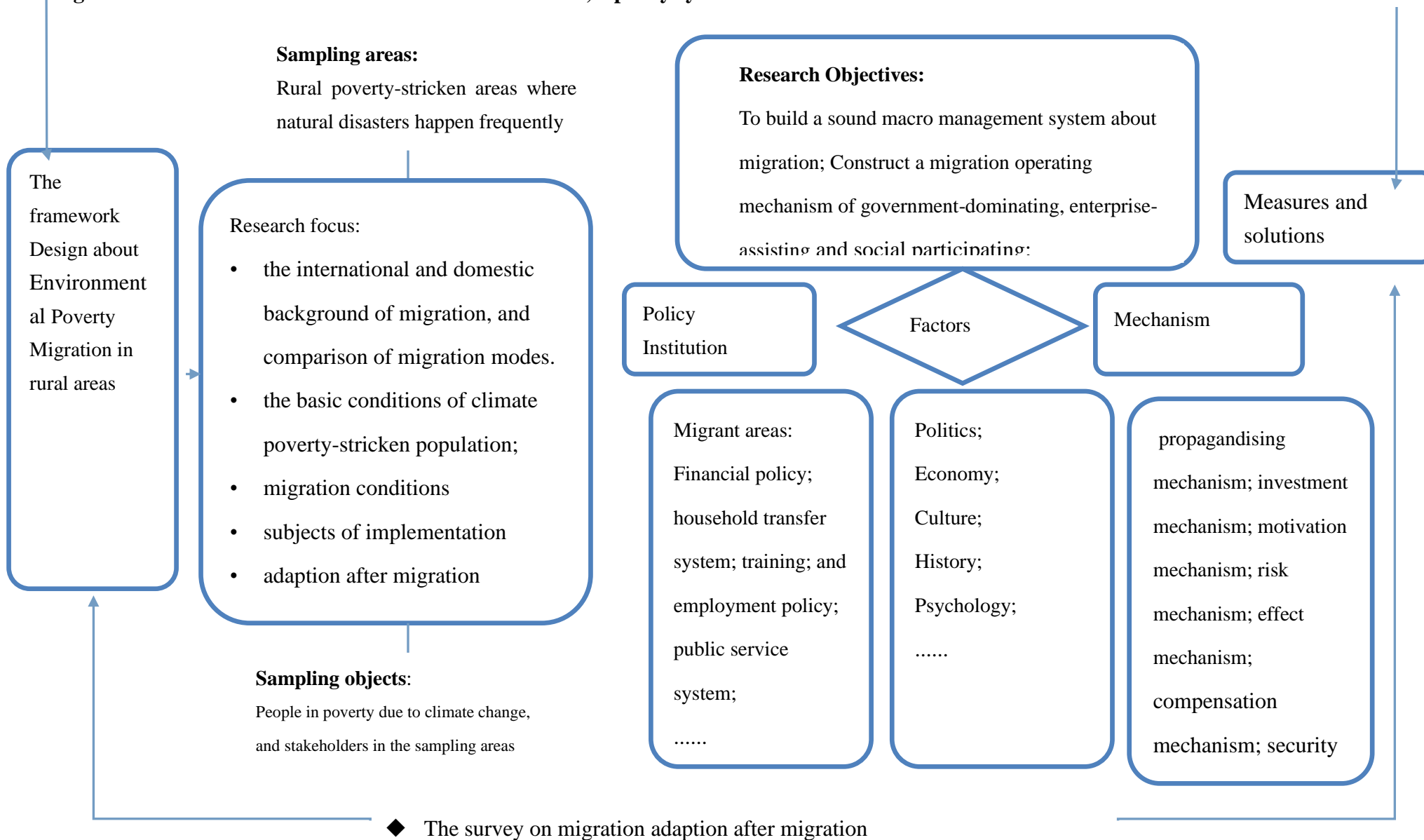
### **3.5 The Main Content of the surveys/ interviews**

The overlap between the impacts of environmental change and ecologically fragile areas will directly or indirectly exacerbate poverty. The adaptability of the populations in vast, poor rural areas, where environmental and ecological natural disasters occur frequently, is very limited, so they often fall into a vicious cycle of environmental

poverty (Yang 2006). Considering the current environmental poverty among rural populations, and economically and socially sustainable development strategies and directions, the fundamental way to solve the problem of environmental poverty is to implement environmental migration. Li *et al.* (2013) in their in-depth study looked at the problems of, and obstacles to, environmental migration and established suitable financial and technical mechanisms, a policy system and an institutional framework, as seen in **Figure 3.4**.



**Figure 3. 4 Suitable financial and technical mechanisms, a policy system and an institutional framework**



This research explores the strategic significance, of environmental migration and its relationship to poverty, and it analyses the migration patterns of these populations. It examines the relationship between environmental, ecology, poverty, population distribution and migration. It then builds a correlation model, identifying and assessing standards of the regularity of environmental poverty occurring, the economic social and political influences on environmental poverty and sets up the theoretical foundation for the correlation.

The background chapter demonstrates that environmental migration is not only a regional problem but a global issue. Lai (2008) argues that in China, the population affected by environmental poverty live mostly in rural areas, and their living and livelihood problems need to be solved. The correlation analysis and model construction are undertaken mainly to build the internal logic between multiple factors. This research examines the size, structure, distribution, patterns and living conditions of the population in poor rural areas and evaluates their impact on local economically and socially sustainable development. It analyses the current situation, the problems, the influencing factors and the conditions of relocation and resettlement in poor rural areas. It also analyses the willingness of these populations to migrate.

The most vulnerable people are the elderly, women, children and clusters of minority populations. Most of them live in areas with harsh conditions, largely in ecologically fragile areas, severely affected by environmental change (IMARG 2012). Therefore, it is imperative to design a comprehensive assessment method, which can quantitatively evaluate the adaptive capacity of human systems to environmental change and the ecology of fragile environments, focusing mainly on agriculture, food, water resources, health, the living environment and other factors. To this end, the study analyses the potential fragility and environmental risks that future environmental change may cause, and how large-scale environmental poverty population affects and challenges locally based sustainable development.

The migration stages, migration types, destinations of choice and placement methods of the population affected by environmental change in poor rural areas are the focus of this research. It also studies the operating and investment mechanisms, the policy

system and the institutional frameworks of migration that are influenced by governments. In view of China's current situation, the migration of the population experiencing environmentally induced poverty is still in its initial stages. Migration in some regions is becoming more established, but the distances involved are limited; trans-regional and inter-provincial migration remains rare. Problems relating to the placement of migrants are challenging, and the understanding of them by the government and migrant populations is very limited (Adamo 2013). Therefore, further research will help scientifically based decision-making and the implementation of reasonable and efficient migration programs. The government must influence the migration behaviour of people experiencing environmentally induced poverty in vulnerable rural areas. At the same time, spontaneous migration of those affected by environmental change must also be considered, particularly among those who have not been included in government plans, nor enjoyed the government's financial subsidies. They usually have no arable land, and lack productive capacity and livelihoods, as well as having no protection from the household registration system, so they face dire circumstances (Li *et al.* 2013).

The study analyses the adaptability of migrants to environmental change in rural areas following migration, including the connection between their origin and destination areas, and their 'survival' and development after migration. The role of migrants, governments, enterprises and society in post-migration survival and development is investigated. The core objective is to provide strong policy support, stability and safeguards after migration. Its aims to move poor people from places not suitable for development, and thereby achieve the dual objectives of eliminating poverty and improving the environment. At present, Ningxia, Gansu, Shaanxi, Qinghai and other places of northwest Chinese have relatively high concentrations of rural environmental migrants (Li *et al.* 2013). These places are likely to adopt government migration policies and accumulate some successful experiences on the connection between the origin and destination areas, migration adaptation, and role orientation. Wallerstein (2004) argues that the aim of researching adaptability is to identify relevant factors and identify the mechanisms of an adaptive policy system and an effective adaptive model.

This research conducted a risk assessment of the extent of migration by rural dwelling populations affected by environmental poverty in areas where environmental changes are relatively frequent and where early warning systems and emergency plans are needed. It identifies feasible measures to further expand the theory, policy, systems and practices related to rural environmental migration in China. Hugo (2011) argues that large-scale population migration involves regional governmental organisations, migrants and regional stakeholders assessing and managing social, economic, cultural, resource and environmental risks. For example, Shi and Chen (2006), from Heihai University, assess the risk of various populations migrating in the arid regions of central Ningxia, which are affected by environmental change. The social dimensions of migration, notably adaptation and social integration of spontaneous migrants in the eastern part of Qinghai, generated some risks; the migrants neither felt settled in the migrant areas, nor enjoyed the same conditions as local residents in relation to social security, minimum living standards and their children's education (Lu and Treiman 2007). In the economic domain, the industrial structure of the resettlement area is often not suited to the migrant population, irrigation costs are too high, water resources are insufficient, and migrants cannot adapt to new methods of agricultural production. In relation to cultural factors, basic cultural facilities, and sport and leisure facilities in resettlement areas are generally deficient (GOMCG 2009). Recreation and spiritual life are also unsuitable. Opportunities for leisure and spiritual practices are often inappropriate. In addition, if migrant's religious life is disrupted, it can lead to conflict.

Rural migrants may increase pressure on natural resources and the environment in the areas to which they relocate. Therefore, in order to smoothly implement any migration plan, it is crucial to study and evaluate the risks of large-scale migration, to establish relevant early warning systems and mechanisms, to formulate relevant emergency plans, and to promote the healthy function and coordinated development of that society.

International researchers and those based in China have reached agreement that migration by people experiencing environmentally induced poverty in rural areas is one of the mechanisms to adapt to environmental change (Tan *et al.* 2014). The

Chinese government and scholars have developed an overarching strategy to solve the poverty of rural populations living in areas of frequent environmental change, by promoting resettlement migration. Specific strategies include introducing policies to encourage population migration or carrying out population migration projects, as well as strengthening governance, supervision and evaluation of population migration settlement policies and projects to reduce the negative effects of large-scale migration (Gu *et al.* 2011).

### **3.6 Conclusion**

As one of the areas with the world's most serious natural disasters, western China is frequently hit by abnormal and widespread environmental change. Harsh and widespread environmental conditions result in poverty for much of the population. This has become a problem that cannot be ignored. Such conditions, in an environment with frequent and extreme environmental disasters, results in the impoverishment of much of the population in rural areas, enormously damaging their production, their livelihoods, and economic and social development. Therefore, it is imperative to organise large-scale population resettlement migration systematically and adequately supported by government.

Environmental change in ecologically vulnerable areas will directly or indirectly exacerbate poverty. The populations in vast impoverished rural areas stricken by environmental and ecological disasters have limited resilience, leading to a vicious cycle of harsh environmental conditions deepening their poverty. This research uses a mixed methods approach to study migration strategies, relocation planning and policy. It focuses upon the relocation systems and mechanisms of poor populations in climate disaster-stricken areas, to establish a model of migration for poor populations in environmental disaster-stricken rural areas, and to advocate feasible policy measures.

## **Chapter 4 Why is it Necessary for People to Move: An Analysis of Out-migration Areas**

### **4.1 Introduction**

Migration in western China due to environmental factors has distinctive regional characteristics, different from those influencing migration due to unfavourable environmental conditions in most regions around the world. Therefore, this chapter analyses a large data set collected from relevant departments of the Ledu County government, which clearly describe environmentally induced migration issues in western China, especially in the Tibetan area. It is important to note that much of government data used in this research were internal data that are not publicly reported, and these kinds of data were used for the government policy design. The conclusions are discussed below.

First, the main reasons for migration include environmental change and economic factors. Environmental factors include ecological vulnerability and poor natural conditions in the rural areas where migrants used to live. Ledu County not only had an unfavourable natural environment, stricken by severe geological disasters, but also very difficult transport and poor exchange of information, leading to poverty among the majority of the population which has greatly damaged its production, as well as its economic and social development.

Second, Ledu County is in one of the poorest regions of China. Despite its urban economy improving after 30 years of reform, its industry has made almost no progress, and its agriculture is also extremely backward. Local people generally have difficult lives. Moreover, harsh environmental conditions directly contribute to the absolute poverty of local people. Therefore, environmental and economic factors were identified as the major reasons for relocation, and these two factors affect each other.

## **4.2 Profile of The Resettlement Migration Project**

### **4.2.1 Overview of the Project**

The Xiangba project is one of the “Three poverty reduction projects” implemented by Qinghai province at the end of the Twentieth Century (DCPADB 2010). It moves poor people living in the drought-stricken mountainous area of eastern Qinghai to the Xiangride and Barron areas of Dulan County, located in the central south region of Qaidam Baisan. The project was planned to realise goals such as exploring the rich land and water resources in the settlement region, helping poor rural populations become rich, as well as restoring and improving the ecology and environment in the original place of residence. It was started formally at the end of 2001, based on the principle “land determined by water, population determined by land”, and was completed at the end of 2003; it successfully passed inspection (DCPADB 2010).

The Xiangba project started in 1996. The original plan was implemented by using a loan from the World Bank, as well as partly by domestic investment. However, the world bank loan ceased in 2001 (Guan 2005). Then, the state government decided to implement the project in 2001 by incurring national debt. The project started at the end of 2001 and was essentially completed in October 2003. It was rated as a qualified project on December 10th, 2003, on the basis of its comprehensive acceptance by both state and province (DCPADB 2009). The implementation areas include: Xiangride township, Barron town, Xiangjia town, and Gouli town in Dulan county, the Oasis Agriculture Development Cooperation Limited and the Ecological Reserve surrounding Tuosuo Lake, with a total area of nearly 12,400 square kilometres (DCPADB 2008). The total investment for the project was 430 million Yuan and it offered various infrastructure facilities for the project area and a series of supporting projects, such as rural roads, irrigation projects for farmlands, drinking water provision for people and livestock, power engineering, cultural and educational resources, all of which provide a firm foundation for the sustainable development of the project area (Guan 2005).

#### **4.2.2 Background of the Xiangba Project**

The implementation of the Xiangba project addressed the following issues. The first was the development focus of the national 'Poverty alleviation project'. In 1999, a working conference on poverty reduction was held by local government. When this was re-examined at the end of 2000, it was noted that there were some people living in extremely poor natural conditions, especially in some remote mountainous areas and in parts of the ethnic minority areas. Those areas lacked basic productive and living conditions, and it was considered necessary to resettle their population (DCPADB 2007). It was estimated that the national resettlement program had reached between five million and six million migrants, in addition to the 1.2 million impoverished people already resettled by 2008. It was estimated that between 4 and 4.8 million poor people in mountainous areas still needed to migrate as a way to alleviate their poverty (DCPADB 2008).

The second issue in the project's implementation was the background of the migration area. The proportion of poor people was higher in the drought affected, mountainous areas of eastern Qinghai, due to its geographical features and for historical reasons (DCPADB 2011). By the end of 2000, the number of people in absolute poverty in the whole area was 0.5 million. About 0.1 million people lived in harsh conditions, and the impoverished population was concentrated to create regional poverty. The average annual income of 30 percent of the population was less than 600 RMB, which was below the basic living line. It was found that in this area it was extremely difficult for both people and livestock to have enough water to drink. The drought rate reached up to 90 percent, and nearly 10 percent of families were extremely poor. It was found that parts of the population were forced by drought to leave their hometown and to seek new living environments, and they also needed to ask friends or relatives for help (DCAB 2002).

Thirdly, this region was in a remote area, its transport and information exchange conditions were poor, with most of the areas having ethnic minority ghettos. Social and economic development was also backward and had progressed slowly (DCAB 2010), due to harsh natural conditions. At the same time, the slower economic growth



and poverty in Qinghai province, has also seriously hindered the process of social advancement and national unity. Thus, the provincial Party committee, as well as the provincial government of Qinghai, made the strategic decision “...to improve western poverty by making use of the eastern strength” based on research and investigation through summarising lessons gained from previous experience (DCPADB 2010). The government responded to the problem of poverty by organising poverty reduction, developing Qaidam’s oasis-led agronomy and by creating new living conditions.

### **4.3 Background of the Project Area.**

The area of Xiangba project is in Dulan County, located in the Central South Qaidam Basin in Qinghai; the ancient Southern Silk Road runs across the whole area. The grand frescoes of NuoMuhong culture have recorded the long history of this area; the scale of preserved ancient tombs confirm the splendid culture created by its ancestors. The word Dulan is Mongolian, and means warmth (DCAB 2009). It explains why the Dulan area was suitable for human survival in the Qaidam Basin. The County, 60 kilometres from Chahanwusu town, in the east, and 294 kilometres from Golmud City, in the west; national road 109 runs across it. Xiangride is a Tibetan term, but in Chinese it implies a place with many lush trees. The Xiangride River divides the whole area into two parts: east and west. Rich water resources, more sunny days, longer frost-free periods and fertile soil provide unique conditions for growing agricultural products. Hence it was praised as Qaidam’s granary (DCAB 2009). There are large Xiangride farms owned by Qinghai province within the area.

Barron Township, another of the main implementation regions, is located in the southern centre of Dulan County. Barron is Mongolian and means “right” (as opposed to left) in the Han language. It is so named because it is located in the meadowland of both Qinghai Mongolia in the Qing Dynasty, and the right-wing league of the Shuote tribe (DCAB 2009). It connects with Xiangride in the east; transportation is convenient because national road line 109 runs through it. The total area of its townships is 5687.22 square kilometres and its total population is 3,300. Mongolian people account for 64 percent of its population, with the rest being Han, Tibetan, and

Hui. It is an area that is based mainly on animal husbandry, but it combines agriculture and animal husbandry. There are vast amounts of arable land under the management of the original Xiangride farm and the famous Dulan international hunting field (DCAB 2009).

**Table 4.1** shows that the project has resulted in the removal of about 3,520 families, constituting 16,131 persons. Among them, migrants from the Haidong and Xining areas numbered 3,107 families, comprising 14,174 persons. The impoverished population resettled in the local Dulan County comprised 413 families, totalling 1,957 persons. The whole project has comprehensively developed 320,000 mu of land. The transformation of medium yield farmland accounts for 154,300 mu, of which 14,700 mu has been used for forestation, 7,900 mu for artificial grass, and 150,000 mu of Seal Beach, which houses more than 150 construction projects. The total area of cultivated land is 60,680 mu in the project region, and they are all flat high-yield fields, which can be irrigated (DCPADB 2010). Moreover, if the agricultural system was improved, 20,000 migrants could be resettled.

**Table 4.1 Xiangba Migration Project Statistics**

Sending area	Households	Population	Proportion
Ledu	1131	5251	32.6
Huangzhong	556	2356	14.6
Hualong	398	2012	12.5
Minghe	302	1469	9.1
Pingan	180	785	4.9
Huzhu	155	620	3.7
Huangyuan	11	502	3.1
Xunhua	87	380	2.4
Dulan	413	1957	12.1
Total	3520	16131	100

Source: Bureau of Agriculture Development, Poverty Alleviation, Dulan 2002

According to government statistics, Ledu county is the region with the largest migration population. Therefore, research selected Ledu county as the main research area. Migrants in the Xiangba project come from arid areas with harsh living conditions. The location was remote, its transport and information traffic was quite poor, and its economic, cultural and educational resources were underdeveloped and its society had developed slowly (DCPADB 2007). The fragile environment had deteriorated further due to natural and human factors. Poor natural conditions have seriously restricted the development of both the local society and economy. Therefore, the implementation of an off-site, development-oriented poverty reduction project was necessary, and it needed to be far-reaching to resolve the problem of poverty in rural areas and to improve the fragile ecology of the area.

Agricultural development in the Qaidam Basin has existed for several hundred years and is based on such strengths. Agricultural development in the Dulan area also has historical roots. Xiangba is termed 'the granary' of Qaidam Basin; its climate is relatively warm, water resources are adequate, and the altitude ranges from 2,600m to 3,000m. The area of the Xiangba project encompasses large areas of high-yield

farmland, through decades of development. Abundant water and grass surround the whole area. It is a region of broad-based human activity. The original Xiangride state-owned farm is a penal farm. In recent years, along with the national adjustment of prison distribution, in 1980s, farmers left with plenty of space that is very suitable for further development (DCPADB 2010).

These conditions offer superior developmental conditions and prospects that not only solve the need for living space for migrants of eastern Qinghai but are also conducive to the overall development of the local economy. Furthermore, they create an historical opportunity for the implementation of agricultural poverty reduction by the Xiangba project.

#### **4.3.1 Main Source Areas of Migration**

Migrants in the Xiangba project mainly came from the Haidong and Xining areas in eastern Qinghai. The total area of this region is estimated to be 20,116 square kilometres (Xining town excluded), with an altitude ranging from 1,700m to 4,000m. This area is a plateau, with a temperate, semi-arid climate; its unstable and infrequent rainfall has an imbalanced seasonal distribution (DCAB 2010). The annual precipitation is 300mm-600mm, while the summer precipitation constitutes between 58 percent and 65 percent of the year's supply. Drought is the area's most serious natural disaster and it happens frequently. The drought rate in spring is between 35 and 60 percent, while the summer rate is between 8 and 45 percent, the constant drought rate between spring and summer is between 5 percent and 25 percent. The annual average temperature in large parts of this area is just above zero degrees Celsius; the average temperature in July ranges from 10°C to 18°C, while in January it is between -5°C and -10°C (DCAB 2009). The area's main soil types are mountain brown soil; meadow chestnut soil; alpine steppe soil; and alpine cold desert soil. The cultivated soils are loess, white loess and red loess, which are loose and vulnerable to erosion.

### **4.3.2 Main Reasons for Out-Migration from Ledu County**

Environmental change hits poorest people the hardest; those living in vulnerable areas such as Ledu county tend to have the fewest resources to help them adapt to, or recover quickly from, shocks. As the effects of environmental change worsen, escaping poverty becomes more difficult (World Bank 2001). Hence, environmentally caused poverty refers to poor populations suffering an environmental dilemma. Therefore, implementing large-scale environmental migration, step-by-step, based on rational planning, is a matter of urgency.

#### **4.3.2.1 Reasons Related to Geography**

Ledu County, of Haidong Prefecture in Qinghai Province, is characterised by such an environment. Ledu County is full of continuous mountains, criss-crossed by gullies, and the Huangshui River flows throughout the county from west to east (DCAB 2009). The Huangshui River is the boundary between the northern and southern parts, which are two structural units, including an uplifted zone in geosynclinals folded system of the Qilian Mountains, as well as a geosynclinals folded Zone of Laji Mountain (**Plate 4.1**). Ledu Basin is between the large western gorge and the eastern Laoya gorge.

#### Plate 4.1 Ledu County geomorphic



Source: Field Survey in Ledu 2012

The terrain inclines from west to east, with a high western part and a low eastern part. It is distributed in a stepped manner, with altitude ranging from 1,850 m to 4,480 m. The natural zone in the whole county is a typical transition zone between the Qinghai-Tibet Plateau and the Loess Plateau, and is divided into four types:

- The area from the altitude of 3,000m to the snow line (about 3,700 m), is a forest prairie area with deep gullies and cliffy mountains (**Plate 4.2**).
- The area within the altitude between 2,800m and 3,000m is the Nao Mountain farming area with a low, even and round terrain, obvious undulations and shallow gully cuttings.
- The area within the altitude range of 2,000m to 2,800m is a shallow-mountain loess hilly region, with criss-crossed ravines, slopes with large and deep grooves, serious water and soil loss, and sparse vegetation, and
- The area within the altitude between 1,850m and 2,000m is a stream basin valley with flat terrain, and is the major farming area (DCAB 2009).

#### Plate 4.2 Ledu County geomorphic



Source: Field Survey in Ledu 2012

Until now, 95,287 people have been living in the shallow Nao Mountain area, as well as poverty-stricken areas with steep gullies, poor transport conditions and serious geological disasters (Liu *et al.* 2007). To improve productivity and living conditions, and to reach the goals of poverty alleviation, and prosperity, it is necessary to complete some very arduous tasks.

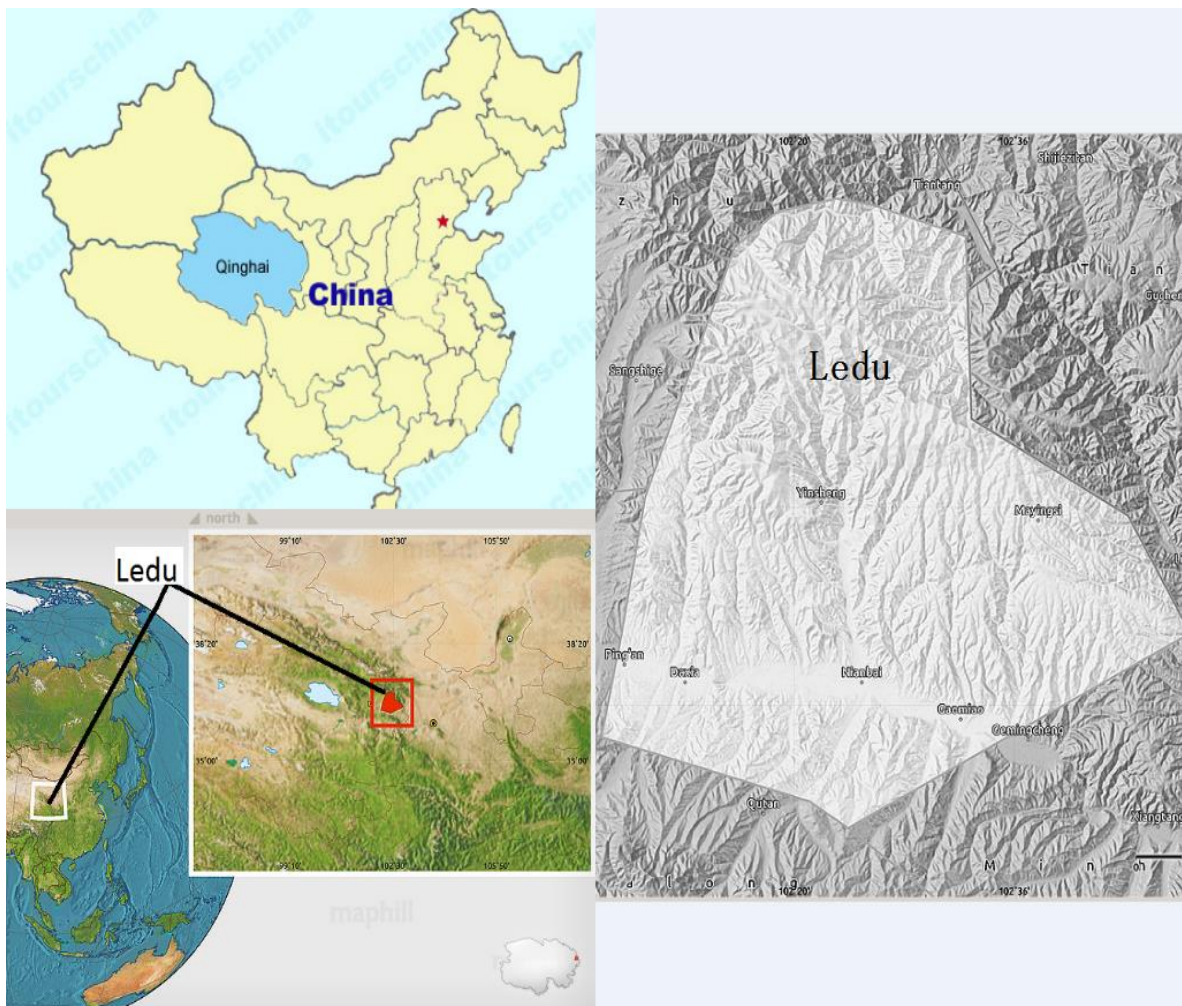
#### 4.3.2.2 Reasons Related to The General Condition of Ledu County

**Figure 4.1** shows that Ledu County is located in the middle and lower streams of the Huangshui River in eastern Qinghai province (GOLCG 2002). It connects Minhe County in the east, Ping'an County in the west, Hualong County in the south, and Huzhu County in the north. Its width, east to west, is 64 kilometres, and it is 76 kilometres north to south. The total area is 3,050 square kilometres, including 388,600 mu of arable land. It ranges between 1,850 to 4,480 metres above sea level, with an annual average temperature of 6.9°C, annual average rainfall is 335.4 mm, and it has 144 days frost-free per year. The Lanqing railway and highway cross it. The county is 63 kilometres away from Xi'ning in the west, 36 kilometres from Caojiabao Airport,



and 169 kilometres away from Lanzhou, in the east. The location is advantageous because of the convenient transportation (GOLCG 2003). The county has 7 towns and 12 villages, 354 administrative villages, and 7 resident committees. In 2010, the total population of the towns was 288,200 people, with 239,900 people in rural areas. It is a gathering place for Han, Tibetan, and Mongolian, Hui, and Tu people. In 2002, it was designated as a national poverty development Pilot County by the state government.

**Figure 4. 1 Geographical Features of Ledu County**



Source: Geographic Journal of Ledu County (2012)

The location of Ledu is advantageous and unique. It is in between the two provincial capitals of Lanzhou and Xi'ning. It is 35 kilometres from Caojiabao Airport, the biggest airport in Qinghai. The Lanqing railway, the Lanxi highway, and the 109 national highway run through the whole county (GOLCG 2011).



#### **4.3.2.3 Reasons Related to The Climate of Ledu County**

Due to its location at the edge of Tibetan plateau, Ledu County's climate is influenced by the summer Indian Ocean monsoon and its westerly circulation in winter. Hence, summer is not hot, the four seasons are not distinct, and it is dry and windy (GOLCG 2005). The annual average temperature is 6.9°C. July is the hottest month, with an average temperature of 18.6°C, while January is the coldest month, with an average temperature of -7.2°C. The average temperature gap is 25.8°C. In the last 30 years, the year highest temperature reached 38.4°C (July 24th, 2000), while the year lowest temperature was -21.7°C (December 13th, 1975). The annual average sunlit hours are 2,664.6 hours (GOLCG 2011). Rainfall is scant but concentrated, and with an uneven distribution. The annual average precipitation is 329.6mm, while the annual average evaporation is 1,613.8mm; 4.9 times that of precipitation. The frost-free period is 217 days per year. Table 4.2 provides details about the temperature, precipitation and sunshine conditions of Ledu County. Year 2002 was the most important year for the migration project, the climate data of 2002 were selected to illustrate the climate of the migration at that time.

**Table 4.2 Temperature, Precipitation, and Hours of Sunshine 2002-2003**

	UNIT	2002
Average Temperature	°C	8.5
Maximum Temperature	°C	34.2
Minimum Temperature	°C	-17.9
Average Air pressure	100P	802.7
Wind Direction		EAST
Maximum wind Speed	M/S	10.0
Maximum Wind Degree	Level	3-4
Extraction Level	MM	1826.6
Days with Precipitation	Day	110
Sunshine hours	Hours	2699.8
Sunshine percentage	%	61
Non-frost periods	Day	162
Days with Hail-s	Day	——
Days with Thunder	Day	165
Precipitation	MM	259.7

Source: GOLCG (2011)

#### **4.3.2.4 Reasons Related to The Historical Issues and Economic Development**

Ledu possesses a long history. Approximately 4,000 years ago, ancestors lived on this land. In the Western Han dynasty, Ledu was formally incorporated into the feudal dynasty's territory. In Long'an Year Three of Eastern Jin, Xinbei founded Nanliang and made Ledu the capital. In the Sui and Tang dynasties, the Shanzhou governor's mansion was established (GOLCG 2007). In the Song dynasty, it was called Miaochuan city, while it was known as Nianbowei in the Ming dynasty, and Nianbo County in the Qing dynasty. In 1929, Qinghai province was set up, and was renamed Ledu County. Currently, it belongs to the Haidong region.

From a longitudinal perspective, Ledu County has experienced quick economic development since the period of reform in China began. However, it still falls behind

national and provincial development levels. The first reason lies in its weak economy and its inadequate financial resources. In 2008 national per capita GDP reached 22,698 Yuan; provincial per capita value reached 17,389 yuan (NBS 2011), while the per capita GDP of Ledu County was only 8,454 Yuan. This was only 37.44 percent of the national average, representing a gap of 14,244 Yuan, and a gap between Ledu Country's per capita GDP and Qinghai Province's level of 8935 Yuan. In 2009, the GDP of the whole county was 2.764 billion Yuan; the general budget revenue of local finance reached 0.054 billion Yuan; the per capita GDP was only 9522 yuan; while the per capita fiscal revenue was only 185 Yuan. Thus, for both the economic aggregate and fiscal revenue scales, Ledu country ranked poorly in comparison with national and provincial levels (GOLCG 2011). **Tables 4.3 and 4.4** give some statistical information about the economic circumstances of Ledu County for the periods 2000-2005 and 2005-2010, respectively (Detailed information is presented in Appendix 4)

The second reason for Ledu County's low level of development is its low level of urbanisation. In 2011, the urban population constituted 45.7 percent of the nation's total population, while the provincial urban population comprised 40.9 percent. However, the urban population of Ledu County constituted only about 16.2 percent of its total population; well below national and provincial levels. Among the 19 villages and towns, there are 7 natural towns, but their scale is relatively small. Urban infrastructure is underdeveloped, and the flows of materials, people, information and capital are limited. In addition, channels are not smooth and play a weak role in the radiation of economic activity and motivation and thus the progress of urbanisation falls behind that of more developed areas (GOLCG 2006-2011).

The children in **Plate 4.3** demonstrates that they need to walk 20 kilometres from home to school every day with the road conditions being awfully bad. Many children cannot continue go to school after primary school. This helps to explain the high level of illiteracy and limited educational opportunities in the region.

**Plate 4.3 Local children after school on their way home in Ledu County**



Source: Field Survey 2012

The third reason lies in the small scale of industrial and economic activity in the area. Fundamentally, the development of the county's economy must be through industrialisation, because only it can allocate various resources, through market operation, to places where maximum benefit can be obtained. However, there is virtually no industrial economy in Ledu County, as shown in **Table 4.3**.

**Table 4.3 Industrial Value for Companies Based in the County (Current Value: Yuan)**

	2002	2001	Comparison
Total	14490.3	16789.1	-13.69
1. Government owned Businesses	153.8	4537.1	-96.61
Ledu water company	153.8	117.4	31.01
Ledu rice and oil production company	—	395.4	-100
Lanpo—Ledu subsidiary	—	4024.3	-100
2. Privately owned Businesses	14336.5	12252.0	17.01
Qinghai Tongli Iron Company	1518.7	1386.7	9.57
Qinghai Ledu Concert Company	3721.0	1777.1	109.39
Ledu Plastic Company	236.4	491.7	-51.92
Fulihua Food industry	98.2	181.7	-45.95
Huaxia Concert Industry	8725.5	8374.0	4.20
Ledu Printing Industry	36.7	41.5	-11.57

Source: Ledu Statistics Bureau (2002, 33)

The fourth reason relates to the slow upgrade of industrial structures. As can be seen in **Table 4.4**, the increments of primary, secondary and tertiary industries in Ledu County reached 0.53 billion Yuan, 0.848 billion Yuan and 1.384 billion Yuan, respectively, during 2011, which constituted 19 percent, 31 percent and 50 percent of the whole county's GDP, respectively (GOPGQP 2003).

**Table 4.4 Main Social Economic Figures of Ledu County in 2002**

	Units	2002	2001	Comparison
<b>County Companies and Institutions</b>				
1. The number of companies		3736	3736	0
2. Employees	People	34997	36666	-4.9
3. Total production Value	Million RMB	906.16	830.56	9.1
4. Increase in value	Million RMB	256.98	233.61	10.0
<b>Social and Domestic Production</b>				
1 Total domestic production (past value)	Million RMB	980.54	879.09	11.54
2 Total domestic production (Current value)	Million RMB	993.49	893.13	11.23
3 GDP per Capita	RMB	3411	3063	11.36
4 Total output	Million RMB	2180.65	2000.94	9.0

Source: GOLCG (2002, 10)

In comparison with Qinghai Province, the percentage occupied by primary industries was 8 percent higher than the provincial average of 11 percent, while the percentage occupied by secondary industries was 24 percent lower than the provincial average of 55 percent. Clearly the scale of industry and its contribution was too low, and the progress of industrialisation has been slow. The percentage occupied by tertiary industries was 14 percent higher than the provincial level, reflecting that the county is becoming increasingly industrialised. Primary industries occupied the lowest percentage of economic activity, secondary industries occupied the largest percentage. This conforms to the national pattern. The secondary industries are taken as the economic pillar with active economic activity still running, and tertiary industries are operating stably. The economy in Qinghai Province demonstrates the industrial structure of secondary → tertiary → primary industries, indicating that secondary industries occupy the largest percentage and have become the economic pillar of Qinghai Province after a period structural adjustment (GOPGQP 2009).

The Economy in Ledu County shows the structure of tertiary → secondary → primary industries, indicating that the industrial economy is not well developed in secondary industries, and that economic growth can only be supported through general public service expenditures by administrative institutions in the tertiary sector. Tertiary industries occupy a significant percentage in Ledu County (GOLCG 2010). Traditional industries, such as the transportation industry and wholesale and retail industries, occupy a large percentage; emerging service industries, such as information technology, information consulting services, finance and insurance, culture and entertainment, are developing slowly and occupy a low percentage (GOLCG 2002). Party and governmental administration associations occupy a large percentage. Hence, the economic structure is somewhat irrational, because the main income is from sheep grazing in Ledu County (**Plate 4.3** The photo was taken on the road when researchers travelled to Ledu county), and the economy is fragile. This means that the county can easily be influenced by environmental and climatic changes.

**Plate 4.3 The main income is from sheep grazing in Ledu County**



Source: Field Survey in Ledu 2012

## 4.4 Migration Patterns

As can be inferred from **Figure 4.2**, in 2002, 2,253 people, constituting about 496 households, migrated to Xiangride Farm and 686 people from 146 households migrated to Saishike Farm both located in Dulan County. In 2003, 2998 people (i.e. 635 households) migrated to Xiangride Farm in Dulan County; while in 2005, 432 people (i.e.101 households) migrated to Golmud Gelemude zhen. During resettlement migration project, 6,369 people (i.e. 1,378 households) were resettled.



Figure 4.2 Resettlement from 2002-2005



Source: Geographic Journal of Ledu County 2005

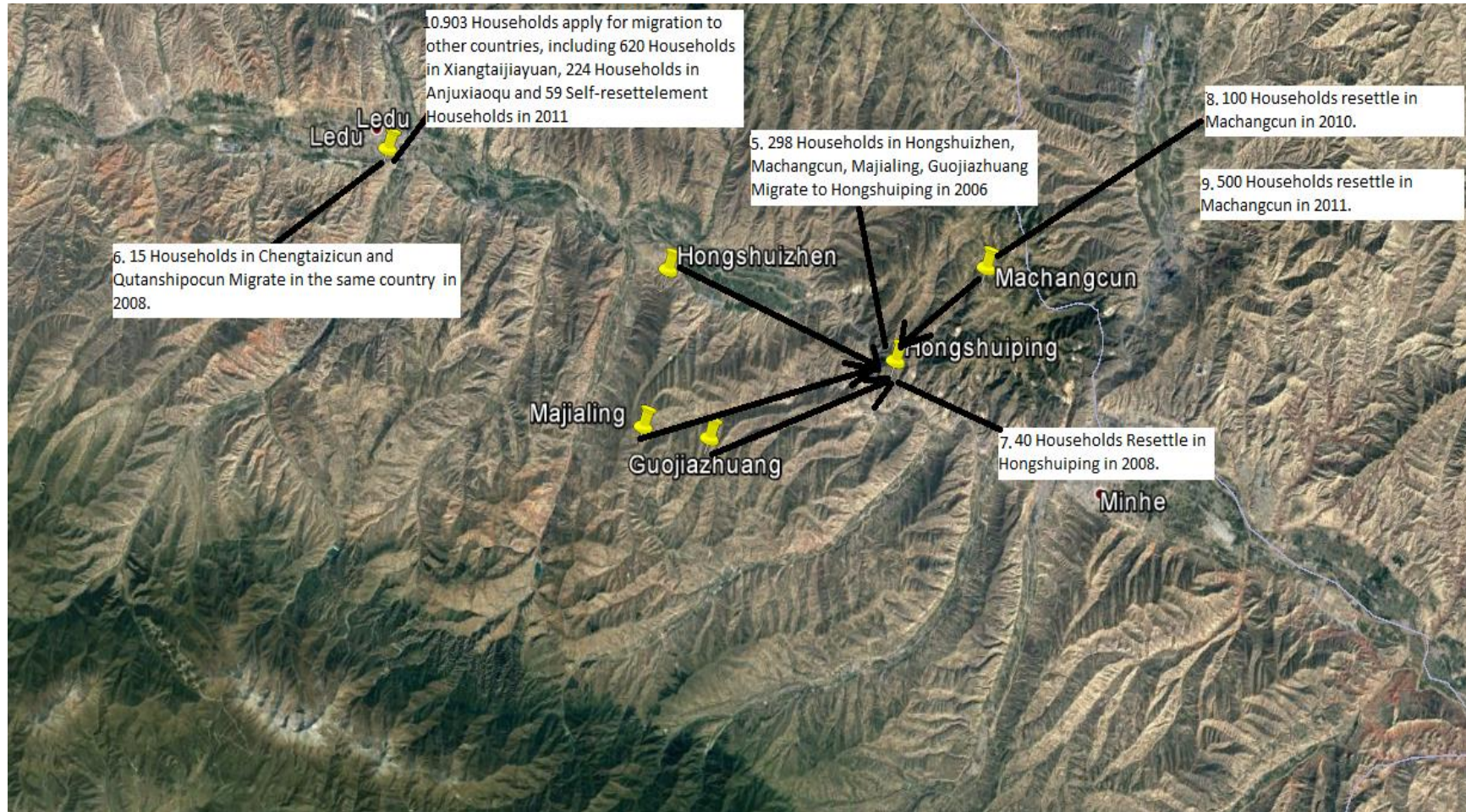
The remainder of the statistics related to migration shown in **Figure 4.3** as follow:

- In 2006, 1,351 people (298 households) in the villages of Machangcun, Majialing and Guojiazhuang and Hongshuizhen migrated to Hongshuiping village (No.5 in **Figure 4.3**);
- In 2008, the local migration project included 68 people (15 households) in Chengtaizi and Qutanshipo villages, with a total investment of 680 thousand Yuan. Meanwhile, a resettlement project was implemented for 169 people within 40 of the remaining farmer households in Hongshuiping village (No.6 and 7 in **Figure 4.3**);
- In 2010, 376 people (in 100 households) in Machangxiang village were resettled. In 2011, 1,906 people (in 500 households) were resettled (No.8 in **Figure 4.3**);
- In 2011, the resettlement project of 3,287 people (in 903 households) was declared, wherein there were 2,406 people (in 620 households) settled in Xiangtaijiayuan village. Also, 626 people (in 224 households) in Anjuxiaoqu village, 255 people of 59 households for self-resettlement, and 7,157 people of 1856 households for migration resettlement (No.9 and 10 in **Figure 4.3**);

By the end of 2012, poverty-relief resettlement was completed for 13,526 people in 3,234 farmer households. Of these, 6,369 people, in 1,378 households, were involved in outer-county migration, while 7,157 people, of 1,856 households, were involved in in-county resettlement (DCAB 2009).



**Figure 4.3 Resettlement from 2006-2011**



Source: Geographic Journal of Ledu County, 2005

#### 4.4.1 Reasons for migration

Resettlement migration from Ledu County is government oriented and residents voluntarily choose environmental migration. After the government proposes participation in the migration project, every individual has the independent choice to participate or not. Refusal is an option. During this process, the government constantly publicises the migration policy and answers questions (LCPADB 2013). During the field work survey, there was no evidence that the government forced migration on people, indicating that all residents were totally free in the process of choosing to migrate or stay.

The Government of Ledu County provides the following support: infrastructure projects, productive development projects, science promotion projects and other projects. The support provided by such projects is one reason migrants show enthusiasm for the project (LCPADB 2011). This involves relationships between national and relevant departments, as well as grass-root units. The constructive aspects of the project was possible because of the combination of the national departments and grass-root units. Among the migrant's motives, it can be observed that "looking for survival" was the most powerful (Zhang *et al.* 2011). After the identity of migrants is approved, they start receiving the benefits of various preferential policies and get national support. Survival and recovery were a relatively long process. In fact, change of personal selection preference cannot be separated from the specific situation. Also, such a change was a continuous and dynamic process (Li *et al.* 2013).

Secondly, migrant behaviour was intricately linked with the future developmental direction of the family, thus it inevitably affects each aspect of the family. The economic status of the family, the relationship between members, and member characteristics will influence behavioural choices (Xue *et al.* 2007). The internal familial factors that can cause an influence on behavioural choices include family structure and family functioning. Boys and girls in migrant families have gendered choices, influencing behaviour. For example, boys can accept more training, participate in training and go out for work in remote places. On the contrary, girls farm at home or do part-time jobs for the family. Different options and choices will influence earning capacity of the household.

At the same time, social capital are resources in social relations. When an individual hopes to achieve a goal, he can use social assets. Social assets refer to investment in social relations

(Zhang *et al.* 2011). Migrants can gain and use the resources of other migrants through social relationships. The social assets within this group are based on various social relations, creating access to resources. In reality, the social relations of migrants are basically based on relationships with acquaintances and relatives. They are social assets based on affinity and geography (Li *et al.* 2013).

In different stages, the relationship between migrants and the environment differs. Before migration, the group's existence is based on the survival processes employed by their ancestors. These processes have damaged the environment, while utilising it. Excessive reclamation and environment change has gradually given rise to the deterioration of the environment. After resettlement migration, they integrate into the local life and participate in sustainable development (Li *et al.* 2013).

#### **4.4.2 The Achievements of Migration**

Since the implementation of the 2002 poverty-relief, resettlement pilot project in Ledu County, governments have provided positive guidance. Local people have also taken part in realising the resettlement of poverty-stricken populations, which could not develop local production or realise the alleviation of poverty in their original place of residence (GOLCG 2012). Through migration:

- Production and living conditions have improved in resettlement areas;
- The ability for comprehensive development has been enhanced;
- Migrating people are more likely to increase their income;
- Poverty alleviation has been implemented more quickly, and
- Ecologies and environments in out-migration areas are effectively restored and protected.

Through poverty relief, migrants have avoided the vicious circle of “develop more lands due to poverty, become poorer due to that developing” that had operated for a long time. They have also liberated themselves from traditional productive process of deforestation and wasteland reclamation, as well as extensive cultivation. The population pressure on resources has been relieved, and land and labour resources are now being allocated rationally.

#### 4.4.2.1. Macroeconomic effects

The migration project has had positive effects on national economic development, including Gross Domestic Product (GDP), the net incomes of farmers, and labour productivity. **Table 4.6** shows the changes in the net incomes of farmers and GDP in Haidong prefecture between 2001 and 2008.

**Table 4.5 Changes in the net incomes of farmers and GDP in Haidong Prefecture between 2001 and 2008**

Years	2001	2002	2003	2004	2005	2006	2007	2008
Net incomes of farmers (RMB)	1248	1393	1547	1764	2011	2315	2727	3219
Increase of net incomes (RMB)	128	145.1	153.9	216	304	247.2	412.3	491.7
Increased amount of GDP (one million RMB)	4.71	6.17	7.21	9.42	7.44	10.56	17.31	20.3
GDP per capita (RMB)	2878	3261	3719	4313	4768	5417	6493	7734
Amount of GDP increase per capita (RMB)	308	383	458	594	455	649	1076	1241

Source: Qinghai Statistical Yearbook in 2001-2009.

Residents move out of a disadvantaged area to seek poverty alleviation and for the protection of the environment. Moving out is also good for improving economic development. An interview with the principal of the poverty alleviation department in the out-migration area revealed:

*“...it can be observed that before migration, rural people’s living standard is lower than the adequate line for degradation of natural conditions and deterioration of ecological environment. The annual net incomes per capita of farmers are less than 625RMB. As a*

*result, Ledu poverty relief office needs to spend lots of finance on local poverty alleviation and ecological environment protection. Moreover, the effect is not obvious. The expenses for poverty alleviation and protection of ecological environment become a serious financial burden in the out-migration district government. This obstructs the local economic development to some extent.”*

--The office principal of Ledu County poverty alleviation development bureau

According to the survey, after migrants move out, the local government finances are in surplus. This surplus capital is used for ecological rehabilitation and focuses on supporting agricultural and industrial projects, which helps the entire economy in the out-migration area.

#### **4.4.2.2. The microeconomic effects**

The microeconomic effects refer to the effects on individual residents. The implementation of Xiangba project brings gains for families' incomes among migrants in the destination area, as well as those who do not move out. An interview with the principal of the poverty alleviation department in the out-migration area claimed that:

*Ecological environment in the out-migration area was effectively protected. Through the resettlement poverty alleviation, migrants are liberated from the vicious circle of “the poorer, the more reclamation; the more reclamation, the poorer”, the traditional mode of damage forests to reclaim land, and extensive cultivation. This relieves the population pressure for resources. The land and labour resources become reasonably allocated.*

--The office principal of Ledu County poverty alleviation development bureau

Two or three years after migrants have moved, the surplus land they have left is reallocated to those who stay for land cultivation or it is returned to being forest or grassland. In this way, the agricultural acreage of farmers is increased. If other conditions remain unchanged there will be an increase in agricultural acreage, which will improve the total output of grains, so improving family incomes.

A Han nationality male, aged 50 years who was primary school education expressed the following opinion during an interview:

*Before implementing the migration project, selling grain was the only source of our*

*incomes. In years with serious drought, grain output is very low, so it is even more difficult to have enough to eat and wear. After implementing the project, our agricultural acreage was increased. The government uses the high-quality land as the cultivated land, while the poor one is used to plant economic forests and worm grass or to cultivate livestock with suitable quantity of livestock. In this way, we have no need to depend on selling grain. The grain output and family incomes in the last two years have been increased. Previously, one-year incomes might be 3,000 RMB, but now it has reached 40,000 RMB.*

---Ledu Interview 12, 2012

#### **4.4.2.3. Social effects**

The evaluation of the social effects of the Xiangba project refers to the degree that the project promotes social development in the out-migration area. The implementation of the Xiangba project played an important role in alleviating population pressure, stabilising the social environment and promoting social progress in the out-migration area. Relieving population pressure in the out-moving area and accelerating poverty relief are the main targets for this project.

The resettlement migration of impoverished people reduces the population density in the outmigration area, thus alleviating population pressure. This not only provides an opportunity for remaining residents to achieve prosperity, it also creates a condition for agricultural restructure and rural structural adjustment in the out-migration area, and it helps coordinate the relationship between population and economy. An interview with the project leader of the resettlement migration in Ledu County revealed:

*After migrants move out, the productive life space of the masses is further expanded. For example, we focus on managing 212mu of basic farmlands, constructing 9.4km of farmland irrigation canal, dividing 353 house sites, and constructing 10.28km of the rural highway. In this way, infrastructure can be improved. The masses in the local out-migration areas basically get rid of the status depending on Heaven for food. The improvement on infrastructure and public benefit facilities in the out-migration area expands the survival development space and lays a good foundation for adjusting industrial structure and developing resources. The net incomes per capita of the*



*impoverished people are significantly improved.*

--The project leader of the resettlement migration in Ledu County

Too many impoverished people in the out-migration area and inappropriate responses to poverty inevitably have adverse impacts on stable social development in the out-migration area. The implementation of the Xiangba project, on the one hand, reduces the absolute number of impoverished people through population redistribution. On the other hand, it allows the farmers who stay to achieve prosperity. In this way, it can be seen that government promotes political stability, national unity and social progress, and therefore, it is good for social stability and harmonious development in the out-migration area.

Migrants in the Xiangba project were basically agricultural populations and after migration, the agricultural population was significantly reduced, while the proportion of the non-agricultural population increased. The Director of Ledu County Statistics Bureau expressed the following:

*By briefly analysing statistical data over the years, it can be observed that non-agricultural populations and proportions in Haidong and Xining Area (except for Xining Downtown) in 2001-2008 were increasing year by year. After 2003, they had obviously increased. The non-agricultural population proportions in between 2001-2008 increased from 11.81 percent to 12.87 percent. The non-agricultural population is an important index to measure the urbanisation level. After implementing the Xiangba project, the non-agricultural population proportion in the out-migration area increased, showing that the urbanisation level has faster improved greatly, thus the Xiangba project accelerates the urbanisation process in the out-moving area, to some extent. This is a good signal for the development of the local area.*

--The Director of Ledu County Statistics Bureau

Population quality includes the cultural and physical qualities of populations which can be improved by resettlement migration. The Xiangba project has had a significant impact on improving cultural and physical qualities. The methods of thought, production and consumption among impoverished people often aims to provide adequate, food and clothing, but seldom includes longer term plans. Due to the Xiangba project, the economic conditions of families which stay improves; with the provision of adequate food and clothing, they can suitably invest financial resources and achieve re-education, higher education and engage in entertainment and

tourism. As a Tibetan male, aged 43 years who was illiterate stated:

*Before implementing the project, we are poor. We just wanted to produce more grain and make money. The strongest wish is to solve the problem of food and clothing. Without money, elder children come back home early. Now, the economic conditions are much better than before. We plan to let two children study further (they attend a junior high school and senior high school), hoping that they will be admitted to a college. The elder child is participating in an occupational technical training class, so that he will have a professional skill, hoping that he will not do farm work and suffer hardship with me.*

--Ledu Interview 15, 2012

Furthermore, they often keep in touch with migrants who move out. This will promote the ideas, culture and technical exchange between the out-migration areas and in-migration areas, improving the cultural quality of life for farmers in both areas. On the other hand, many of the remote populations leave out-migration areas, which is good for reducing the possibility of intermarriage among close relatives and clans. In this way, it broadens genetic exchange and improves the physical qualities of populations.

#### **4.4.2.4. Ecological effects**

The resettlement migration project not only solves population's poverty problems, but also improves the environment, and develops land and water resources in out-migration areas. It also creates a more harmonious agricultural and forestry ecosystem. The ecology and the environment of out-migration places is effectively protected. Through resettlement migration, migrants have overcome the vicious circle of "develop more lands due to poverty, become poorer due to that developing", which has operated for a long time. They have also liberated themselves from traditional production processes of deforestation and wasteland reclamation as well as extensive cultivation. In many ways, population pressure relative to resources have been relieved, and land and labour resources have been allocated rationally (GOLCG 2012).

During field work, it was found that vegetation in the out-migration area had greatly improved. For example, villagers in remote mountains had migrated to the Langwotan Community, and the cultivated lands returned to grassland. **Plate 4.5** shows that after migration, Ledu's environment had improved, with the mountains more vegetated and the rivers had increased flows.

#### **Plate 4.5 The status of Ledu County in 2012 after migration**



Source: Field Survey in Ledu 2012

In the project implementation process, governments at all levels conduct scientific and systematic planning and implement comprehensive treatment for mountains, water, farmlands, forests and roads; thus, the environment in the out-migration area can be effectively transformed. Vegetation improvements have two advantages: improving the local environment; increasing air humidity. This is good for the growth and reproduction of flora and fauna, the maintenance of biological diversity, and maintaining ecological balance. It can effectively prevent water and soil loss and reduce landslides and debris flows. The implementation of the Xiangba project has significant ecological effects for the outmigration area, by contributing to repair and improving the environment.

#### **4.5 Constraints on Resettlement Migration**

The size of the migrant population is related to overcoming the intermediate obstacles. In other words, intermediate obstacles can greatly influence migration flows. During the 15 years of resettlement migration in Ledu, many intermediate obstacles have been transformed into supporting factors; these include, migration effects, as well as the economic, social and ecologic benefits that have been generated. Nevertheless, many constraints still exist. It is only after eliminating these factors that resettlement migration will achieve the desired development (LCPADB 2013).

Most of impoverished people in out-migration areas get a chance of moving into the Xiangride area with its good productive conditions and lifestyle. However, the survey found that family who are with relatively good economic conditions, were they more willing to move more than those with relatively poor economic conditions. A Tibetan male aged 55 years who was illiterate expressed the following sentiment during an interview:

*Some households with good family conditions in our village were move out, but some unmoved households have poor family conditions, just like us. In relation to the government only promises to provide us some relocation payment about 450 RMB for each person. Then, we must move. However, it is far away from Xiangri Debalong. We don't have a large-scale vehicle; thus, we can't afford the high expenses to transport family properties. Therefore, we prefer not to move out.*

--Ledu Interview 9

It was observed that some households that meet the eligibility requirements and plan to move can not move, because they can not afford the high costs of migration. This is considered unfair and it prevents them overcoming poverty, while others with more resources can afford to do so. This inevitably affects poverty alleviation expected by the Xiangba project.

In some out-migration villages most of the residents had moved out. The survey found that the migration of many villagers implies the disappearance of medical and educational facilities. A Tibetan male aged 63 years who was illiterate expressed the following during an interview:

*Previously, there were more people in the village. There was only a doctor and a primary school in our village. When we fell ill, we could see a doctor in the village and children could attend the primary school in the village. Now, there are only a dozen or so households. The doctor moved out and the school closed. After the family conditions slightly improved, children may be transferred to the school in the town(boarding). Some children do not go to school. If we fall ill, we just take some medicine for minor illness (we purchase it in the town for standby). When it is relatively serious, we just go to other villages or go to the town to see a doctor.*

--Ledu Interview 21

It was found that the migration project brought many adverse effects, while it also generated many positive effects for remaining residents. Medical conditions are related to people's life and safety. Educational facilities concern the development of people's cultural quality. If these basic and important problems can not be solved effectively, inevitably it will adversely affect the remaining population and development.

Due to seclusion and long-term poverty in mountainous areas, people find it difficult to overcome the constraints of old traditions, concepts and consciousness. Despite the harsh life, people hardly ever leave their homelands, because all the previous generations have lived there. The old concept of "*never leaving and never changing career*" taught by the elder generation cannot easily be changed (Li 1996), let alone adopting the "uprooting" practice of resettlement. Without sufficient information on the new place of residence, some migrants have passive responses to resettlement. Therefore, the overall planning and implementation of resettlement is exceedingly difficult. For this reason, it is necessary to transform negative thoughts of cadres and the public in both out-migration places and migration destinations. In relation to places of origin, it is crucial to eliminate the traditional idea of "never leave a homeland". If people can recognise that migration is a special poverty relief measure, poverty that has existed for generations in mountainous areas can be effectively reduced. As for migration destinations, it is important to eliminate a view of the migration "burden". It is necessary to let people there recognise that the new migrants are an effective asset in the development of irrigation areas (GOLCG 2011). When necessary, migrants who have earlier moved to an irrigation area, and are no longer in poverty, should be mobilised to return and advise others, using their own experience. Conversely, people in mountain areas could be organised to visit resettlement areas to see the benefits for themselves.

Resettlement migration is a measurable social project needing a large amount of funding. In the last 15 years, the Chinese government has successively invested hundreds of millions of Yuan in the project. In the resettlement migration project of 2001, 1,906 people in 500 households, located in 14 villages and towns of mountainous areas, were involved, and total investment reached 92.5 million Yuan. These funds were mainly used for water conservation projects, investment in wasteland reclamation, matched subsidies, construction subsidies, public welfare facility subsidies and technical training fees (LCPADB 2006). The average household subsidies used for resettlement, the production, and reconstruction of the livelihood exceeded 500 Yuan. Hence, in the government resettlement report of 2012, local governments listed effective migration as a major means of poverty relief (NDRC 2012). However, with the increasing scale

of migration, the development of migration destinations will become more difficult, and investment in construction will need to be expanded. In addition, more capital investment is required for consolidation and development of migration destination communities. As a result, a shortage of funds has become a major constraint for resettlement development. National investment in the resettlement project of poverty relief is relatively low. According to “12<sup>th</sup> 5-year Plan”, for resettlement planning in Ledu County, the poverty relief resettlement of 5979 people will be completed by 2015 (NDRC 2012). Hence, the resettlement tasks of 1,196 households should be completed every year. Resettlement capital subsidies are insufficient, and resettlement households have no economic base or technical advantage (GOLCG 2011). Hence, during implementation, many resettled farmer households borrowed money to build houses and pledged the predicted returned money to outgoing work income and production development projects, which have not shown any real effect. In this way, it will take a very long time to thoroughly alleviate poverty (GOLCG 2012).

## **4.6 Conclusion**

Migrants in western China cannot be simply classified according to international practice. First, population migration in western China has been due to extremely harsh local environments and absolute poverty, with residents unable to continue to live there. Therefore, they can be categorised as involuntary migrants, according to international practice. However, Ledu Country residents were relocated under the organisation of governments. This study found that the government gave limited guidance and did not force residents to relocate. Local residents make their own migration decisions, with very few residents wanting to continue to live in Ledu Country. Therefore, they can be regarded as voluntary migrants, according to international practice. Through the analysis of government documents, combined with interviews of relevant government staff, can be summarised as: old concepts; shortage of relocation funds; inadequate social services; different relocation policies operating in in-migration and out-migration areas, and lack of theoretical research. All these issues were reflected in the questionnaire survey of migrants. These issues are discussed in more detail in Chapters 6 and 7.

Through 10 years of development, from relocation in 2002 to investigation in 2012, the production conditions in the regions to which migrants moved had significantly improved, and

the ecology and the environment of the areas they left were to some degree effectively protected.

Poverty alleviation via resettlement liberated residents from a long-term, vicious cycle of "alleviating poverty by excessive cultivation, in turn exacerbating poverty" and traditional production methods of "deforestation for farming and large-scale cultivation but little yield". It reduced population pressure on land and resources, and rationally allocated land and labour resources. Therefore, migrants had more opportunities to become richer, and thereby, further improve their financial situation. In addition, infrastructure and public welfare facilities in the resettlement area had also improved.

Through detailed analysis of Ledu Country, from which residents migrated, a better understanding is gained of the policy of "poverty alleviation by migration", the characteristic Chinese method of relocation. Studies of such large-scale migration in rural areas are rare in Western China, especially in the Tibetan area, so there was no ready-made experience for reference. Poverty alleviation obtained by migration also needs some theoretical guidance in terms of relocation mechanisms, benefits, methods, resettlement scale, direction, flow and other major issues, to gain maximum benefits with least investment. Therefore, the findings of this study attempt to fill these gaps.

# **Chapter 5 The Experience of Resettlement migrants in Dulan County**

## **5.1 Introduction**

This chapter focuses upon factors which influence migration in rural areas. It begins with a discussion of the history of the minority areas in Western China, focussing particularly on the factors that caused its population to stay or move, and the reasons why some migrants return to their original areas. The analysis is based on the field survey data obtained in Dulan, Qinghai in 2012. Results indicate that to promote successful resettlement there is a need to establish an environment-related migration compensation mechanism as soon as possible. Based on the survey data, a model was developed together with data from the in-depth interviews. This chapter describes the conditions of the resettlement areas, the situation after migration and some resettlement problems.

## **5.2 History of the Resettlement Project**

By the end of the 1960s, six counties in the eastern Qinghai Province, could not progress their economic development due to unfavourable natural conditions and large populations with the majority living in poverty (GOPGQP 2011). Many families had an average annual income of between 200 and 500 Yuan in the 1990s. Qinghai Province proposed a poverty alleviation policy. In order to give priority to supporting poor ethnic minorities, the project was included in the third World Bank Poverty Alleviation Initiative in February 1997 (World Bank 2001). However, despite the World Bank sponsoring the project and providing a loan of \$40 million US dollar to help people resettle, some Western news media and the Tibet-exiled separatist group assailed the project. On June 24, 1999, the World Bank approved a loan to China of \$160 million US dollar, regardless of objections by the United States, the largest shareholder. On June 24, 1999, at a meeting of the World Bank's board of directors, 24 were in favour of the proposal, 2 objected and 4 abstained; the loans were therefore approved by an overwhelming majority. But officials of the World Bank pointed out that the loans caused the biggest difference of opinion within the World Bank's Board of Directors for many years. Many reasons pointed to the strong opposition



to the loan (GOPGQP 2008). Many people opposing the loans, particularly some Tibetan-exiled separatist groups, claimed that the World Bank helped the Chinese government "dilute" the culture of Tibetan people. There was no factual basis for this claim. Han people, Mongolian people, Tibetan people, Hui people and other ethnic groups all inhabited the regions which Qinghai people migrated to and from. Among the nearly 58,000 people who volunteered to move to get out of poverty, ethnic minorities accounted for 58 percent (GOPGQP 2011). Cultural changes and the blending of different ethnic groups after relocation will be discussed in detail in Chapter 7. This chapter mainly outlines the implementation of the resettlement project and discusses the adaptation of migrants to their new environment.

### **5.3 The Profile of the Resettlement Area**

The Qinghai Province Xiangride-Balong Resettlement Migration Project started in May 2002 and was completed in October 2003 (GOLCG 2003). The project passed comprehensive prefecture-level inspection, as well as inspection and acceptance by various individual provinces. The project effectively promoted the coordinated development of the region in terms of economy, society and ecology, as well as advancing poverty alleviation in Qinghai Province (Fei *et al.* 2011).

The project construction areas were in Dulan County, Haixi Prefecture, Southeast of Qaidam Basin, and the implementation regions included Xiangride Town, Balong County, Xiangjia County, Gouli Country, Xiangride Oasis Agricultural Development Co., Ltd. and Tuosuohu Lake Ecological Protection Zone; a total area of nearly 12,400 square kilometres. As a typical desert oasis agricultural development zone, the region abounds in water, soil, sunlight and heat resources, and is suitable for large-scale development and construction, as well as resettlement of migrants. After completion of the project, 16,131 people, comprising 3,520 households, living in poverty in Xining City and Haidong Prefecture (including 1,957 people, within 413 households from Dulan County) were resettled, and 8 administrative villages and 25 natural villages were founded (Fei *et al.* 2010). The project mainly relocated 15,000 poverty-stricken people from prefectures and counties of three cities—Xining, Haidong and Haixi—and improved local production and living conditions for more than 21,000 people, bringing benefits to more than 36,000 people.

Since its official launch in 1996, the Xiangride-Balong Agricultural Poverty Alleviation Project not only drew the attention of China’s national ministries and the Qinghai provincial government, and relevant departments, but received world-wide attention.

The area of the Xiangba project is located in Dulan County, of the Central South Qaidam Basin in Qinghai, with the ancient Southern Silk Road crossing the whole area. **Figure 5.1** shows the geographical location of Dulan County and the towns within the county.

**Figure 5. 1 Location of Dulan County**



Source: Geographic Journal of Dulan County (2012)

The Xiangride area, one of the main implementation regions (DCPADB 2011), is located in the central part of Dulan County, 60 kilometres away from Chahanwusu town, in the east, 294 kilometres from Golmud City, in the west, and the national road 109 runs across it. ‘Xiangride’ is a Tibetan word and its Chinese translation is ‘the place with many lush trees’. The Xiangride River divides the whole area into east and west. The rich water resources, more sunny days, longer frost-free periods and fertile soil provide unique conditions for agricultural production

(DCPADB 2011), and it has been praised as Qaidam's granary. There are large Xiangride farms owned by the Qinghai province within the area.

Barron Township, another main implementation region, is in the southern centre of Dulan County. Barron is a Mongolian word and means "right (as opposed to left)" in the Han translation. It was thus named because it is the location of the meadowland of both Qinghai Mongolia in the Qing Dynasty and the right-wing league of the Shuote tribe. It connects with Xiangride in the east and transport is convenient, given that the national road line 109 runs through it (DCPADB 2010). The total area of the township is 5,687.22 square kilometres and its total population is 3,300. Mongolian people account for 64 percent of the population and the rest are Han, Tibetan and Hui. It is a township that is based mainly on animal husbandry and it combines agriculture and animal husbandry in one entity (DCPADB 2011). There are vast tracts of arable land under the management of the original Xiangride farm and the famous Dulan international hunting field.

As shown in **Figure 5.2**, Xiangride town is located in Dulan County in the Haixi Mongolian Tibetan autonomous region, Qinghai province, which is in the eastern part of the county, 60 kilometres from the county government. Xiangride town is one of the main population centres, with 23 administrative villages, 34 enterprises, and 33 party branches. The total population is 27,000 with an additional floating population of 35,000, mainly comprising Han people. **Plate 5.1** shows the main entrance to Xiangride town which has better road conditions compared with other towns.

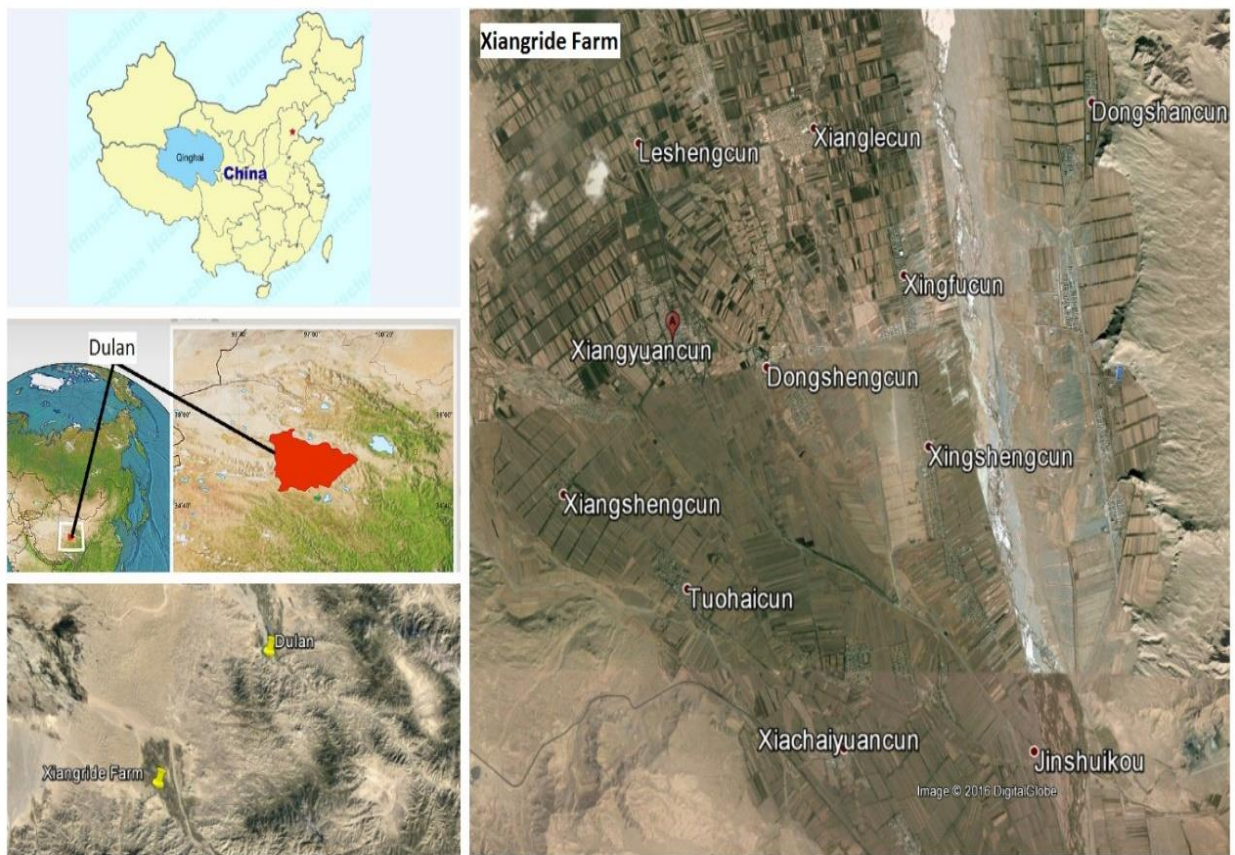
**Plate 5.1 The main Entrance to Xiangride town**



Source: Field Survey in Xiangride 2012

There are also minorities such as the Hui, Tibetan, and Mongolian in the Xiangride region: The Hui account for 23.6 percent; Tibetans for 10.8 percent; and Mongolians for 2.3 percent. It has an area of 291.2 square kilometres, covering 14 villages (herd) committees. The Xiangride bureau was established by the Republic of China and the Xiangride region was set up in 1950, and Xiangride village was established in 1955, when it still belonged to the Xiangride region. In 1958, it was changed to the Xiangride commune, and then to Xiangride village in 1984, and, finally, to Xiangride town in 1985 (DCAB 2009).

**Figure 5. 2 The location of Xiangride Farm**



Source: Geographic Journal of Dulan County (2005)

The average altitude of Xiangride town is 2,950 metres and 50 percent of its land is alluvial slope plains. The Xiangride River (**Plate 5.2**) runs through the whole town and divides it into parts east and west of the river. The annual flow of the river is 12.5 cubic metres per second, suggesting that the area's water resources are comparatively rich.



## Plate 5.2 The Xiangride River



Source: Field survey in Xiangride 2012

Xiangride County has ample light, big day and night temperature differences, a cold and dry climate, strong and frequent winds, but little rainfall. It is a typical continental desert climate. The average temperature in the coldest month (January) is  $-10.1^{\circ}\text{C}$ , while the average temperature during the hottest month (July) is  $33.2^{\circ}\text{C}$ . The annual average precipitation is 166.8mm, while the annual average evaporation is 2,285.44mm. For years, the average temperature has been  $3.1^{\circ}\text{C}$  to  $4.4^{\circ}\text{C}$ . The highest recorded temperature was  $33.2^{\circ}\text{C}$ , and the lowest temperature was  $-26.6^{\circ}\text{C}$  (DCAB 2009).

The soils in Xiangride are mainly brown calcic soil, millet calcic soil, and Aeolian sandy soil (**Plate 5.3**). A variety of crops are planted here. Arable land totals 5076.28 Ha, with an average of 0.2 Ha per person. It is an important food production area in Haixi, and Xiangride had the world record for a spring wheat yield with 15,097.5 kg per Ha, and, as such, gained a reputation as a “desert oasis”.

In 2007, the total income of the town reached 66,801,500 Yuan, with an average per capita income of 1,973.25 Yuan. Xiangride town is in possession of more than 10 varieties of non-ferrous metals and minerals, including lead, zinc, and gold. About 70 kilometres south of Xiangride, is the Tatu coal mine and the Shashi road goes directly to the mine. Xiangride town also has abundant water resources, with good quality of ground and underground water. It is

ideal for drinking, irrigation and industrial uses. The area is rich in wildlife, plant resources and animals, such as blue sheep, foxes, marmots, snow cocks, rabbits, wolves, deer, and leopards, and it has plants, such as Chinese rhubarb, cynomorium, songaricum, medlar, ephedra, which are all common. It has abundant tourist resources; Snow Mountains, Ice Mountains, sand seas, grasslands, oases; these are the most common attractions, but it also has other unique scenery (DCAB 2009).

### **Plate 5.3 Farmland in Xiangride County**



Source: Field survey in Xiangride 2012

## **5.4 Analysis of Survey Data**

### **5.4.1 Survey Responses and Demographic Characteristics of Respondents**

In total, 404 people undertook the household questionnaire. 92 percent of the survey respondents did not have any political affiliation. For those who claimed to have political interests, about 5 percent indicated that they were affiliated with the Communist Party, while 3 percent claimed to be League members.

**Table 5.1** shows the educational attainment of respondents and it is evident that nearly a quarter of them have never been to school, and about 18.7 percent did not finish primary school. Only 14.2 percent claimed to have attended and completed primary school. In addition, about 21.3 percent of respondents have attained education up to the middle school level education. Interestingly, only 1.2 percent of respondents had completed university study.

**Table 5.1 The Education Level of Survey Respondents**

<b>Level of education</b>	<b>Percentage (%)</b>
No Schooling	24.9
Finished Middle School	21.3
Finished Primary School	14.2
Did not finish Middle School	8.0
Did not finish Primary School	18.7
Did not finish High School	1.8
Finished High School	4.7
Did not finish College	0.6
Finished College	0.7
Did not finish University	0.7
Finished University	1.2
Vocational College	1.4
Others	1.8
Total	100.0

Source: Field Household Survey in Xiangride 2012

As shown in **Table 5.2**, two thirds of the household survey respondents (67.2 percent) were of Han ethnicity. This was followed by those of Tibetan ethnicity, constituting about 23.9 percent of the respondents. Collectively, about 8.9 percent of the respondents claimed to belong to other ethnic groups, such as the Hui, the Zhuang, the Mongolian, and the Dongxiang.



**Table 5. 2 Ethnic Backgrounds of Survey Respondents**

<b>Ethnicity</b>	<b>Percentage</b>
Han	67.2
Tibetan	23.9
Hui	2.5
Dongxiang	1.2
Tujia	0.5
Mongolian	1.8
Zhuang	2.1
Others	0.8
Total	100.0

Source: Field Household Survey in Xiangride 2012

#### **5.4.2 Migration Experience of Respondents**

The survey found that over 50 percent of respondents liked living at the migration sites because of the convenient education, medical treatment and shopping, as well as the better climate. They also liked the sites because they had some relief from housework burdens. The survey results further revealed that about 49 percent of migrants were unwilling to move back. Information obtained from the local government explained the major reasons for this unwillingness: one was that they could not go back because they had sold their livestock; another life was better at the migration sites; they have adapted to their new life; transport was inconvenient at their old place of residence; and the opportunity to obtain more income was less likely at their original place of residence. However, a quarter of respondents did hope to return to their original place (11.9 percent of them “hope to return very much”, while 13.8 percent of them “hope to return”). As a Han nationality male farmer aged 49 years who had primary school education stated:

*In comparison with other migrants, my family moved relatively earlier! I was pleased to do that. I yearned for the convenient life in the city and town. In view of the serious grassland deterioration as well, I decided to move. I like living at the migration site very much as there are many working opportunities to make money here.*

--Xiangride Interviewee 7, 2012

**Plate 5.4 Interview by Qinghai normal university student 1**



Source: Field survey in Xiangride 2012

A Tibetan female aged 50 years who was an illiterate interviewee similarly stated the following:

*I moved here in 2000. Without any grassland or working ability, I never wanted to go back. I like living at the migrant settlement site as the government has provided me with a subsidy and good house. My life becomes better than before as I can eat fresh vegetables.*

-- Xiangride Interviewee 6, 2012.

About 69 percent of respondents pointed out that the most difficult economic problem was that they “have no steady and reliable income except for the government subsidy”. In addition, 44.4 percent of respondents thought that their living standard had “improved” compared to life at their place of origin, while nearly 20 percent thought that living standards had decreased (15.7 percent of respondents indicated a “certain decrease”, and 3.9 percent of respondents indicated a “great decrease”). Moreover, 91.1 percent of respondent families had no savings, while 23.7 percent of migrants joined training organised by the government. However, only 12 migrants found a job after the training, mainly because they said that, “*there is only a few working chances*”. Employees only constituted 15 percent of migrant family members and were mainly in part-time work.

A Han nationality male aged 26 years who had middle school education expressed the following sentiment during an interview:

*I moved in 2000. In the migrant community, my family lives on the governmental forage subsidy (3000 Yuan), a subsidy for herdsmen with minimum living standard, a subsidy for old people and a subsidy for children. Besides, I could gain 1,500 Yuan every year at most by doing work outside the area. Life is hard, but I cannot find other ways. We people here hope that the government can provide more subsidies.*

-- Xiangride Interviewee 9, 2012.

This challenge was further elaborated by an interviewee: a Tibetan male aged 41 years who was illiterate said that:

*Living conditions at the migration site are ordinary and even worse than the original life. I owned cattle and sheep at the original residence, by which I could earn fixed economic income. I cannot find a suitable job after moving to the city and obtain no economic income except for the governmental subsidy.*

–Xiangride Interviewee 4, 2012.

In respect to the provision of public services, it was found that about 51 percent of respondents joined the endowment insurance scheme, and some 84 percent of respondents, and their families, had the “new rural cooperation medical service insurance”; the difficulty and high cost of obtaining medical services were frequently pointed out by the migrants. There are no health centres in over 50 percent of communities at present, while 4 communities are located far away from hospitals. Living conditions and facilities were also seen to be not good enough. Regarding the quality of residences in migrant communities, about 50 percent of respondents were satisfied with them. However, 40 percent indicated that they were not. Provision of drinking water and domestic water is basically guaranteed for migrants at present, but its convenient supply still needs to be improved. Facilities for the disposal of polluted discharge, faeces and rubbish at the migration sites were also found to be generally inadequate. Household rubbish, excreta and waste-water management will become a more serious problem over time. Community management and service facilities are also imperfect, given that 47 percent of communities have no offices. Regarding the availability of education, about 45 percent of students lived at schools, while 55 percent said they attended a day school. Sixty-four percent of the communities were “satisfied” with the convenience of attending primary school. Moreover, in respect to the convenience of going to middle schools, about 47 percent of communities were “satisfied”, while 53 percent were “dissatisfied”.

Regarding the challenge of access to medical services, a Han nationality male aged 79 years who

was an illiterate respondent highlighted the following:

*I cannot afford the medical services. Family income is unsteady, while stone carving income is low. The biggest problem for us is the difficulty in obtaining medical services and the long distance (450 kilometres) to the hospitals. Doctors in nearby clinics are not professional enough. Reimbursement of medical service insurance is only applicable for hospitalisation, while we have to make full payment for other medical services. It is so difficult and expensive for us herdsmen to obtain medical services*

–Xiangride Interviewee 16, 2012.

Another Tibetan male aged 66 years who had primary school education summed up the problems in the following way:

*My family moved in 2001. We were provided with 3 houses and a sheepfold when we moved to the migrant community. Area of the houses is about 45 square metres. These 3 houses are indeed insufficient for my family, so we have to sleep on the ground. Migration to the migrant community is convenient in some respects. For example, we can go to hospital easily, and kids can go to school conveniently. However, the houses are insufficient and low-quality. Maybe these houses cannot meet requirements and plans of the government. We hope the government can strengthen quality supervision and inspection of houses in the migrant communities.*

-- Xiangride Interviewee 8, 2012.

In respect to meeting the spiritual needs of migrants, about 47 percent of communities were equipped with a cultural activity room of between 50 and 150 square metres and a further 29 percent were equipped with a cultural activity place. Similarly, about 58 percent of communities were equipped with community gathering places, such as a square, Mani meetings, Mani stones and white towers, and a third of communities were equipped with agricultural bookstores. About 60 percent of respondents felt it was “convenient to go to temples”, while 30 percent of them felt that it was “inconvenient”. To go to celestial burial sites, migrants in 70 percent of the communities had to take a bus journey of between 1 and 3 hours, while migrants in 23 percent of communities had a bus journey of between 4 and 24 hours, which clearly made visits difficult. On religious satisfaction, about 58 percent of communities indicated that their religious needs could be satisfied, while 41 percent said that their religious needs could not be satisfied. After

moving to the migration sites, 49 percent of migrants claimed that they celebrated festivals as before, while 30 percent of them did not celebrate them any longer, and almost 10 percent celebrated festivals in new forms. Some communities began celebrating festivals such as the Spring Festival, for people of Han nationality, while 29 percent added new festivals. Regarding changes in festivals and religious activities, about 50 percent of migrants deemed them to be acceptable, while others felt unable to celebrate in their preferred way.

A Tibetan female aged 27 years who had high school education expressed the following during an interview:

*At the migrant communities, Tibetan people have lost the original habits. Before the migration, community leaders would organise us to celebrate traditional festivals for us. Now we don't celebrate the Horse Racing Festival and we've lost the charisma of Tibetan people. I don't know why the present leaders do this.*

-- Xiangride Interviewee 1, 2012.

#### **Plate 5.5 Interview by Qinghai normal university student 2**



Source: Field survey in Xiangride 2012

A similar sentiment was expressed by a Tibetan male aged 50 years participant as follows, “*I hope relevant departments can allow us to build towers and prayer wheels in the village square*” (Xiangride Interviewee 12, 2012). Another Tibetan male aged 53 years participant also expressed the following: “*The migration site has no temple and monk. It's difficult to invite monks outside*

to come here" (Xiangride Interviewee 13, 2012).

### The most concerning issues and future expectations

When respondents were asked to indicate the issues that were of great concern to them, **Table 5.3** shows that about 64 percent of them were concerned about “increasing their incomes”, followed by “improving children’s education” (45 percent), “improving health” (30 percent), and “improving employment” (17.2 percent).

**Table 5.3 Issues of Concern to Respondents (Multiple Responses)**

Issue	Percentage (%)
Increased Income	64.4
Children’s education	45.0
Health	30.0
Employment	17.2

Source: Field Household Survey in Xiangride 2012

It also emerged from the survey that the most urgent issue for respondents was to obtain capital support and assistance. **Table 5.4** shows that the top four issues for respondents were: “difficulties in accessing subsidies” (67.5 percent), “capital support” (44.2 percent), “loans” (40.5 percent) and “medical insurance” (29.7 percent).

**Table 5.4 Expectations of Respondents (Multiple Responses)**

Expectations	Percentage (%)
Difficulties in accessing subsidies	67.5
Capital support	44.2
Loan	40.5
Medical insurance	29.7

Source: Field Household Survey in Xiangride 2012

In respect of their expectations for the future, respondents only had a limited understanding of national policies and were also confused about any possibilities for future development. The overriding expectation expressed by migrants is that the government could issue a one-off

subsidy, issue more subsidies generally, and provide capital project support, as well as issuing loans. They also hoped that the government could support local industries. In the migrant villages, the biggest difficulty was the fact that expenditures exceed income, as well as a general lack of economic resources.

The following sentiments were expressed by a Tibetan male aged 61 years who was an illiterate regarding his future expectations:

*Old people will not be hired. I never worked with a shovel before in the pasturing area, so I don't know how to use it. In recent years, I lived here on the income obtained by selling my cattle and sheep. However, the money is used up now. The government's provision of subsidies also expires. I'm really worried and afraid as I don't know how to live in the future.*

-- Xiangride Interviewee 18, 2012.

A similar sentiment was also expressed by another Tibetan male aged 70 years old who was an illiterate:

*I voluntarily moved to the migration site in 2001. I don't know much about the preferential policies for ecological migration and also don't know the current policies. I live a despairing and hopeless life in the migrant area as I have no steady income or subsequent industry. I don't know whether the descendants can survive. Without the subsidy, we will have no income source. We hope the country can issue more subsidies and loans and provide more projects.*

-- Xiangride Interviewee 19, 2012.

The survey results showed that livelihood problems were the most serious difficulties faced by migrants, especially as subsidies were soon to be discontinued. Most migrants obtained an annual governmental subsidy of 6,000 Yuan per household (subsidies for forage grass and migrant's removal) and an annual fuel subsidy of 1,000-2,000 Yuan. In addition, their income sources mainly included Cordyceps digging (**Plate 5.6**), out-migration for work, small-scale commerce and trade, public-benefit positions and support from relatives and friends, among others. However, they generally feel that they cannot afford to live around cities and towns with the income they receive. This is due to relatively little economic development in local areas, insufficient employment opportunities, as well as the fact that the migrants have been herdsmen



for generations. Ecological migrants are faced with a lack of working opportunities, but they also lack skills to make a living, and they lack the ability to change their circumstances. It is urgent that the government find ways to help ecological migrants find new livelihood opportunities. If such problems cannot be effectively solved, migrants will become ‘lost’ in cities and towns. Migrants cannot live this way with any self-respect, and this will increasingly put pressure on local development and social stability in Qinghai Province as a result.

**Plate 5.6 Cordyceps harvest in Xiangride County**



Source: Field survey in Xiangride 2012

In the 17 communities visited by the researchers, it was found that about 75 percent of the migrants had moved into them between 1998 and 2002. At that time, the government made a promise that “Migrants will move for 10 years to protect the environment and can choose whether to return 10 years later.” The survey found that about 50 percent of respondents were unwilling to return to their original residence. Hence, migrants were very worried about whether the government will continue issuing the subsidies for another ten years.

The survey found that medical services had improved after migration and “convenient access to medical services” was given as one of the reasons why migrants like living at the settlement sites. Firstly, however, migrants are also faced with the problem of difficult access to those medical services, due to high costs. Over 80 percent of respondents and their families joined the “new rural cooperative medical system” insurance, but it was reported that high costs for medical



services, the huge amount of guarantee deposit required, and the troublesome reimbursement processes, were still seriously troubling migrants (DCPADB 2011). In addition, over half of the communities were not equipped with health centres, which also resulted in difficulties in obtaining medical services by ecological migrants. This led to some minor diseases becoming serious, because of delayed treatment.

Secondly, living facilities need to be improved; the survey showed that over 40 percent of respondents were dissatisfied with the quality of their housing. Many respondents mentioned “rain leakage” and “cracks “, and others also reflected that the houses were too “small” and “crowded”. Drinking water in migrant communities can basically be guaranteed, but problems such as time-limited water supply and insufficient water outlet points also existed, and these required improvement. It was found in the survey that wastewater at migrant sites is basically discharged into soil trenches. As for disposal of living rubbish, a few communities use rubbish trucks to move the rubbish out, while most dispose of, or burn, the rubbish themselves. The construction and normal use of toilets are generally unsatisfactory; in 17 communities, only 4 had indoor toilets which could be used normally, while 5 had no indoor or public toilets. As time goes by, rubbish and domestic waste-water management in migrant communities will form increasingly serious pollution problems, which may lead to public health disasters.

In addition, management organisations and relevant facilities in communities are not coordinated. The survey found that some communities have not been equipped with formal management organisations, while 47 percent of them have no offices. Due to the lack of clear management mechanisms, the management of migrant communities is still poor. Moreover, there has been progress, but deficiencies remain in the availability of school education. The survey found that many chose to migrate to enable children go to school. The availability of education has improved in most cases after migration, but migrants are still dissatisfied with many aspects, such as the convenience of going to school and the courses available. Migrants in over 50 percent of communities deemed it inconvenient to go to middle schools, although they were happy with access to lower levels of schooling.

The survey results indicated that residents in migrant communities came from different herdsman communities. Due to the lack of familiarity between residents, imperfect community management, and the lack of cultural facilities and community gathering places, it was difficult for migrants to adapt to their new life. Nearly all the Tibetan people believed in Tibetan

Buddhism, therefore their spiritual anxiety was intensified due to the lack of, or distance from, religious places in migrant communities. Additionally, loss of reservations and loss of traditional festival activities were found to be directly correlated with changes in the living environment. Without attention paid to this issue, younger people may become the “lost generation” lacking traditional cultural support, which may hinder integrated development and the stability of communities.

To protect the ecology and the environment in the three river source regions and to increase local living standards, the state and the government of Qinghai Province have invested a lot of human resources and materials, and ecological migration projects have also been implemented year-by-year, according to the plan. As a result, more and more migrant villages have been built, while more and more herdsmen have migrated out. However, due to the characteristics of migrants, the goal of protecting the economic environment in the three river source regions is far more difficult. The following three issues need to be addressed during the implementation of ecological migration if it is to achieve all of its aims.

Firstly, there should be an ongoing commitment to fulfilling the purpose of migration. Rather than emphasising project completion, or the number of migrants, the fundamental purpose of the projects lies in the protection and poverty relief for residents, and in the development of the environment in the three river source regions. Therefore, corresponding standards should be formulated regarding the population, grassland areas, cattle and sheep quantity and other factors related to the wellbeing of migrant’s families. In addition, specific implementation measures and assessment mechanisms should be formulated for ecological recovery and protection of grasslands after migration.

Secondly, the receiving sites must have increased grassland areas and more cattle and sheep in order to attract more families. At present, the annual subsidy of 6,000 Yuan is issued to each family, but this is not enough to attract families to undertake migration with the prospect of good economic conditions and high incomes. In addition, governmental subsidies are given to each household, and this is an obstacle for large families.

Thirdly, ecological migration should be different from other types of migration. Due to huge differentials in their living environments, production methods, lifestyles, languages, cultures and religious customs, these ecological migrants are faced with complex challenges. How migrants

adapt to life in the receiving areas, and find new livelihoods as soon as possible, is still a substantial puzzle that needs to be solved. The survey found that migration over long distances and with large differences in ways of life between sites of origin and relocation, further exacerbates difficulties in adaptation. In fact, the environment in origin and resettlement regions still needs to be monitored and protected by people. Locals and officials have put forward an argument for governmental subsidies to reduce grazing capacity and to relieve problems related to the human-land and human-livestock relationships. In addition, propagation of environmental production and increasing the educational levels of herdsmen could smoothly transform the passive migration. This may be a more effective and stable method.

In addition to the protection of the environment in places of out-migration, the researchers are also of the view that policy makers should think about ecological protection in the places to which migrants move. Construction of migrant villages at the destination sites and the implementation of migrants' subsequent production and ways of earning livelihoods will also pose threats and may ultimately destroy the environment of these places. The pros and cons of these two aspects should be carefully considered during planning of migration.

## **5.5 Analysis of the factors affecting migration**

The resettlement project started at the beginning of 2002, and the local government integrated mandatory relocation and voluntary relocation policies to encourage local residents to move into new residences, through active propaganda (LCPADB 2003). Population migration in Ledu County has unique characteristics, not only constrained by external environmental and internal factors, it is also greatly affected by cultural and other non-economic factors. After resettlement, many herdsmen left and went to the city and lived a life similar to urban people (LCPADB 2003). However, it is worth questioning why some people moved to other places to settle down and why some returned to their original place of residence. Analysis suggests that migration and settlement are related to mutual interaction between individuals and their community, and between macro and micro-environments. Due to the widespread distribution of migrant communities and the large population involved, this study could not deal with all the resettlement area in Ledu Country but selected relatively mature and typical ecological migrant communities for investigation.

### **5.5.1 The Living situation of the entire Xiangle Town, Ledu county**

Xiangle town is located in the mountainous area of Ledu county from which most town residents migrated to Xiangride county, therefore the survey residents mainly came from Xiangle town. Xiangle town was inhabited mainly by ethnic minorities (Tibetan and Mongolian) prior to relocation. Given the extreme cold and oxygen-deficiency, the harsh climate and fragile environment, it was claimed to be not really suitable for human habitation (GOLCG 2013). In 2002, residents volunteered to relocate under the guidance of the government, and they moved to the current settlement area of Xingale Country which had almost the same number of males and females. However, the survey found that most young people went to other places to work for a few months, so that the elderly accounted for a large proportion of the local population, and they had limited skills and limited capacity to adapt to a new life. The illiteracy rate was high among the migrants, and they generally had low educational levels, which presented difficulties in communication with migrant workers and other people.

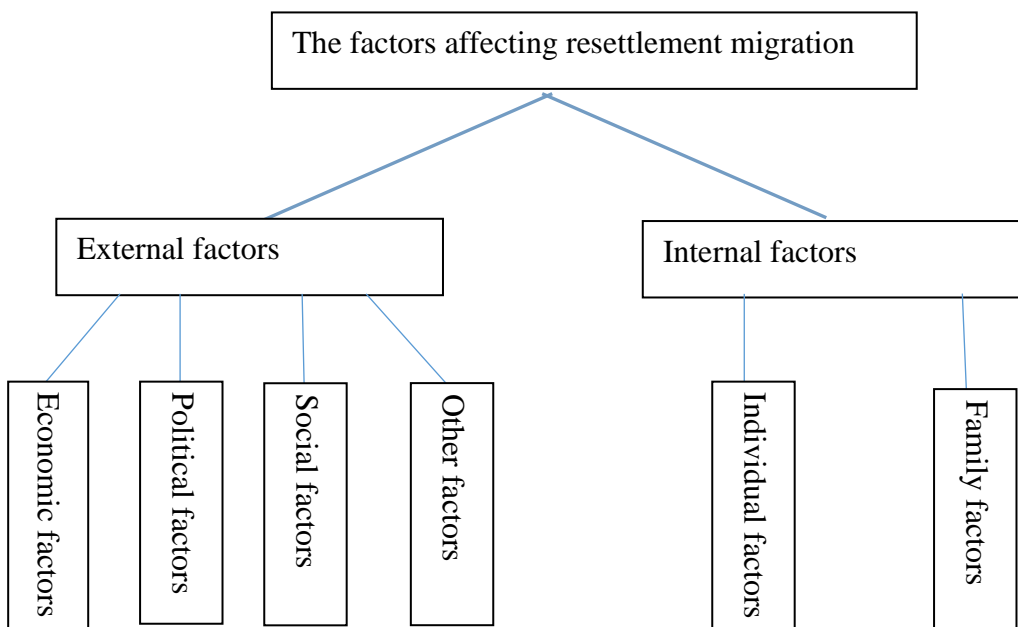
The people of Xiangle, who had lived in an impoverished mountainous region before moving from Haidong to Dulan, had lived where there was water and grass, with livestock trading as their major livelihood. They were used to dealing with mountainous lands and lacked the knowledge and technology needed for cultivating irrigated land. The study found that their means of livelihood, as well as their interpersonal relationships and values, which were closely related to the grassland ecosystem, changed after moving to a new place, and their lifestyle and methods of production were also different. Most people had conservative mind-sets and did not recognise new crop varieties or adjust crop structures, soon after relocating to a new settlement area. Most migrants relied on government compensation to make a living, so the overall living standard was low, with low employment rates and problems related to an ageing population.

With the passage of time, migrants tend to gradually adapt to their new living place. More and more men went out and worked, mainly in the construction industry, while women were mainly engaged in catering and service industries. During the process, the government also tried to enhance the living standard of migrants, and gradually improved various pieces of infrastructure within migrant communities. Notwithstanding these initiatives, the place was still poverty-stricken and plagued by poor living conditions.

### 5.5.2 Analysis of the factors affecting migrant resettlement

The factors affecting resettlement migration include negative factors, which drive people to leave their original location, and positive factors, which make them move to a new place. These factors tend to work jointly in making people relocate (Chen 2010). So, this research started from this theoretical assumption, and in combination with data collected from the survey, further analysed the factors affecting resettlement migration. Based on the above analysis, this research put forward a causal model which helps to explain the factors affecting migration (see **Figure 5.3**).

**Figure 5.3** The factors affecting migration



Source: Author's Own Construct

### 5.5.3 Overall analysis

Du (2012) argued that people from Qinghai did not relocate voluntarily and were led by the government; preferential policy was one of the major factors driving them to migrate. The government played the characteristic role of Chinese "parents" and provided support to migrants and assumed long-term responsibility for them. They supported the relocation project by making a large investment in it, and by introducing and implementing many policies designed to ensure migrant's living standards.

The natural environment resources are external factors affecting relocation and are important

criteria for people in making decisions about migration. Most migrants lived in high-altitude areas, more than 4,000 metres above sea level. Low temperatures, strong winds, thin air and oxygen deficiency, meant the natural environment was very harsh and not suitable for long-term human habitation. By contrast, the natural environment in receiving areas was better, and generally had better infrastructure (Guan 2005). The ‘social norm’ factor refers to social, cultural and religious standards the migrants consider when making decisions about migration, including choosing the method of migration and overcoming any obstacles.

Hurley and Walker’s ecological theory advocates that the environment not only includes biological and physical dimensions, but also the general dimension of culture, which constitutes both the ecological system and human activities (Hurley and Walker 2004). Culture can greatly impact on people’s behaviour and their attitudes towards nature. Xiangle County had a disproportionately large number of Tibetan people, and it should be noted that traditional Tibetan culture advocated harmony between human beings and nature, so humans were not only responsible for the development and utilisation of natural resources, but also the protection of nature and ecological balance. These ideas influenced their decisions.

In addition, it is noteworthy that economic factors played a more important role in the relocation of population in Xiangle Country compared with that in other places. The long-term deterioration of the environment had led to low productivity, resulting in poverty, because most residents made their living primarily from animal husbandry. In addition, people living in ethnic minority-inhabited areas tended to exhibit more differences on relocation. Han people were more willing to move, while Tibetans were more reluctant, due to cultural factors. The economic issues and cultural issues are discussed later in Chapters.

## **5.6 The Analysis Process**

### **5.6.1 Analytical method and background**

Migration selectivity, as research demonstrates, mainly refers to the fact that migrant populations generally differ from non-migrant populations at the point of origin (Yang 2006). Generally, migration is highly selective, and is not a response randomly undertaken by the population at the place of out-migration. This is because migrant’s response to the influence of factors operating in

in-migration places and out-migration places is different and their ability to overcome obstacles in the migration process will be different, according to personal characteristics. From the perspective of age, people between 20 and 50 years were the most likely to move. Single, divorced and widowed people migrated more than those who were married. In addition, people with higher educational levels were also more likely to migrate (Chen 2010).

Similarly, in China, according to data obtained by the Sixth Population Census, age and educational levels strongly influence population migration. However, among young migrants, more females were likely to be engaged in migration than males. Generally, married people had a lower rate of migration than single ones. Most importantly, in relation to resettlement migration in the Qinghai Tibetan area, it is very much more commonly undertaken by the family as a unit. Therefore, it can be assumed that the selectivity of resettlement migration will not be the same as occurs among populations undertaking more voluntary migration. Resettlement migration in the Qinghai Tibetan area is voluntary to a degree, under governmental organisation, given that migrants can choose whether to migrate or not, and this does not conform to the usual theory.

Hence, most research in migration selectivity mainly focuses on differences between the characteristics of migrants and non-migrants and compares characteristics between migrants and the non-migrant population at destination. The indices of migration differentials are used to measure migration selectivity. They are universal indices used to measure population migration selectivity, calculated by the following formula:

$$MD = \frac{\frac{M_i}{N_i} - \frac{M}{N}}{\frac{M_i}{N_i}}$$

$$MD = \frac{\frac{M_i}{N_i} - \frac{M}{N}}{\frac{M}{N}}$$

Where MD is an index of migration differentials;  $M_i$  is the number of the migrant population with certain characteristics, and  $M$  refers to the total number of the migrant population;  $N_i$  is the number of the non-migrant population, with certain characteristics, or the total number of the population;  $N$  refers to the total number of the non-migrant population or the total number of the population.

The first method is called the method of specific gravity. The second method is known as the ratio method. The same results can be obtained by using either method. If the characteristics of the migrant population are the same as those of non-migrants at the point of destination, the index of migration differentials is 0. A larger index of migrant differentials indicates larger differences between migration selectivity at the outgoing place or at the ingoing place. A positive or negative sign of the index of migration differentials reflects distribution situations of migrant selectivity in relation to different characteristics. For example, regarding age selection, if migration occupies a high proportion in the outgoing population, the differential index is positive and age aspects, while the differential indices of children population and old population may be negative. The size of the differential index can reflect the intensity of migration selection. The positive or negative sign reflects the orientation of the selection.

### 5.6.2 The Formula's Evolution

Given that the underlying factors influencing migration have different effects on different segments of the population, these effects can be inferred from the characteristics of migrants, as well as the comparison between origin and destination sites. In the specific model, the influential factors can be calculated by comparing different populations in terms of certain variables, in respect to the characteristics of origin and destination sites. Based on the traditional model, in combination with research by other scholars, an improved migration influence factors forces formula, operating at Xiangride, is shown as follows: Setting  $M$  as the migrated population,  $I$  as the population at the relocation site and  $O$  as the population at the site of origin,  $I$  refers to different levels of a variable.

The improved formula is as follows:

$$Positive = \frac{\left| \frac{M_i}{\sum_{i=1}^i M_i} - \frac{O_i}{\sum_{i=1}^i O_i} \right|}{\frac{M_i}{\sum_{i=1}^i M_i}}$$

$$Negative = \frac{\left| \frac{I_i}{\sum_{i=1}^i I_i} - \frac{M_i}{\sum_{i=1}^i M_i} \right|}{\frac{M_i}{\sum_{i=1}^i M_i}}$$



Where:  $M_i$  is the number of the migrant population with certain characteristics, and  $M$  refers to total number of the migrant population.

$O_i$  is the number of the non-migrant population with certain characteristics or the total number of the population in the migration sending area;  $I_i$  refers to the total number of the non-migrant population or the total number of the population of the migration receiving area.

### 5.6.3 Analysis of the Model

In 2012, when the survey was conducted, migrant populations had lived in their place of relocation for 10 years, and had almost totally integrated into local life, especially those in Xianle Town in Ledu county, where had moved entirely. Due to out-dated equipment and statistical difficulties, almost no accurate data were collected from relevant government departments, not to mention the absence of online data. So, the researchers mainly used data collected from the survey and compared it with government data from 2009.

A total of 1,287 people in Xiangride Town were surveyed, including 521 people from Xiangle County. This enabled factor analysis, and the population was classified based on age, sex, educational level, and cultural and ethnic composition, to assess the impact of different factors on migration. The settlement results are as follows:

#### 5.6.3.1 Age and Gender Effect

The surveyed populations were mainly composed of people aged 30 and under, but it was found that young people seldom stayed in local places. Most of them went out to work in other areas all year round, leaving young children at home. The results of the model's calculation are as follows.

**Table 5.5** shows the relationship between age and the migration motivation of respondents and it is evident that older people were more affected by negative factors (35 percent), while young people (30 or under) were more influenced by positive factors (only 8.4 percent). Young migrants were full of curiosity about the outside world and were looking to broaden their horizons, so urban life greatly appealed to them. The reasons for migration by elderly people was mainly due to their culture and their motivation was religious. The elderly respondents were more religious than young people and they were devout believers, as they experienced socialisation and obtained psychological and spiritual peace, as well as a sense of security, from

religion. Additionally, the elderly often lacked access to, and control of, natural resources, so they relied more on religion. Their religious culture was one of the major factors explain why the elderly did not want to move away from their place of origin.

**Table 5.5 Xiangle County Resettlement Migration motivation by age of respondent**

	Total population	30 years old and below	31-40	41-50	51-60	More than 60 years
Relocation place	1287	614	226	214	124	109
Migrated population	521	250	87	89	46	49
Negative factors		8.4%	8.6%	20.1%	27.8%	35.1%

Source: Field survey in Xiangle and Xiangride 2012

On the other hand, it was noted that people aged between 31 and 40 were not as affected by negative factors. The government of the resettlement area provided all migrants with high quality land in relocation areas to grow cotton and other economically viable crops, but it was difficult for older migrants to engage in heavy labour work. The cultivation of cotton, barley and other crops is labour intensive, so many young, strong labourers chose to migrate to these lands to cultivate them. It was also found that many local young labourers contracted more land for farming, which provided high incomes for them.

A Tibetan male aged 35 years with high school education expressed that:

*I moved here in 2002 and the government assigned to my family 9 mu of lands. I also contracted 20 mu lands from other people to grow cotton. At present, I earn RMB 5,000 Yuan per mu annually, when a year's spending is deducted; I can save 60 to 70 thousand Yuan. Last year, I spent 120 thousand to buy a car, and plan to renovate our house to improve our living environment next year. Although I work hard, I earn more than going out to work for other people.*

--Interviewee 10, 2012.

Normally, gender is not an important factor. Based on other research works, many studies have not addressed gender as a special research question. In particular, most males have chosen to go out to work, according to previous migration project results, leaving a large number of females in

the resettlement area. However, this survey found that negative factors were the same for both males and females. Results of the model’s calculation showed that the gender ratio was found to be 1:1. It can be assumed that good farmland and some new factories and other industries required labour. As a result, migrants under 30 years of age whether male or female, chose to work outside the resettlement areas while older migrants preferred to stay in resettlement areas to find jobs.

### 5.6.3.2 Effects of culture and educational levels

Based on data shown in Table 5.1, prior to migration, the overall educational level among migrants was relatively low, with most only obtaining junior high school education. This was because, first, local educational resources were very limited; second, income levels were low and migrants were unable to afford education, and third, some ethnic minorities were not willing to accept education that had Han origins because of cultural differences (this will be discussed further in chapter 7). The results of the model’s calculation are as follows:

**Table 5.6** shows that nearly most of migrants generally had low educational levels. The lower the educational level, the higher the possibility they were engaged in manual labour, and their dependence on, their original grazing life. In addition, lower educational levels made people afraid of the outside world, making them doubt their ability to survive in town and city environments. So, negative factors may be stronger for those with lower education.

**Table 5.6 Motivation for Resettlement migration by education level of respondents**

	Total population	Illiteracy	Primary school	Middle school	High school	University degree and above
Local Population	1287	321	444	379	119	25
Migrants	521	348	168	150	52	9
Negative factors		38.3%	36.0%	10.5%	11.7%	3.4%

Source: Field survey in Xiangle and Xiangride 2012

A Tibetan male aged 46 years with primary school education migrant said that:

*I am the third child in my family. I have five brothers and sisters. The family has been farming and herding for a living. I could not afford to go to school, so I only went to school for two years and back to work. I also went to work in the city. But because I have little education, I can only do some common work. I am very tired with low income, and by moving to a new place, it is same as before, nothing has changed. I don't know what to do. maybe it will get worse as I am too old to learn anything. I can only do farming and herding sheep. So, I don't want to move any more in the future.*

--Interviewee 53, 2012.

### 5.6.3.3 Effect of Ethnic Composition

**Table 5.7** shows that Ethnic composition and migration exerted the largest impact on Tibetan migrants, in line with the expectations and results of the survey.

**Table 5.7 Motivation for Resettlement migration by ethnic composition**

	Total population	Han people	Tibetan people	Other ethnicities (survey code A1h)
Local Population	1287	865	308	114
Migrants	521	397	55	69
Negative factors		33.6%	50%	16.4%

Source: Field survey in Xiangle and Xiangride 2012

Most migrants in the Qinghai Tibetan Area are Tibetans who have lived on high-altitude pastures for generations. They mostly speak only the Tibetan language and cannot understand or speak Chinese. In the relocation areas, they do not own pastures, cattle and sheep, or land, making their traditional skills for survival useless. They faced huge changes in production methods, lifestyle and cultural customs. Due to difficulties with language, they found the changes enormous. Even migrants of the same Tibetan nationality, may differ due to regional differences in cultural customs; blending and adaptation in trans-prefecture and trans-county migration are harder than intra-county migration. The most extreme changes were experienced by migrants moving to the Golmud suburb. Governments, at both the origin and destination sites, had used all possible measures to help them adapt to life after leaving, and to find employment as soon as possible, but

such attempts did not achieve results until recently. Many migrant families could not comfortably make the changes and had to return to plateaus and continue their former activities. This will be explained in more detail in chapter 7.

#### **5.6.4 Factors influencing the resettlement of Xiangle residents**

The survey found that many ethnic groups could not change their old production methods, or adapt to their new environments, due to a lack of technical skills. Therefore, they could not integrate into urban life and were forced back to their old, familiar lifestyle and working environment. Due to individual situations, living conditions and for other reasons, ethnic minority migrants were more likely to return to their original places, and this has become the main risk to the success of migration projects.

The reason that migrants returned to their original places and their marked dependence on animal husbandry, was because there not adequate proper follow-up related to their problems in production and problems in living. Due to their high dependence on animal husbandry in pastoral areas, some settlement areas were mainly inhabited by old people and children, while young adults returned to pastoral areas to pursue grazing activities. Although only 10 percent of people from Xiangle Country returned to their original places, this still needs to be addressed to ensure the success of the project.

A government officer who was the office principal of Dulan County poverty alleviation development bureau claimed that:

*The state government has issued strict policies for the ecological environment. One year ago, before it was forbidden to graze in the mountains. Although the income from farming is very small, but farmers have a little income from farming. After the ban on grazing in the mountains, many fields are not allowed to be planted and also not allowed to graze sheep. The government's excesses are often exaggerated. However, it is a good thing that sheep are herded in the fields of irrigated areas. They eat grass and pull dung, which not only increases the soil fertility, but also reduces the environmental pollution caused by the burning of archilite seeds. The officer from the Agriculture and Animal Husbandry Bureau if found someone is grazing animals, they will give the migrants very severe penalties. So, some families have moved straight back.*

--The office principal of Dulan County poverty alleviation development bureau

#### 5.6.4.1 Overall Analysis

Migration from the Qinghai Tibetan Area is different from project-based, non-voluntary migration, but it is a form of non-voluntary migration which is still highly selective (CPG 2012). It is clear from the above analysis that migration was mostly undertaken by the family unit. Illiteracy rates were also extremely high within migrant villages and there were only a few migrants with educational levels above junior high school. However, each migrant village showed the number of family members in one-member and two-member households was exceedingly high within migrant families, while the number of migrant families with over 5 members was exceptionally low. In addition, based on the economic conditions of migrants before migration, most of them were families which owned less grassland, had fewer cattle and sheep and lived in relatively poor economic conditions.

Investigation of the selectivity of migrants in the Qinghai Tibetan Area, as analysed above, revealed that small family size, owning relatively little grassland, and the number of cattle and sheep owned by the family, went against the goal of protecting the environment in the region. Regarding the migration of small family units, government departments had to make the same investments, housing arrangements and subsidies as they did with larger ones. However, in relation to large families, migration efficiency could be improved. In addition, if migrant families only owned relatively poor grasslands and relatively few cattle and sheep before migration, or owned no grassland, cattle or sheep, such migration would hardly bring benefits in relieving grazing capacity and ecological pressure in the area of origin. There are two primary factors influencing migration by different kinds of families.

The first reason lies in the relatively low motivation to practice ecological migration in the three river source regions, located in high and cold places, with harsh survival conditions, and a fragile ecology system. However, contrary to outsiders' views, for the herdsmen who were born there and who have lived there for generations, this is a prized homeland, which supports them. They have their own way to exist with nature, their unique production methods, as well as a mode of living to ensure their survival, and their spiritual survival. According to the survey findings, only 8.9 percent had migrated due to the poor and harsh living conditions at the site of origin, while only 17.6 percent of them reported that they migrated in order to protect the natural environment.

The second reason is that while the government built houses for each migrant family and

provided various forms of infrastructure, such as water, electricity and roads, the annual life subsidy of 6,000 Yuan for each family hardly attracted large families, especially families which already had good economic conditions. At the destination site, if the migrants had no grasslands or other land, their original production and living skills were useless, and most of them faced a series of changes in language, lifestyle habits, cultural and religious customs, all of which greatly hindered their success in settling. The overriding reason for migration was the response to the country's calling, indicating that governmental advocacy is a decisive factor in migration. In addition, among the driving forces, most migrated to enable their children to obtain a better education, indicating that some herdsman families had recognised the importance of education; educational conditions at destination sites were generally better than those they had left. Accordingly, it was found that children lived with old people and their mothers in some destination villages. As for relatively poor families, they had bear fewer losses caused by migration, given that they will be provided with governmental subsidies and various preferential employment policies, and training, so their life could be better than if they had stayed at their original place of residence.

Improved employment must be a main priority in solving problems in migration, especially for ethnic minorities, which find it difficult to find jobs due to low educational levels, poor communication skills, and lack of professional skills. Low employment rates and declines in living standards were the major causes for the return of migrants. In addition, many migrants did not benefit from training, because many of them could not speak, or understand, Mandarin, or communicate with other people, which made their lives difficult and was a huge obstacle to employment.

Religious activities cannot be ignored in ethnic minority areas because they affect public emotions and opinion. It appears, however, that after moving to their current living area, religious activities were not affected, so religious activities, as well as ethnic customs and culture, were not major reasons for the return of migrants. In addition, many ethnic minorities had unique national cultures and values, formed from routines and long-term work and lifestyles in underdeveloped environments, which significantly impeded mobility and employment. They were satisfied with the status quo, lacked motivation and had no desire to leave their harsh environments. Without motivation and desire, they had not been willing to leave their familiar environment and their adaptability to their new environment was also poor, so they were more likely to return to their original location. As the residents of Xiangle County were all relocated

together, and had similar background and status, they felt comfortable living in such an environment, so this factor cannot be regarded as a reason for the return of migrants (cultural changes are discussed in Chapter 7).

#### **5.6.4.2 Individual Factor Analysis**

The survey found that the elderly population in migrant communities was more likely to be relatively satisfied with their new place. They received government compensation and a fixed source of income, and enjoyed preferential policies, such as medical insurance and endowment insurance. However, some young people preferred to return to their original place to dig Cordyceps or graze stock to improve their incomes, due to a decline in quality of life at the in-migration site.

People with high educational levels had better adaptability than those with low educational levels, but this did not appear to significantly affect migration. In terms of gender, because females were responsible for housework and males for making money, females did not appear to be affected by migration as greatly as males after relocation. In respect to ethnic factors, Tibetan people were most influenced by migration, because they preferred to live together and most affected by changes in religions practices.

Both internal and external factors were considered important in the survey of the migrants of Xiangle Country. It can be concluded that migrants moved to their current settlement areas due to harsh natural environments at the sites of origin, preferential policies and religious beliefs, but they still had not achieved improved lives. Specifically, employment problems were an important cause of dissatisfaction and for the return of migrants. It should be noted that success of the relocation project depends on the construction an adequate life in the place of relocation.

### **5.7 Conclusion**

In order to protect the vulnerable ecology and the environment and improve local living standards, the state and the government of Qinghai Province have invested a lot of money and resources, and ecological migration projects have also been implemented year-by-year,



according to plan (GOPGQP 2008). As a result, more and more migrant villages have been built, while more and more herdsmen have migrated to them. This appears to show obvious achievements by the project. However, an ever-increasing number of migrant villages is not the real purpose of migration. Instead, the final objective of migration is to protect the ecology and the environment in the regions and to improve the quality of life of migrants. Given the selectivity of migrants, the protection of the economic environment in the regions is far more difficult, despite superficial impacts. It can be argued that there needs to be more serious attention to the following issues during the implementation of ecological migration projects.

Firstly, the purposes of migration should be defined in consultation with people to be relocated. Rather than project completion, or the number of migrants, the fundamental purpose of the projects lies in their protection of the ecology and in providing poverty relief in these regions. Based on such purposes, standards should be formulated for the size of the population, grassland areas, cattle and sheep numbers and other factor related to the wellbeing of migrant's families. In addition, specific implementation measures and monitoring mechanisms, should be formulated for ecological recovery and the protection of areas returned to grassland after migration.

Secondly, destination areas should make concerted efforts to attract larger size families, which have relatively more grassland and more cattle and sheep. At present, the annual subsidy of 6,000 Yuan is issued to each family, which is not enough to attract large families with good economic conditions and with high incomes. In addition, governmental subsidies are issued per household rather than per capita, which effectively disadvantages large families.

Thirdly, resettlement migration should be different from that which occurs at other places. Due to huge differentials in living environments, production methods, modes of living, language, cultural and religious customs, resettlement migration in the regions is faced with complex challenges. Questions remain unsolved regarding how to help migrants adapt to life at the destination site and to find new livelihoods as soon as possible. According to the survey results, migration with longer distances and larger differentials will further enlarge difficulties in such change and adaptation. The environment still needs to be protected and monitored by people. Local people and officials have put forward the idea that governmental subsidies could be issued to reduce grazing capacity to relieve problems of human-land and human-livestock relationships, while the production and educational level of herdsmen could be gradually increased in order to smooth the transition of resettled migrants. This may be more effective and produce stability.

Meanwhile, besides the protection of the environment at the origin, there is a need for ecological protection of places experiencing migration. Construction of migrant villages at destination and implementation of migrants' subsequent production and life will also pose threats and destruction to their ecological environment. Pros and cons of these two aspects should be carefully considered during migration planning.

# **Chapter 6 Economic Adaptation and Government Support of Resettlement Migrants**

## **6.1 Introduction**

The chapter presents and discusses the study results relating to the issues around migrant's economic and income adaptation. Specifically, it examines the major sources of migrants' incomes, the factors affecting their income and suggests possible ways to avoid risks to them. It also examines the issue of resettlement migration compensation and whether it is adequate. It is based on survey and interview findings from field households survey in Dulan 2012.

For people in a developing country, an adequate income is a basic demand for food, shelter, etc. and a developmental foundation for them. Therefore, this chapter first identifies the main income sources for surveyed migrants. It was found that the economic circumstances of resettlement migrants in western China had changed considerably after migration. Losses in fixed assets, productive properties and income sources had occurred. This resulted in reduced living standards and economic status for migrants, affecting their adaptation to a new life. This also influenced the economic and developmental capacity of migrant families. However, the survey results also showed that some families could not adapt well to life after migration for various reasons, leading to a decline in incomes.

Because this migration project was organised and led by the government, it plays a vital role in the project outcome. Therefore, government support to migrants is key to their success. The field survey found that in different families, factors influencing economic recovery are quite different due to geography, culture, education, health and production methods. Hence, the study proposes that it is impossible to make uniform arrangements for migration compensation and later-stage support policies. It is necessary to have targeted policy arrangements, according to region, culture and other aspects unique to different areas. Specifically, where migrant families suffer serious losses in human capital and sustainable developmental capacity during removal, mere capital support will highly likely cause dependency and constrain their developmental capacity. Hence, in the long run, it is necessary to support and cultivate the developmental capacity of migrants from an early stage.

## 6.2 Migrant's Income Sources

The survey found that two thirds of migrant respondents still worked in agriculture and one fifth in labour-based industries, as shown in **Table 6.1**. Service industries and small self-owned businesses were also popular in the region. However, only one surveyed resident was working in a technical or professional job. Moreover, little change is evident between 2007 and 2011.

**Table 6.1 Occupation Type of Migrant Respondents**

Occupation	2007		2009		2011	
	N	%	N	%	N	%
Agriculture/forestry/husbandry/fishery production	590	66.7	587	66.2	592	66.4
Small private business	30	3.4	30	3.4	29	3.3
Labouring work in manufacturing	143	16.2	144	16.2	145	16.3
Labouring work in a service industry	41	4.6	45	5.1	46	5.2
Sales in a business industry	16	1.8	16	1.8	16	1.7
Business administration and management	2	0.2	2	0.2	2	0.2
Technical or professional work	1	0.1	1	0.1	1	0.1
Service in public institution	11	1.2	11	1.2	11	1.2
Government officers	51	5.8	51	5.7	49	5.5
	885	100.0	887	100.0	891	100.0

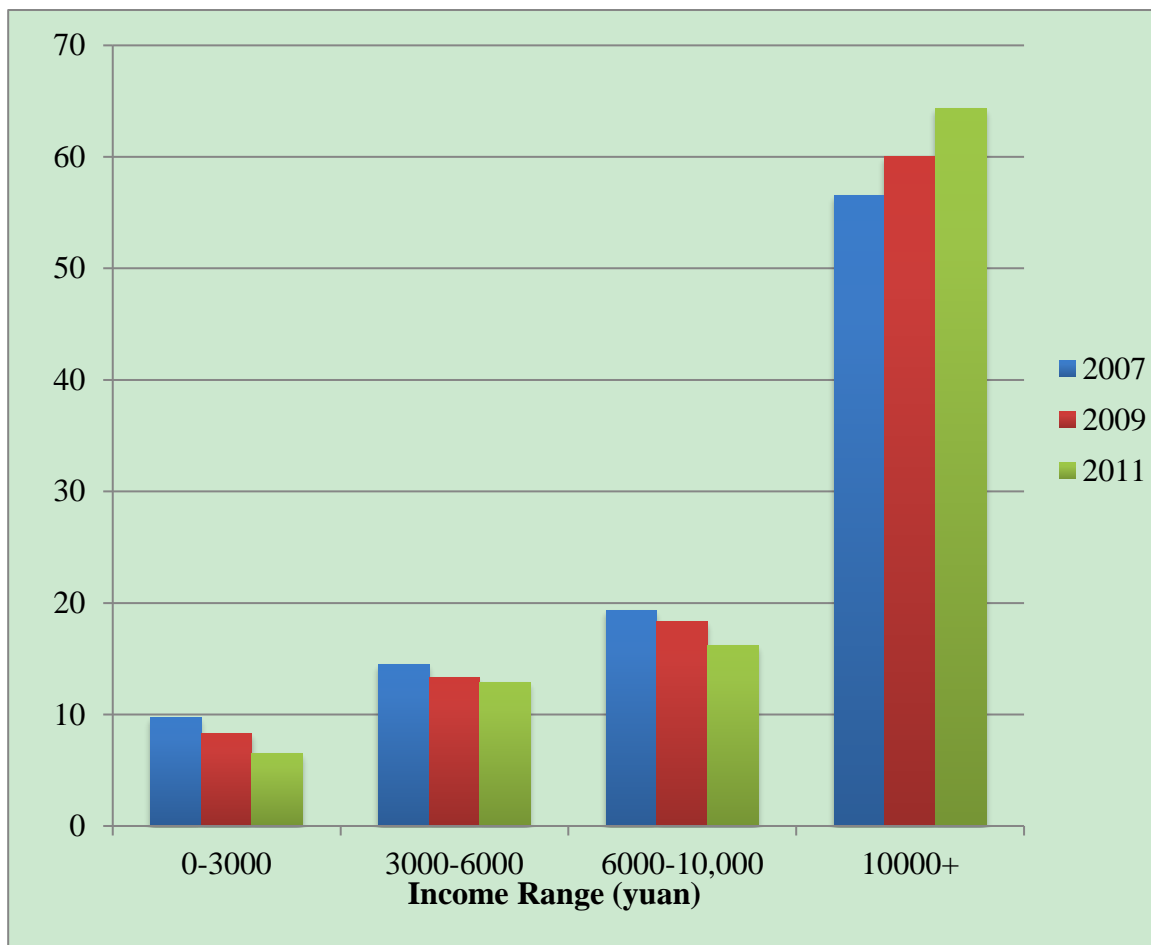
Source: Field Households Survey in Dulan (2012)

### 6.2.1 Agricultural Income

For China's rural farmers, agricultural products, including food products, economic crops, livestock products, aquatic products, forest and fruit products, processed agricultural products and so on, were the main income source before migration (Li *et al.* 2013). However, with the implementation of the migration projects, migrant's living environments and agricultural production methods were bound to change. Accordingly, in this migration project, herdsmen need to make the transition to being farmers, or off-farm workers, because they migrate from grasslands to agricultural areas and towns. In the process of this migration, it is apparent that the

success of settlement depends not only on the ability of migrants to adapt to changed income sources, but also on how much support they receive from the government. **Figure 6.1** shows that incomes of over 10,000 Yuan (based over 3 years) had increased markedly between 2007 and 2011. It is noticeable that not only did total income keep increasing, the share of agricultural income per family also increased for families with an income of more than 10,000 Yuan. Furthermore, the income related to agriculture increased gradually for all income brackets in the four years from 2007 to 2011.

**Figure 6.1 Household Annual Income of Respondents from Agriculture, 2007-2011**



Source: Field Households Survey in Dulan (2012)

However, because agriculture is the main source of income for most migration families, there is a risk to their incomes (**Plate 6.1** shows that farmers harvesting highland barley in Xiangride County). Agricultural income is vulnerable to environmental change and climatic disasters, which may cause significant changes in household income over time. Given the risk of this relative dependence on agricultural income, the role of government becomes very important. The

field survey found that local government had played an important role for many years, especially when natural disasters occurred. As expressed by the office Principal of Dulan County Migration Bureau:

*According to the investigation data survey by the Dulan government, the net per capita incomes in Dulan county during 2008 to 2010 reached 950 RMB, 1,230 RMB and 1,425 RMB respectively. The main sources of these income came from plantation and cultivation. The income structure is quite simple. The majority of households are under the family workshop; thus, it was hard to form the intensive, high-efficient and large-scale economic entity. As a result, residents were at high risk. Once there was any natural disaster, farmer would reap nothing at harvest time, causing a great impact on the family incomes. For example, hail occurred in our county in spring of the year before last. Almost all households were hit by this disaster. People would have extremely limited incomes without government compensation in that year.*

-- -- The office Principal of Dulan County Migration Bureau

### **Plate 6.1 Farmers harvesting in Xiangride County**



Source: Photo collected from Xiangride County Government

### **6.2.2 Income from Industrial Sources**

In the process of environmental migration, many migrants used compensation funds to invest in industrial production and establish firms (Li *et al.* 2013). However, the production scale of these firms is too small to create economies of scale, and their products are often uncompetitive because of their high price and their relative lack of technological sophistication. Therefore, the success rate of these companies was extremely low, and they had poor outcomes. Thus, income from industry is quite low compared with other income sources. However, developing industry is an important way to solve the problems associated with the livelihoods of resettlement migrants in areas where agriculture is less developed.

A Tibetan male aged 43 years who was a restaurant boss with primary school education expressed the following during an interview:

*I came here in 2002. At the beginning, I did farm work and fed sheep at home. Then, with an increase in family members, it was impossible on such incomes to raise them, so I started working outside. Without any educational background and skills, I could only do some physical work when working outside. I worked more than 10 hours every day and only earned 100 RMB. Unfortunately, I was left with very little after my expenses. After that, I sought help from the government. I took a loan from the government to establish a small business. I went back to the county and operated a barbecue restaurant. Local young people or people in surrounding sites came here to barbecue. Now, everything goes well. I basically can support a family of seven.*

--Dulan Interviewee 121, 2012

Since the migration project is dominated by the government, it should take responsibility for ensuring adequate migrant incomes, by providing support funds, as well as technological and human resource support, for firms developed by migrants. Such action could help migrants adapt to their new environment as soon as possible.

### **6.2.3 Courtyard Economy Income**

Most migrants developed a courtyard economy, such as planting vegetables, fruits and breeding cattle and sheep. This is important for migrants because it can enrich their lives and reduce their living expenses. They can also obtain some income from the sale of their surpluses. However,



the development of such an economy is closely related to migrant's environment and location. If the land in migration areas is rich and fertile, the courtyard garden economy will undoubtedly become an important way to increase income. But because local governments don't allow pasture, those who were previously herders have to change their courtyards, (refer to **Plate 6.2**), and can only feed sheep in their backyards.

A Tibetan male aged 40 years old who had primary school education expressed the following during an interview:

*The government forbids pasture after we moved in. It is particularly strict in management. If someone grazes secretly, their cattle and sheep will be confiscated and they also will be fined lots of money, implying they will lose most of their incomes for the whole year. Therefore, we can't do anything about it, but only build a sheep shed at home and feed them in our backyard. Before the grazing prohibition, incomes were better by being able to graze cattle and sheep every year. Then, we were forbidden to feed sheep in the bulk store, so we had to feed them in the backyard shed. However, the fodder grass costs of feeding them are too high. If we feed too many of them, we are afraid that we can't recover the costs. We have fed more than 100 sheep before, but now we at most can only feed 30 sheep in captivity, thus our incomes have been reduced a lot.*

--Dulan Interviewee 53, 2012

**Plate 6.2 An Interviewee's Courtyard for breeding sheep in Xiangride County**



Source: Field survey in Xiangride County 2012



#### 6.2.4 Salaried Income

Salaried income refers to the payment obtained through engaging in state occupations, for example, or the income obtained by working in governments, companies and non-profit organisations (Zhang *et al.* 2011). Because most migrants are from other regions, their salaried income from such occupations is relatively low. **Table 6.1** shows that the labour output and income had been at a low level in recent years in the migration area.

**Table 6.2 Labour Output and Income Records of Main Years in Qinghai Haixi Area**

Years	Labour service output number (ten thousand person times)	Labor output incomes (ten thousands RMB)
1985	4.0	--
1987	8.29	4366.3
1990	8.51	4982.2
1995	28.27	2362.8
2000	42.0	45108.0
2005	25.3	78918.0
2011	65	357500

Source: Data collect from local government office unpublished data (2012)

For many families, however, which are unwilling to work in agriculture, salaried income is their most important income source, as one Han nationality male interviewee, aged 55 years with primary school education explains:

*In recent years, the government doesn't allow pasture, but only allows us to feed cattle and sheep at home. The government cattle and sheep raising projects failed. In these two years, due to less rainwater, grasses couldn't grow very well. It is too expensive to buy fodder grass. Households can't afford to feed them at home, so we have to work outside. Recently, men work outside, while women, old people and children do farm work and feed sheep. We just make a living in such a way. It is not bad if someone works outside. If not, it is too poor to satisfy adequate or ample food and clothing. It is so difficult.*

--Dulan Interviewee 76, 2012

### **6.2.5 Income from capital and Donations**

In the process of migration, migrants face the loss of material wealth, but they experience pressure to invest some of their idle funds in the capital market. However, because of their limited knowledge, they do not know how to increase their revenue through capital investment. Therefore, the capital income of migrants is mainly composed of a small amount of savings, as well as deposit and bond interest. The proportion of migrant's total income accounted for by income from capital is exceedingly small.

Donation income refers to funds obtained from donors. Generally, donation income is accidental, temporary and very small, so it cannot lead to fundamental change in migrant's long-term income structure. In China, people tend to pay attention to national or regional disasters, but donations for migrants, who fail to get attention, are rare and only a small number of very poor migrants can access income from donations (Xue *et al.* 2007).

### **6.2.6 Government Compensation**

In China, government compensation for environmental migrants plays an important role in guaranteeing their basic living standards. It has become a necessary part of the environmental migration process, according to most migration project reports (Xue *et al.* 2007). The compensation paid differs, according to the reasons for it and the differing forms of migration. In classical cases, such as projects "returning farmland to forest" and "returning farmland to Grassland", most migrants can get compensation, corresponding to the amount of cultivated land or pastoral area returned to the natural environment (Zhang *et al.* 2011).

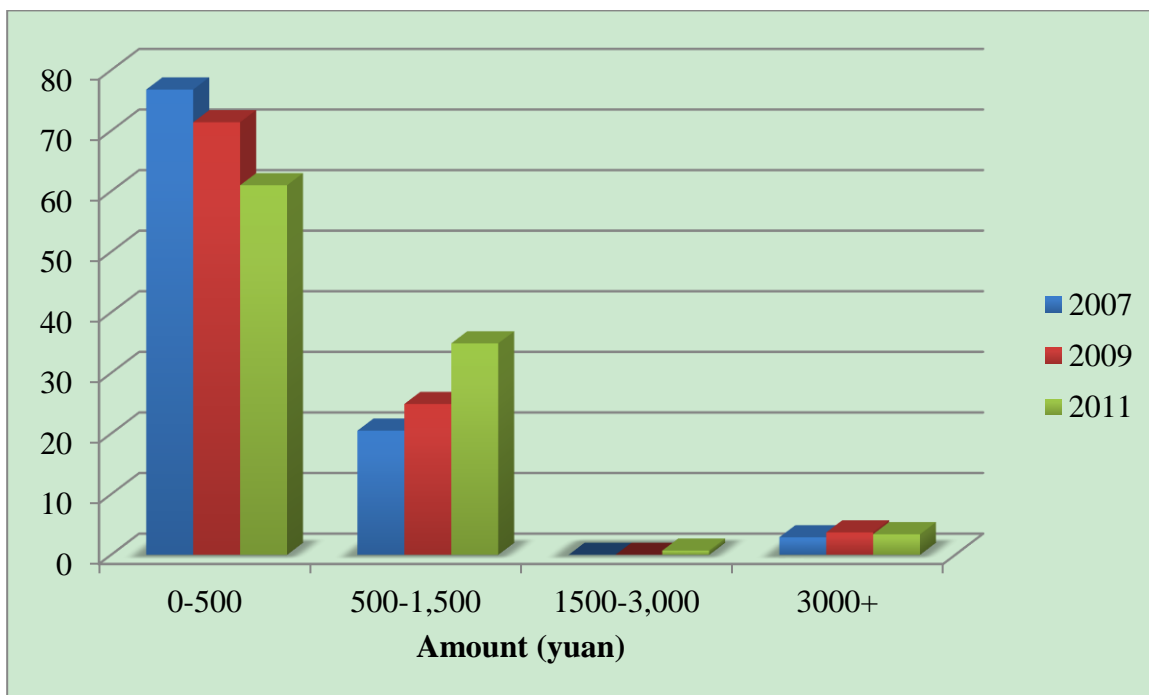
For example, in June 2011, Inner Mongolia started a national grassland ecological protection subsidies and incentives project, which provided herders with comprehensive production subsidies, forage and livestock balance subsidies, periodic grazing subsidies and superior breed subsidies (Liu 2012). In the resettlement process, different regions adopted different compensation practices. For example, in some regions, one-off compensation funds were paid according to the number of households, or the overall population. In some regions, they were given gradually in the form of agricultural subsidies. For instance, in the case of Diaozhuang migration, in Ningxia, (a long-distance resettlement migration organised by government), the government provided a one-off compensation payment. In addition, migrants could also get

indirect forms of compensation, such as housing, education and so on (Li *et al.* 2013). Generally, government compensation plays an important role in migrant’s basic security, but they still experience difficulty in overcoming economic burdens, because of the lack of lasting compensation over time (Zhu and Zhang 2005).

The survey found that the net income of resettlement migrants indicated that their income has increased and is correlated with income related to agriculture. Moreover, the number of people who have higher incomes has increased year by year. Related research shows that, in some areas, gross regional domestic production and migrant incomes had improved. For example, Chen (2014) has argued that, after implementing ecological resettlement, migrant income increased from 0.55 billion RMB in 2009 to 1.3 billion in 2013; urban resident’s disposable income increased from 9847.6 RMB in 2009 to 15,790 RMB in 2013, and rural per capita net income rose from 3030 RMB in 2009 to 5,317 RMB in 2013.

The results of the survey in Dulan County, shown in **Figure 6.2**, suggest that income from local governments is more important for migrants than for the local non-migrant population, and increased between 2007 to 2011. A reduction for low income (under 500) and increase for income between 500-1,500 yuan.

**Figure 6. 2 Respondents Social Security and subsidy 2007-2011**



Source: Field Household Survey in Dulan (2012)

Total income from social security accounted for little in terms of total income, and most of the social security income was below 500 RMB per year. Therefore, it can be concluded that social security is not likely to be a major income resource. As expressed by the office Principal of Dulan County Migration Bureau revealed that:

*The total investment of the migration project reached 430 million RMB. 320,000 mu of land was comprehensively developed. The project area could arrange 60,680 mu of total cultivated land for migration, especially for the flat high yield fertile irrigated farmlands, which could contain 20,000 migrants. Until the end of 2003, Xiangba project relocated 3,520 households and 16,131 people. After migration, 3.5 mu high yield irrigated farmlands per capita were obtained (in the former residence, less than 2 mu low yield dry land per capita was only obtained). Everyone got 450 RMB of the governmental subsidies. The land in the resettlement area was much better than the land before migration. Each mu of land could get more 3,000 RMB. Each household could get 10,000 RMB of incomes per year. Even the government only provides fewer cash subsidies, governmental compensation in other aspects have been better, such as land compensation, housing subsidies, skill training subsidies and interest-free loans. The government has invested a lot in these aspects.*

-- The office principal of Dulan County Migration Bureau

It should also be noted that most government subsidies were under 1,500 RMB, which are insufficient, even for those with the lowest incomes. Thus, it can be said that government cash subsidies are not the main income source for migrants. However, the government's cash compensation is not the most important, or the only, way to receive a subsidy. The government has tried to improve the living standards of migrants through various forms of compensation.

### **6.3 Key Factors Affecting the Income of Resettlement Migrants**

According to the field survey, there are three main factors affecting the income of resettlement migrants: institutional factors, social factors, and economic factors.

### 6.3.1 Institutional Factors

Institutional reform is an especially important factor that affects environmental migrants' incomes. As China's economic system transforms from a planned economy to a market economy, the policies and solutions relating to environmental migrants under the planned economic system, are no longer applicable. This has weakened the protection of migrant income (Jiang 2006). Moreover, migrants are in a minority compared to the whole society; their interests are seldom considered in the process of the economic system's transition. Therefore, Li et al. (2013) argue that the changes in China's economic system will affect migrants more than non-migrants.

Under the planned economic system, the prices of commodities are determined by the state, while under the market system, they are determined by the market. There is no specific price for migrants under the planned system, but they often enjoy more price concessions and protection than non-migrants. Change in the commodity price determining mechanism will have two kinds of effects on migrant's' income. On the one hand, production costs are affected by the market, and migrants can only buy goods which have no preferential price in the market system. On the other hand, the selling price of migrants' products is determined by the market, rather than the government (Zhang and Zhao 2008). That is, the commodity price determining mechanisms mean migrants lose price policy protection in production and consumption. Compared to other factors, the commodity price determining mechanism directly affects migrants' incomes.

A Han male aged 52 years with primary school education who had the principal of a livestock farm expressed the following during an interview (**Plate 6.3** shows the livestock farm and interviewee):

*Our family always makes a living by feeding cattle and sheep. We have grazed before, so yearly incomes were not bad and could support children to go to school. After migration, because of forbidden pasture, we could only loan from the government and apply for constructing a small livestock farm. Several years later, our life is not bad. However, fodder price in recent years have increased sharply, while the price of cattle and sheep has seldom increased. Now, I will spend more 200 RMB more than before to raise a sheep. This even excludes other investment. If the sheep price drops, I lose money. The government gives us some measure protection price, but the costs increased so sharply. Now, our life is uptight.*

**Plate 6.3 Interviewee's livestock farm in Xiangride County**



Source: Field survey 2012

Under the traditional planned economy, China's state-owned enterprises adopted a unified distribution system of employment and lifelong hiring. In the process of rural environmental migration, the government, based on the special urban and rural household registration system, adapted migration as a way of making agricultural residents transition to becoming non-agricultural ones (Lu *et al.* 2005). Consequently, many migrants were placed into enterprises for work. As the deepening of the reform of state-owned enterprises occurred, the enterprise personnel management system underwent a fundamental change. Fan (2004) argues that generally, if the areas to which migrants moved are small towns, or are suitable for agricultural development, they are likely to find jobs. At the same time, with the policy of reducing staff to promote greater efficiency, many migrants faced the risk of unemployment, because of their low educational levels, underdeveloped labour skills and weaker competitiveness in the labour market. However, in the current market system, migrants being placed in state-owned enterprises, or stable organisations, is rare, or almost non-existent. Therefore, migrants must find jobs by themselves. Although local governments provide some help, they do not directly allocate jobs for them.

In China, urban land is owned by the state, while rural land is owned by the village, and the land resources' compensatory price, in the migrant resettlement project development, is determined by the land management law and related laws. Therefore, environmental migrants may not be completely compensated once they have lost their land resources (Li 2005). So, the survey found that the income level of migrants who mainly depended on land resources or locational advantage for their living, will certainly decline after relocation.

### **6.3.2 Social Factors**

The following section examines the social factors affecting resettlement migrants' incomes.

#### **6.3.2.1 Culture, Education, and Healthcare**

In the process of migration, migrants' original culture, educational and healthcare systems are disrupted, and the government has to rebuild these systems in the relocation areas. However, The early policy, which stressed resettlement and ignored support for migrants, affected their production knowledge, skills and health (Fan 2004). Since 2000, the local government has had a series of policies. For example, the Opinions of the State Council centres on improving supporting policies within large and medium-sized reservoir resettlements. The policy greatly improved reservoir migrant's production and living conditions. At the same time, migrants compensation standards were also enhanced. As support for migrants gets more attention, their children have greater access to education, medical care and other basic public services. Additionally, skills training for migrants together with financial support, have also been included in late-stage support policy.

An expressed by a Tibetan male interviewee aged 54 years who was illiterate:

*We have five family members, including three children. Both of us are illiterate and have little knowledge. We have made a living before by helping others to graze. After migration, the government forbids pasture, thus we did not have a job and could not make money. We wanted to do other manual labour. However, with poor education backgrounds and skills, we could not find a job at all. After that, the government organised us to participate in*

*skill training, but we basically could not understand it at all, thus we didn't want to do it. Now, we can only do some odd jobs and manual labour. The family life is so poor. We also sometimes need relief from friends and relatives.*

--Dulan Interviewee 43, 2012

The influence of culture, education and healthcare on migrants are not readily visible, but they are far-reaching (Jiang 2006). It was found in the survey that, in Xiangride Town, migrants did not know about scientific farming and planting of irrigable land. Based on this, the local government held agricultural technology classes to enable migrants to grasp relevant technologies, such as farmland irrigation, intercropping of wheat and beans, cultivation of apple trees, and the scientific application of chemical fertilisers, or pesticides. Moreover, migrants passed these production techniques onto the original residents through visiting relatives or friends, helping to improve agricultural production in the entire region. But for many families engaged in agricultural production, their health status directly determines their income.

A Tibetan male aged 58 years with primary school education who suffered disease for 4 years expressed the following during an interview:

*When I was in good health, I helped others to graze. Then, I learned some skills and did some manual work in the surrounding factory. I worked hard for more than 10 hours per day, and I could earn more than 4,000 RMB per month. It had no problems to support a family. After working in this way for several years, which was gruelling work. Then, I was diagnosed with lumbar disc herniation and lung disease, thus I am always coughing and can't do manual labour. I have to take some medicine every day. Now, my wife goes out to do odd jobs to earn some money. The family almost has no income.*

--Dulan Interviewee 65, 2012

For many poor households, they no longer needed to ask the government for relief, but, instead, ask for scientific and technical personnel to provide guidance on scientific farming and cultivation.



### 6.3.2.2 Social Relationship Networks

The study found that in many cases the migrant's original social relations, or networks, had broken down, which made it difficult for them to access information. In addition, it took energy and time for migrants to establish mutual trust. The survey results indicated that most of the migrants from rural areas chose to work outside, with the help of their relatives or friends. Following migration, the breakdown of social networks hindered the ability of migrants to gain access to information and, hence, affected their income levels.

A Tibetan male, aged 62 years, who was an individual business operator with primary school education expressed the following during an interview:

*I sell cattle and sheep in my native place at ordinary times. I have five children, with four married daughters. Only one 23-year-old son is not yet married, who studied in our agricultural school. After graduation, he works in his brother-in-law's seed company and earns 2,000 RMB per month. Previously, we didn't plan to migrate, because our life is not too bad, and our friends and relatives live here. Under the support and care of friends and relatives, our life was good. Afterwards, we were informed that the director in the migration office is our relative who told us our life will be better after moving here. The governmental policy is also good. We have good means of livelihood, thus we migrated here. Without such relations, we wouldn't migrate at all. There is no doubt that our incomes definitely will be greatly affected after migration without such relations. In today's society, if we want to make money, we still need some social relations.*

--Dulan interviewee 89, 2012

Correspondingly, different social relations networks produced different social and cultural values. The transformation from a closed natural economy and social system to an open market economy, together with migration, will bring about profound changes (Wang *et al.* 2009).

In the survey of new migration villages in Xiangride, it was found that, with the help of the government, migrants who had moved there had adopted new farming technology and the means for getting richer had improved greatly. This was mainly due to the close relationship with the administration, and the similarity between origin and destination sites. The opinions of the

original residents about the migrants also changed in the process of mutual visiting between relatives and friends. Generally, the conservative and complacent mind set prevailing at the place of origin, was replaced with the concept of a pioneering spirit and a sense of competition with residents at their new site.

### **6.3.3 The Environment Factors**

As people migrate to a new region, increasing population density is bound to affect its ecology. Although the government emphasises conservation of the environment in the process of migration, people tend to develop natural resources excessively, or inappropriately, due to the need for economic development and short-term income, leading to serious environmental deterioration (Wang *et al.* 2009). In turn, migrants need to pay for investment in expensive environmental pollution treatments, which affects the sustainable development of their economic status. Environmental migrants in China are generally from the middle and western regions. According to Zhao Yuelong's typology, most regions in the western part of China belong to the northern semi-arid or semi-humid ecological fragile area and the northwest arid ecological fragile area (Zhao 1999). Ecological degradation and deterioration in these ecologically fragile zones are common, and will directly affect their economic development potential, and even people's survival, because the environment is a basic condition for survival (Liu and Wang 2010). At the same time, as with the human body, ecological deterioration will extend and harm other good ecological systems, if not controlled in time. Therefore, the quality of the environment will have a direct impact on the earning capacity of migrants.

### **6.3.4 Economic Factors**

Among China's non-voluntary migrants, the problem of poverty has related mainly to rural migrants. China's rural economy is still mainly a self-sufficient, natural one and rural migrants are often in areas which are least developed. Accordingly, Sicular (2007) argues that the material basis of economic development is the main factor affecting the level of development. The result of migrant's' passive development is caused by not only by the material basis of economic development, but also by the lack of other economic resources.

## Land Resources

China is a populous country and per capita land resources are extremely limited. Once migrants lose their land, it is difficult for them to get it back, especially in the eastern plains (Lee and Zhang 2005). The opportunity for migrants to obtain income from land will be greatly reduced due to the loss of land resources. Therefore, land resources are a key factor in determining a migrant's success. At present, agricultural areas are still the main migration destination for most migrants, and they must be guaranteed sufficient land. On that basis, they can develop a diversified economy; that is, they can be both workers and peasants, and they will be free to go forward or to change direction.

A Han male aged 49 years with primary school education expressed the following during an interview:

*Before migration, we planted on the dry land and just ignored it after seeding, waiting for harvest. We just lived by depending on the weather. With little water supply, it was not bad as a mu of land could earn 2,000 RMB per year. It was not enough for supporting a family. After migration, the land is flat land with an irrigation system, in which water is led from channels to farmlands, and also, there are specialised fertilizers and pesticides. Even if we have to work a lot, a mu of land can earn 8,000 RMB per year. In this way, our life is greatly improved. With the growth in living standards, we have paid off previous debts one by one*

--Dulan Interviewee 75, 2012

**Plate 6.4** shows the wide expanse of crops that provide a high yield per mu of land in Xiangride area which has increased greatly compared with previous yields.

## Plate 6.4 High quality farmland in Xiangride County



Source: Photo collected from Xiangride County Government Office

From the view of the geographical environment, and migrants' economic and social backgrounds, the best option for them is to get a fixed amount of land. Thus, land quality is particularly important for migrants because it affects what they can produce and, therefore, their income.

### **Production Skills**

It was found in the survey that migrants in the Xiangride area were forced to change from grazing to planting in combination with grazing, and to transform their production and technology. If they could not adapt to these new work styles, their agricultural income decreased. Those ecological migrants who had grazing as their main production method needed to change from grazing to confinement feeding, because of the requirements for ecological protection; this meant that more forage was needed. Therefore, they needed to learn the technology of grass planting. But for many families, it's not easy to switch from grazing to planting.

A Tibetan male aged 57 years who was illiterate expressed the following during an interview:

*Our family has been making a living from pasture for several generations. We also did some farm work, but we didn't do other things. After migration, the government doesn't allow pasture, thus we have to do farm work. We are unfamiliar with this aspect and can't understand lots of things. The government dispatches agricultural experts to teach us, but we still can't understand it that much. We have just fed cattle and sheep in all our life, while now we are suddenly required to do farm work, which it is almost impossible. We can do nothing about it but ask neighbors to help us. Now, our incomes are greatly reduced and are not as good as before. Lots of people are similar to me. The government indeed gives us good land, but we don't exactly know how to plant and don't like planting, either. Lots of households just make the land barren and would rather borrow money, instead of doing farm work.*

--Dulan Interviewee 62, 2012

However, support is especially important. To enable migrants to successfully adapt to their new life, the government support is particularly important, especially in the area of skills training. This will allow migrants to adapt the new ways of production more quickly and effectively, without affecting their income. The office principal of Dulan County poverty alleviation development bureau said that:

*During the migration project process, we utilised the governmental anti-poverty funds to support and cultivate some labour-intensive industry in the migration village. The increase urban population promotes the increase in social consumption. Industries such as catering services, business circulation, real estate and building accompany the new development. We invest millions of special capitals every year and run a special skill training school. People who attend the skill training will receive 800 to 1,600 RMB of subsidies. Now, lots of farmers and herdsmen start engaging in retail industry, catering service, transportation, motorbike repair, and small-scale agricultural and animal product processing industries to drive the transformation of farmers and herdsmen. Many people work in towns and attempt a new way of making a living. Some people even sell fruits, vegetables and national articles. Particularly, young people actively participate in various vocational trainings. Nowadays, the number of farmers and herdsmen in the county who work in restaurants have increased considerably.*

-- --The office principal of Dulan County poverty alleviation development bureau

### **Population Density**

The essence of migration is redistributing population from areas of origin to areas of destination. In the process, population pressure in the area of origin is reduced and it is increased at the destination (Potts and Mutambirwa 1990). It is evident that, as the population density increases in migration areas, the pressure on resource requirements will grow accordingly. In addition, in the process of integration, because of differences in social and cultural backgrounds between migrants and original residents, conflict among interest groups may arise, which may trigger social problems and even affect migrant's income and economic well-being

### **Human Capital and accumulation**

Human capital and material capital, which are complementary, are two indispensable conditions for economic development. However, the effects of investment in human capital often needs time to be evident (Li *et al.* 2013). In the process of migration, there is often too much attention paid to the short-term effects of material capital, ignoring the impacts of investment in human capital. This can make the sustainable development of economic capacity is limited. Human capital is more important than material capital, especially in the development of modern economies. If migrant's capacity to accumulate human capital weakens, it affects not only economic development, but income will decrease and become less stable in the longer term.

## **6.4 Government compensation for resettlement migration**

In China, government compensation for resettlement migration plays an important role in guaranteeing migrants' basic living conditions. It has become a necessary part of resettlement migration process, according to most studies (AAHB 2011). However, the types of compensation will differ according to the reasons for, and forms of, migration. The results of the survey in Dulan country revealed that the income from local government is more important for these migrants than for the local population. So, this section will specifically analyse government compensation in the resettlement migration project.

#### **6.4.1 Previous studies on government compensation for resettlement migration**

In defining the content of migration compensation, it has been argued that welfare lost by migrants, who were forced to migrate because of construction, was a kind of spill over cost (Bright *et al.* 2000). Moreover, the losses experienced by migrants should be borne by construction budgets, instead of by migrants themselves. Migration compensation should include the property losses of migrants, according to its replacement cost, loss of social networks, loss of markets, and psychological harm resulting from migration. The compensation should be recorded in the engineering cost. From the perspective of Knetsch and Romann (1983), market value could not make up for the loss of the economic welfare of asset ownership, even if the market value of an asset could be calculated. According to Cernea (2004), current compensation mechanisms always lead to an underestimation of migrant's various asset losses (physical capital, human capital, social capital and so on). Only a small part of migrants' costs was compensated, and a large part of these costs were borne by migrants.

The Chinese scholar, Jing (1999), pointed out that China had not paid enough compensation to migrants in the past, so the living standards of many migrants were significantly lower than that of non-migrants in specific locations. Similarly, Xu (1998) has argued that traditional migration compensation policies neglected the social damage caused by migration, the various costs of reconstructing migrant communities, as well as the physical strength and the psychological price paid for employment of migrants and their adaption to new environments. Zhengang *et al.* (2003) pointed out that the real costs of migration refer to capital input in production and the living costs of migrants and must also cover economic and social costs. The total investment in local construction included investment in migration, but it did not reflect the real cost of migration, which far exceeded the investment costs. Duan and Steil (2003) point out that compensation for the losses of migrants should not be based solely on visible, tangible loss; the intangible, social losses of migrants should be an important component of estimations of their losses.

From the literature review, it can be seen that previous studies on resettlement compensation have pointed out deficiencies in existing compensation, which showed migrants bore the intangible spill-over cost of projects (Abu *et al.* 2014). Considering that these intangible, indirect losses cannot be quantified, studies from various countries only provide qualitative analyses of

related losses and fail to quantitatively measure the intangible losses of migrants. The most important loss is the psychological cost, caused by migration between different local government. In addition, these two kinds of losses will have a long-term influence on migrant's quality of life after migration.

#### **6.4.2 Resettlement Migration Compensation Methods**

Under the system of market economics, the migration behaviour of migrants can be regarded as commodities that migrants provide for the market. Governments and enterprises are consumers of those commodities (Papademetriou and Martin 1991). The basic attribute of commodities includes value and use value. Value is the essential attribute of commodities, while use value is the natural attribute of commodities. Changes in land and residence, caused by migration are the natural attribute of commodities. Due to different geographical locations, the commodity has different additional value according to its natural attributes. Migrants enjoy different public services in different regions, including education; cultural services; medical treatment and public health; and social security infrastructure and so on.

In the process of migration, the government, enterprises and the public obtain the positive effects of commodity value, while migrants are forced to bear the negative effects of commodity value. In previous studies it was found that this includes the pain of leaving their homeland and separation from their homes, neighbours and relatives, as well as loneliness and psychological trauma for original inhabitants (Cheng and Wang 2011). All these contribute to the "negative" value of migration. Therefore, in more recent project the value of some elements of public services and the psychological costs should be embodied in the transaction price and become an indispensable component of reasonable compensation in the transaction process of migration, except for the transaction of natural attributes, like land and houses (Möbrand 2006). However, compensation policies at present pay more attention to compensation for physical assets and neglect compensation for psychological costs resulting from migration (Adger and Adams 2013). Compared with the loss of physical assets, which involve a short recovery period, the psychological costs not only have a long recovery period, but can also continuously influence the effectiveness of migration (Ma 2002).

Therefore, based on the above analysis, this section puts forward a reasonable compensation mechanism for resettlement that has three aspects: physical assets, elements of public services,



and psychological costs (Cheng and Wang 2011).

Compensation = Compensation for physical assets + Compensation for the elements of public services + Compensation for psychological costs.

Regarding compensation for the assets of migrants, China has unveiled relevant policies and regulations. Specific laws, regulations and articles can be used for reference in the case of accounting (Wan 2004). With regard to the accounting of psychological costs, some scholars have adopted a contingent valuation method, and the methods of experimental economics, to establish a corresponding relationship between non-physical loss and the amount of loss (Castles 2003). There is no tradition of doing market research into consumers in China at present which has resulted in a distortion of willingness to pay respondents who may not understand the method of measurement (Cheng and Wang 2011). This method is poorly understood and therefore it is difficult to achieve reasonable results with its use in contemporary China.

Therefore, this research only provides a specific calculation method regarding compensation for elements of public services. Given that migration behaviour is dominated by the government, most migrants passively accept resettlement except for those actively turning to their relatives and friends. Differences in the quality of public services, because of resettlement, are usually the main factor influencing the willingness of migrants to migrate, and which, to a certain degree, have a long-term influence on migrant's quality of life. According to Afifi and Warner (2008), a favourable geographical location, political resources, non-agricultural employment opportunities, and population and social resources, all have a negative impact on the willingness to return. This research only provides a specific calculation method for compensation relating to elements of public services.

#### **6.4.3 Measurement of the Quality of Public Services**

By referring to the evaluation index system of the *Blue Book of Public Services*, released by the Chinese Academy of Social Resources, and by considering factors strongly linked to the life of migrants and the representativeness of selected indices of counties and cities (Bai and He 2003), this thesis constructs an evaluation index system for two levels of public services. There are 4 first-level indexes, including medical care, transportation and communications, cultural education and employment, as well as economic security. In addition, the research builds 16

second-level indexes, under each first-level index, which finally gives rise to a comprehensive evaluation index system of resettlement public services.

#### 6.4.4 Standardisation Treatment of Evaluation Indexes

Given the dimensions and units, necessary data must be standardised. According to the nature of evaluation indices, they are divided into “benefit” indices and “cost” indices. Benefit indices refer to ones whose attribute value is positively correlated with the quality of public services and where higher values mean better services. Cost indices refer to those whose attribute values are negatively correlated with the quality of public services, and which will be better with lower values. In the system of second-level indices, only the index of ratio between various types of students and full-time teachers belongs to the cost index (Fan 2002).

Below is the standardisation:

Benefit indices:

$$Z_{ij} = (y_{ij} - y_{jmin}) / (y_{jmax} - y_{jmin}) (i = 1, 2, \dots, n; j = 1, 2, \dots, m)$$

Cost indices:

$$Z_{ij} = (y_{jmax} - y_{ij}) / (y_{jmax} - y_{jmin}) (i = 1, 2, \dots, n; j = 1, 2, \dots, m)$$

In Formula (1) and (2),  $y_{jmax}$  and  $y_{jmin}$  are the maximum and minimum value of index  $j$ . After standardisation, the decision-making matrix is  $Z = (Z_{ij})_{n \times m}$ . In this way, the data of the decision-making matrix can be directly processed. Obviously, the higher  $Z_{ij}$  is, the higher the quality of rural public services will be.

#### 6.4.5 Determination for the Weight of Comprehensive Evaluation

The key to the analysis of comprehensive indices evaluation is the determination of the index weight. This thesis adopts the high-precision objective value assignment method of mean square

error to determine the index weight. This method takes various individual evaluation indices as random variables and the dimensionless attribute value of each project  $i$   $P$  under index  $j$   $G$  as the value of the random variable.

Firstly, it requires working out the mean square error of these random variables and normalising these mean square errors to obtain the weight coefficient of various indices. The calculation steps are as follows:

① Mean value of various random variables:

$$E(G_j) = \frac{1}{n} \sum_{i=1}^n Z_{ij}$$

② Work out the mean square error of  $G_j$ :

$$\partial(G_j) = \sqrt{\frac{1}{n} \sum_{i=1}^n (Z_{ij} - E(G_j))^2}$$

③ Work out the weight of indexes:

$$W(G_j) = \partial(G_j) / \sum_{j=1}^m \partial(G_j)$$

Through the above calculation, the weights of various single indices of public services can be obtained. The sum of weights of various first-level indices is the weight of various second-level indices. Therefore, the weights of the first level and second-level indices are obtained.

#### 6.4.6 Evaluation and Calculation Method

Every index among second-level indices reflects the quality level of urban public services from different perspectives. It is necessary to make a comprehensive evaluation of the overall level of urban public services. As a result, a multi-objective linear weighting function is adopted to work

out the index of urban public services, which is represented by  $Q_i(W)$  and calculated according to the following step:

$$Q_j(W) = \sum_{j=1}^m Z_{ij}(W_j)$$

From Formula (6), the evaluation index  $(W)_i$  of urban public services can be calculated. Apparently, the value of  $(Q)_i$  reflects the quality of urban public services.

#### **6.4.6.1 Accounting of Compensation for Public Services**

The new version of *Regulations on Land Requisition Compensation and Resettlement of Migrants for the Construction of Large and Medium-sized Water Conservancy and Power Projects*, published by the State Council of China in 2006, explicitly stipulates the recovery and reconstruction of migrant's production and livelihoods. The state implements development migration policy, and it adopts a method of combining early-stage compensation and allowances with follow-up support, and helps migrants reach, or exceed, their original living standards (Choi 2015). However, a specific measurement index is not provided for the definition of living standards in the regulations. Living standards measure the resident's degree of satisfaction with life and their subjective assessments. The quality of public services can objectively reflect differences between different cities, but whether individuals are satisfied with services is usually related to expenditure (Beck *et al.* 1992). Therefore, living standards show consumer's degree of satisfaction with service quality, given a certain expenditure level.

Living standards reflect the consumption of social products and labour services used by residents to satisfy their demands for materials and their cultural life. Previous scholars have tended to use household income to embody living standards. The income situation reflects the payment capacity nominally owned by residents while consumption embodies their actual expenditure. The cost of living index (CLI) is usually used for welfare analysis. Scholars use CLI as an important index of measuring the living standards of peasants (Diebold and Rudebusch 1991). CLI refers to the minimum ratio of expenditure required by consumers to reach a certain level of effectiveness (or welfare and living standards) at different points in time. Effectiveness, in an economic sense, is an immeasurable intermediate variable. Low income migrant's perception of

effectiveness is relatively simple. Effectiveness can be directly reflected by service quality. So, this research borrows the concept of CLI, and selects the quality of public services with objectivity to replace the level of effectiveness and uses the per capita expenditure of unit quality of public services to compare the level of public services in different regions.  $V_i$  Refers to the per capita expenditure of unit quality of public services;  $C_i$  means the per capita expenditure of public services;  $Q_i(W)$  stands for the quality of public services.

$$V_i = \frac{C_i}{Q_i(W)}$$

The formula above can be used to work out the per capita expenditure  $V_i$  of unit quality of public services, which refers to the price paid by consumers for one unit of a public service.

Thus, the higher value of  $V_i$  indicates the higher cost of enjoying the same quality of public services and the lower value otherwise. Through calculating differences in the per capita expenditure of the unit quality of a public service in different regions, the compensation standard for the elements of public services can be given quantitatively.

The process of computing compensation for the elements of public services in this section is based on the following assumptions:

(1) The future economic development of in-migration places and out-migration places grows steadily at the current rate.

(2) The influence of the delay period is neglected. There is a delay period from deciding to migrate and then starting the process of migration. Local governments usually stop making investments into out-migration places at the point in time where the decision to migrate is made, which will influence the quality of public services. In the process of calculation, this research neglects differences in compensation caused by the delay period.

(3) The influence of income differences caused by migration on compensation is neglected. The actual compensation for migration is determined by income loss before and after migration. There are differences between the actual amount of compensation and the theoretical calculation.

This part only provides reference to compensation for the elements of public services used by migrants.

In this specific calculation, with the 2012 survey as the point in time, statistical data for Qinghai Province during the period from 2010 to 2011, around the time node, was calculated. Through calculation of statistical data in the survey area during the two years, differences in public service quality between migrant resettlement places and the corresponding prefecture and province, as well as changes in public service acquisition costs, are analysed. In this part, the researcher expects to find some differences through the comparison.

The acquired governmental data are substituted into the calculation formulae based on the same unit of measurement. Relevant calculation results are shown in **Table 6.3**. According to the calculation formula, indicating that among typical administrative divisions on the three levels of province, city (prefecture) and county (district) in China, evaluation indices of Qinghai Province have a low score within a national scope (the research does not provide specific discussion and detailed calculation; this opinion is a rough conclusion obtained through comparison with relevant research results of other scholars). However, in comparison with the overall situation of the province, the evaluation indices of Haixi Prefecture and Dulan County are always slightly higher than the overall level of the province. Both areas have high comprehensive scores of public service levels. From the perspective of an out-migration place, a high-level of public service quality may hinder resident's decision making in respect to family migration. However, from the perspective of a resettlement place, the high-level of public service quality may motivate the resident to make the decision related to family migration.

**Table 6.3 Public Service Comprehensive Evaluation Indices  $Q_i$  (W) in Government, Prefecture and County Levels in Surveyed Areas**

	2010	2011
Qinghai Province	1.538	1.603
Haixi Prefecture	1.756	1.670
Dulan County	1.696	1.700

Source: Modelling result-based Field Household Survey data 2012

#### **6.4.6.2 Public Service Comprehensive Evaluation Indices $Q_i(W)$ in Government, Prefecture and County Levels in Surveyed Areas**

The researcher found during field studies that public service quality generated only low levels of motivation to migrate locally, especially for potential migrants within minority areas. In view of the local cultural and national characteristics, rural residents who still retain obviously nomadic traditions do not pay much attention to some elements of public service that are necessary for modern urban life. For example, they do not care much about buses, paving of roads, community activity places and, even, housing. Farmers and herdsmen who get used to living for long periods in areas with atrocious weather have fewer requirements for public facilities in comparison with residents living in urban and rural areas. This point was explicit in the survey, wherein most people (as shown in chapter 4) were satisfied with their environment and their public services, such as the infrastructure at current resettlement places. Hence, the effect of such improvements on ecological migration in minority areas still needs to be confirmed. Large-scale investments in public facility construction will not always lead to greater approval from locals, especially among migrants from poorer regions.

Meanwhile, in the surveyed area of Dulan County, the public service evaluation index in 2010 was slightly lower than for the whole Haixi Prefecture, but the value was 0.16 higher than that of Qinghai Province, and showed obvious superiority. However, this trend changed in 2011. The public service comprehensive evaluation index of Dulan County was higher than for Haixi Prefecture, while the overall superiority of the latter over Qinghai Province had shrunk. It can be concluded that China's large-scale investments in infrastructure construction and improvements in people's livelihoods has enabled Qinghai Province to make obvious progress. However, Haixi Prefecture, which previously had enjoyed the highest levels, fell behind during this round of development. The study found that the prefecture-level of government held the real jurisdictional power in the distribution of public service resources and it showed more obvious variation, whereas province-level and county-level governments mainly played a role in struggling to get resources and in executing tasks. Under the framework of modern urban-rural development overall, it is necessary to focus on the effects of municipal-level and prefecture-level governments on ecological migration (GOMCG 2008).

**Table 6.4** shows the per capita total expenditures on services and confirms that prefecture-levels of government showed higher values. Meanwhile, within the whole province-level of

government, annual per capita expenditures for public services were low, while Haixi Prefecture was higher than the average level, exceeding province-level expenditures by nearly two multiples. It was found, in combination with governmental materials and survey results, that Haixi Prefecture had obvious advantages from the overall appropriation by the Qinghai Province government. In addition, because of some support projects implemented by the central government, as well other province-level and municipal-level governments, the overall available capital of Haixi Prefecture was much higher than the average level for the whole province (CPG 2012) (CPG 2012).

**Table 6.4 Annual Per Capita Total Expenditures (Yuan)  $C_i$  for Public Services in Province, Prefecture and County Levels in Surveyed Areas**

	2010	2011
Qinghai Province	981.033	1198.585
Haixi Prefecture	1702.300	2041.557
Dulan County	852.877	1169.614

Source: Modelling result-based Field Household Survey data 2012

However, it is noteworthy that although Dulan County had a high public service evaluation index, the annual per capita total expenditure on public services in the county was lower than in Qinghai Province. Through the field survey, the author found that local public service expenditures were influenced by prefecture-level financial appropriation, while the county-level government did not hold any real jurisdictional power. According to local population size, it was found that Dulan County assumes a heavy burden for public services in Haixi Prefecture. This tendency continued until 2011; that is, the tendency existed before the author undertook the relevant survey. Based on this finding, it is easier to understand why residents of Dulan County, who were surveyed, were dissatisfied with public facilities and compensations, but still approved migration behaviour; this seems “contradictory”.

As of 2002, a lot of migrants moved in successive waves from different places to, Dulan County because it enjoyed the greatest environmental advantages in the entire of Qinghai Province, in comparison with the poor living conditions in other high-altitude plateau areas. As a result, a lot of pressure was placed on public services and on the compensation paid for by local governments. Thus the per capita public expenditures were lower than the average level for the



whole province.

#### 6.4.6.3 Per Capita Expenditures (Yuan) $V_i$ for Unit Public Service in Province, Prefecture and County Levels

**Table 6.5** shows the results of the calculation on per capita expenditures on unit public services. It convincingly demonstrates the above analysis. Theoretically speaking, when we deem public services as calculable units, which have no dimension or difference, the calculated value of per capita public service expenditures denotes the cost needing to be paid by a resident to acquire 1 unit of public service locally. The tendency conforms to the calculation results in the table, wherein the per capita expenditure on a unit of public service in Haixi Prefecture was high, whereas the value for Dulan County was low, and was even lower than the overall level of Qinghai Province. The gap value denotes the public compensation value to be supplemented. Based on the average level of Qinghai Province, with Dulan County as a major migrant resettlement place, the per capita compensation for public services in 2010 should be supplemented by 135.05 Yuan and 466.42 Yuan, in comparison with average levels in Qinghai Province and Haixi Prefecture, respectively. The per capita compensation for public services in 2011 should be supplemented by 58.97 Yuan and 534.97 Yuan in comparison with average levels in Qinghai Province and Haixi Prefecture, respectively.

**Table 6.5 Per Capita Expenditures  $V_i$ /Yuan for Unit Public Service on Province, Prefecture and County Levels in Surveyed Areas**

	2010	2011
Qinghai Province	637.776	747.829
Haixi Prefecture	969.152	1222.832
Dulan County	502.730	687.858

Source: Modelling result-based Field Household Survey data 2012

In comparison with Qinghai Province, the public service level of Dulan County had become increasingly closer to the province's average level, year-by-year. Nevertheless, the gap between it and the average level of the direct administrative prefecture —Haixi Prefecture— increased year-by-year. On one hand, Haixi Prefecture enlarged governmental investments in public services overall, and obtained a lot of appropriation from national-level and province-level

governments. On the other hand, while allocating the appropriation, Haixi Prefecture slowed down financial support to relatively mature migrant resettlement places, such as Dulan County. At the same time, financial investments will be increased to some newly established migrant resettlement places.

Hence, if these areas are taken as resettlement places during migration decision making, the required cost for migration compensation and other aspects will be greatly reduced (Huang 2008). Although Dulan County in 2011 still showed low-cost superiority over other places in Qinghai Province, this was against the background that substantial growth was obtained through the overall development of Qinghai Province in public services and infrastructure construction. By contrast, public service costs increased sharply due to slow population growth in Haixi Prefecture. In the future when population migration is more large-scale, in the future, the per capita expenditure on unit public services in Dulan County is likely to increase and then influence the distribution of public service resources in Haixi Prefecture.

## **6.5 Possible Approaches to Avoid Risks to Incomes in Resettlement**

### **Migration**

Based on the above analysis and modelling, it is appropriate to implement the policy of migration with a development-oriented focus for resettled migrants. The policy should be beneficial in helping migrants avoid risks to their incomes, reduce poverty and help restore them to close to their original income level, as far as possible. The concept of development-oriented migration is based on the following ideas: the problems related to migration cannot be solved by one-off compensation, or life-time relief. The key to successfully solving these issues depends on the combination of compensatory investment and human resources from migrants that transforms negative compensation to positive start-ups, a life of relief to a life of assistance, , passive migration to active migration, to ensure that migrants have stable and peaceful lives (Ma *et al.* 2004). The so-called relationship between development and migration refers to the development of resources, the development of the economy and the resettlement of migrants; i.e., governments should make full use of various resources (natural and human resources), and migration funds, to organise migrants to explore resources, develop production, construct reservoir areas and rebuild their homes. Peng and Tang (2012) argue that these are needed to

realise the benefits of migration for the economy, to improve living standards, and to provide opportunities for migrants to have better lives.

### **6.5.1 The Principles of Migration that is Development-oriented**

Migration that is development-oriented takes advantage of compensation funds to help migrants construct resettlement areas and produce products. Therefore, Zhu (2002) notes that compensation funds are the foundation of change and, without them, it is impossible to ensure development for migrants. The calculation of compensation costs should be based on migrant's production levels and living standards that can be equal to previous levels, rather than compensating for all the property losses that are incurred.

The goal of development-oriented migration is to properly organise migrants' production and living situations to avoid reductions in their incomes and ensure that their economic circumstances improve (Wan *et al.* 2007). In order to achieve this, it is necessary to combine compensation with development, and to take various measures in the process of resettlement to achieve sustainable and stable development of the society and economy of migration areas.

The key goal of development-oriented migration is to develop and to turn economic disadvantage into economic advantage, by taking full advantage of the resources in migration resettlement areas, specifying proper investment and effective development activities, to promote development (Hao 2009). Development-oriented migration has been found to be the most fundamentally effective way to resettle migrants. Compared with the traditional resettlement practice, which focuses only on resettlement compensation, migration that is development-oriented will be better by making full use of resources in migration areas and utilising migrant's funds reasonably, to improve investment results.

Development-oriented migration plans include production, living conditions, and economic development as a systematic project (Dow *et al.* 2013). It employs the mechanisms of the market economy to relocate and place migrants, which abandons the old migration patterns that lacked overall planning, and it combines resettlement with the construction of new migration areas. Further it unites resettlement with improvements in the environment. Therefore, development-oriented migration is beneficial in adjusting the economic structure of migration areas, accelerating industrial upgrading and promoting mutual coordination and sustainable

development between the economy, society, population, the environment and resources. Cchen (2011) argues that to maintain the sustainable development of the economy and society in the resettlement area, the basic goal of development-oriented migration needs to be pursued.

## **6.5.2 The Ways to Restore Income**

### **Developing migrant's Production Skills**

Human capital theory in economics holds that personal income is determined by personal knowledge and skills. Hu (2013) has argued that the main reason why China's resettlement migrant income is low is that their low-skilled production is coupled with a lack of material resources. In the investigation of Xiangride's migration projects, it was found that most migrants previously lived in impoverished mountainous areas, where traffic and communication were underdeveloped, and their productive technology and skills were limited. In addition, their deep-rooted traditional ideology, meant that their agricultural production patterns and the varieties of their products have been the same for many years. Therefore, after migration, local governments must carry out productive skills training for new migrants. The government must improve the productive skills of migrants and expand their employment opportunities, by offering training courses consistent with the economic structure of the area. If migrants have acquired a variety of productive skills, they can avoid the potential risk of having only a single productive skill that cannot lead to employment and a reasonable livelihood.

#### **6.5.2.2 Institutional Reform and Management Innovation**

If the macro-economic system and policy change, the policies related to migrants should be adjusted accordingly, so as to reduce the loss caused by either the macro-economic system or policy changes (Cui 2010). At the same time, the management of migrants should be improved. For example, governments should provide old-age insurance for the elderly and establish a participation mechanism when they implement any new migration projects. Wu (2007) argues that development-oriented migration fundamentally changes the old ideas. Old ideas focused on taking the project seriously, but ignoring migrants; attaching much importance to migration, regardless of construction; and paying attention to compensation but failing to attend to development issues.

Development-oriented migration integrates migrant's relocation with institutional reform, connects the management and social progress of migrants, and makes them simultaneously plan, construct and develop. It highlights the links between exploitation and development, effectively mobilises migrant's enthusiasm for relocation, and changes the past passive dependence on governments doing everything. In the past, it was compensation-oriented, which was basically a simple, administrative and transactional task, implemented by government, while migration that is development-oriented highlights the economy of migration (Cheng and Wang 2011). Therefore, to better design and manage the migration system, besides using administrative means, it is imperative to introduce more economic measures to adjust economic structures and modes of economic development in resettlement areas, thus helping migrants to transition out of poverty.

### **Labour Transfer**

Migrants lose their land resources in the process of non-voluntary resettlement migration, so many of them become part of a labour surplus. If surplus labour cannot be transferred, huge pressure on employment may result, so full employment must be the goal (Tan 2013). However, the regional industrial structures transform slowly and resistance to upgrading industrial structures is high, and economic growth therefore slows, and so migrants are then caught in a vicious circle. Development-oriented migration advocates multi-channel resettlement, which takes "big agriculture" as its main form.

In Xiangride's migration areas, the level of economic development in most areas is low. It is unrealistic to accommodate many migrants by only relying on industry. For most rural migrants, the most effective way to assist them is to adopt a comprehensive approach, featuring multiple-channels, industries, forms and methods, to realise the transfer of surplus labour. That is, government should develop "big agriculture", including farming, forestry, animal husbandry, side-line production and fishing, according to the characteristics of local land and water resources and temperature conditions, and actively set up secondary or tertiary industries, to accommodate more migrants in the workforce. Therefore, in the process of economic development, governments should transfer surplus migrant labour from traditional industries to modern industrial activities, and from resettlement areas to places outside resettlement areas, and establish towns for migrants, and promote the development of migration areas by building townships' economies.

## **Improving the Legal Systems Related to Protection of Migrant's Interests**

The survey found that the biggest problem in the process of resettlement is not how much compensation is paid, but whether migrants can move out and achieve better lives in the future. In the past, migrants were not well placed; the economy did not develop quickly, and many social, economic and other problems were left unattended. Migrants need to make a contribution to the construction of the migration project, ensuring that their own rights and interests are protected (Li 2005). Development-oriented migration emphasises the need to effectively protect migrant's production and living conditions in the relocation process and beyond and insists that migrants should be participants and builders to make their future life better and richer. However, the laws, regulations and institutions serving to guarantee migrant's rights are premised on the condition of mobilizing migrant enthusiasm. Therefore, it is necessary to strengthen the construction of the legal system relating to non-voluntary migration, to eliminate some of the more prominent problems like poverty.

## **6.6 Conclusion**

Clearly a national compensation mechanism is needed to play a key role in the migration process. It aims to have migrants, enterprises and governments equally share the benefits generated from concentrated settlement and development. Nevertheless, migration involves many disciplines, while quantitative calculation is hard to accurately implement. Hence, this chapter only provides certain references for migrant compensation and provides a feasible idea for compensation accounting. The chapter aimed to find differences in migrant compensation, made by different levels of governments during the management, through comparison. Based on these references and methods, unfair treatment in migration can be reduced.

In relation to public services, Dulan County indeed fell behind the prefecture and the province. It is imperative to discuss the distribution, course and manner of prefecture-level government's allocations, after province-level public compensation expenses are allocated to them. For a long time, due to a lack of public resources in areas of China with lagging economies, limited public financial expenditure was mainly allocated to core cities, under province-level or prefecture-level administration, as well as to sensitive special minority areas. Hence, some areas which more urgently required governmental public compensation, such as those like migration

settlement places, lacked sufficient support.

From the perspective of different kinds of migrants, residents who are used to living in minority areas, with poor environments, do not care much about some public services necessary for modern urban life. The survey results revealed that they preferred direct material compensation, such as cash and material objects. They always lacked appreciation of governments' investments in aspects of public services.

It is important to note that compensation issues are not transparent or openly discussed during migration. The compensation, which may be finally obtained by migrants, is obviously insufficient. This problem is commonly seen in the current migration processes. Due to level-by-level appropriation of different levels of government, rather than centralised funding, the compensation amount which can finally be implemented is much lower than the amount initially budgeted for. More importantly, migrants lack power and must passively obey the plans made for their compensation, or even their own arrangements. As a result, the fairness level is not always optimal during migration. Therefore, it is especially necessary to find ways which can balance the rights and needs of migrant group and the organisational departments. The following chapter will discuss this issue.

## **Chapter 7 Cultural Adaptation Risks after Migration**

### **7.1 Introduction**

During resettlement, the living environment, production and livelihood, as well as other aspects of migrant's lives, are changed and these changes in both natural and human environments, exert significant influences on their day to day lives. Due to the different cultures existing in minority areas, the most notable issue lies in the changes to each national culture, as well as the various problems arising from these changes. This chapter discusses the inevitability of cultural change in ethnic minority areas through migration, and problems arising from such change, as well as the specific context of these changes. Moreover, it offers a critical analysis of responses, countermeasures and makes suggestions for addressing the problem of cultural change associated with migration.

### **7.2 The Inevitability of Cultural Change in Migration**

During the implementation of ecological migration, people are forced by economic and environmental changes to adjust their cultural lives. Change in the regions where people reside, leads to changes in many factors, such as production methods, as well as lifestyles and customs, and this will cause changes in other cultural systems (Hare 2002). In anthropology, cultural changes are usually defined as the changes within a nation and changes in the personal concepts and behavioural habits, caused by developments inside the national society, or through contact with different nations. Lin (2001) argues that through ecological migration, the social environment of minority migrants is changed, and communication among different ethnic groups becomes increasingly more frequent, making cultural change inevitable.

#### **7.2.1 Changes to migrant's living environments will inevitably cause cultural change.**

It is generally believed that cultural changes are promoted by two kinds of factors. Internal factors are internal changes in a society that cause change, while external factors, are phenomena such as changes in the natural environment and in the social-cultural environment, through things such as migration, contact with other nations, and changes in the political system (Luo



2003). When members of a society respond to environmental changes in a new manner, migration will start when it is accepted by enough people in the society. At this time, cultural change is deemed to have started.

Luo (2003) argues that resettlement migration is a typical case of national cultural change, caused by changes in the external natural environment and in the social environment. In an ecological migration project, migrants leave their original residence, so the natural environment is changed. Their social and cultural environment, and other factors, are also changed, as migrants are removed from their original production methods and lifestyles. In ecological migration in minority areas, it is common that migrants move from pasturing areas to cities and towns, or from mountainous areas to cities (Jiang *et al.* 2005). Unique minority cultural systems formed over a long period based on their original social environments, will be impacted by the culture at the destination site and this culture may, in turn, suffer huge change, leading it to alter. These changes are most prominently embodied in changes of material culture, such as production and modes of living. The Three-River Source Region is an example. Tibetans living in the Three-River Source Region once had pasturing as their major productive mode. However, since the migration project, herdsmen have sold their livestock, left the grasslands where they have lived for generations, and moved to new residences, built for them by the government. In this way, they now live a very different life (Liu *et al.* 2007). Such a phenomenon is called “*put down the sheep whip, to enter the city*”. Meanwhile, the productive mode of plateau animal husbandry, practised by Tibetans in this region over many generations, also disappeared. Thus the national culture’s and industry have begun to be changed from grassland nomadic culture to a culture of modern urban settlement (Peng and Tang 2012).

### **7.2.2 Changes in national culture will inevitably take place when migrants blend into their migration destinations**

In the opinion of American anthropologist Steward, who is also the founder of cultural ecology, adaptation is the major cause of cultural change (Peng and Tang 2012). In ethnology, the cultural adaptation of migrants refers to them entering a place, making an initial settlement there and, then, gradually transforming themselves into ‘local’ people, through mental and cultural adjustment and practices of adaptation (Zhang 2002). Transformation of the initially formed ‘migrant culture’ into local culture symbolises the completion of migrants’ ‘cultural adaptation’. With regard to the migrants, when they adapt to life at their destination, they are changed from

“strangers” to “local people”. This process is the main force driving cultural changes in the nation (Jiang *et al.* 2005).

Migration from the original place of residence to the one of resettlement is always a mutation process, which will inevitably cause profound changes in the living environment of migrants and thus cause sharp changes in their production and ways of living, interpersonal relations and other elements of their lives. Such sudden change can lead to non-adaptation by migrants. Luo (2003) argues that a migration project can be completed in deed only when migrants manage to adapt themselves to the life of their destination and start living and producing at the place of resettlement. In a migration project, migrants are generally not adapted to local life at the beginning, but they gradually blend themselves into local life, which can be deemed a cultural adaptation process. During such cultural adaptation, changes in national culture are inevitable. Cultural changes, with the purpose of blending into the migration destination, can be embodied in things such as customs and habits (Zhang 2002). The survey in Dulan county found that customs and habits, and even the dietary patterns, of migrants had changed. Before migration, 43.2 percent of the migrant families had eaten beef and mutton and related products, but after migration they mainly ate rice, flour and vegetables with beef and mutton, supplemented by other products.

### **7.2.3 Acceleration of modernisation in minority areas will inevitably cause changes in national culture**

The American scholar, David Popenoe (1996), pointed out in his work, '*Sociology*', that modernisation refers to the major internal social transformation that happens when a traditional, pre-industrial society moves towards industrialisation and urbanisation. This social reform originated in Western Europe and brought globalisation almost everywhere, which has generated cultural and social changes. The modernisation process inevitably impacts on traditional cultures. Such a phenomenon cannot be avoided by any developed country, or developing country, or any cultural majority or minority. The transformation from traditional to modern society will inevitably change cultures. With China's social development, the level of modernisation has continuously increased. For a long time, most minority groups were located in remote deserts, the Gobi area, mountainous and plateau areas, and due to poor transport and access, each minority had lived in enclosed “lonely islands”. (Beg *et al.* 2002). Due to this, people hardly moved beyond their closed, inward looking, conservative and uneducated conditions, due to poor

communications, severely restricted access to information, lack of knowledge, and old ways of thinking. This is because they have not been exposed to the liberation of modern ways of life, or the acceptance of new life experiences, new ideas and new behaviour patterns (Li 2000). Therefore, in many instances, people's transformation from conservative ideas to progressive thoughts, and from old habits to pioneering behaviours, did not occur.

It is also important to stress that the progress of modernisation in minority areas is very slow. However, through ecological migration, each minority can be removed from their original living environment and be blended into urban life, and thus be rapidly exposed to the modernisation process. In this way, minorities can realise further linkages with modern civilisation, while old ideas and customs, such as domination by familial ideas and marriage with close relatives, are likely to be abandoned. This change in national culture is inevitable as part of both modernisation and social development in minority areas.

### **7.3 Some Problems Generated by Cultural Changes in Resettlement**

#### **Migration**

Cultural change during resettlement migration of minorities is inevitable, but it can also greatly promote the development of minority areas. However, both the process and the results of this cultural change can have certain negative impacts, which are worthy of attention during further implementation of migration.

#### **7.3.1 Changes in national culture brings certain negative outcomes for the cultural development of each minority**

Development of any country, or nation, cannot be separated from its traditional culture, because such separation will inevitably break the harmony required between economic development and traditional culture. This would hinder the healthy development of the economy and may also lead to deep social contradictions. Inheritance and transmission of minority traditional culture can become the basic condition and the internal impetus for minority cultural development. The traditional culture, as the core component of the national culture's vitality and cohesion is especially valuable during the development of each minority. It is especially important to

maintain the diverse ethnic cultures of minorities. Only by maintaining the uniqueness of each national culture will the culture of a minority continue to be preserved and ensure the minority's viability. During migration, the culture of the minority is greatly influenced by its destination, thereby generating change. In this way, the economic and social development of the minority is promoted to a certain extent, but the diversified traditional culture of the minority is often ignored during cultural change, and, in some instances, the minority's traditional culture may be denied or ignored (Popenoe 1988, Curran and Saguy 2001). As a result, the traditional culture becomes "endangered", which can lead to spiritual loss among the cultural minority and also to the loss of one of the world's cultures.

### **7.3.2 Changes in religious behaviours of urban Tibetan migrants**

The development of a religious tradition is not only conducted in an isolated social domain; all traditions should be related to current social developments and to the believer's perception in that society. After Tibetan migrants moved to mainland metropolises from Tibetan areas, the external manifestations and patterns of their belief changed, mainly because of changes in the external social environment, and through change their own in perceptions. In combination with the practical situation of Tibetan Buddhism, this section focuses mainly on religious rites when studying the religious behaviours of Tibetan believers, and it divides ceremonies into daily rites and special rites. The ignition of butter lamps, consecration of pure water, kowtow, walking while praying, chanting of scripture, visiting of temples and white towers, and freeing of captive animals each morning and evening, are daily religious rites. There are also some special rites, such as participating in religious festivals; dharma assemblies and ashram rites, which are generally organised by temples (such as inviting the living Buddha and Lama to make dharma events at home); asking eminent monks for divinatory symbol estimations of events which cannot be decided; selecting lucky days for a long journey, and estimating divinatory symbols and chanting scriptures for weddings and funerals, house construction and decoration.

### **7.3.3 Changes and innovation in daily rites**

There are various kinds of rites in Tibetan Buddhism and rites vary between different areas, religious sects and temples (Li 2005). The study found that, in Dulan County, the practice of Tibetan migrants in daily rites had changed in the following ways:

- Scripture chanting had undergone minimal changes. Most changes were associated with the kowtow rite and the decrease in simultaneous kowtow and chanting of scripture. These changes derive from either perception about the behaviour, or from the convenience of practicing it;
  - The forms and quantity of kowtow have changed, due to the limitations of urban living, as well as changes in the structure of work time.
  - Regarding the freeing of captive animals, the previous freeing was conducted in the family unit, but has changed to be the behaviour of a single person, mainly because of changes in family structure, caused by migration. Nevertheless, in such situations, an unconfined, self-organised group is gradually forming (Li 2005). In fact, except for Tibetan Buddhists, such collective freeing organisation are also very popular among believers in Chinese Buddhism.
- Plate 7.1** shows local Buddhists celebrating an annual festival.

**Plate 7.1 Local Religious Assembly of Tibetan Buddhists**



Source: Field Survey in Dulan (2012)

### **7.3.4 The orientation toward privacy and the transfer of special rites**

Liu and Zhang (2007) argues that in general, special rites are very public, and the lack of public places in urban areas leads to two phenomena. The first is the altered realisation of the rite mentioned above; namely that the rites presently practised are transferred to and undertaken at the original place where the belief was practised. The second is the private conduct, or domestication, of public rites in cities. Migration will directly cause changes in availability of locations, so that large religious festivals are hosted by temples, meaning that migrants cannot normally join these activities. The survey found that most Tibetan migrants joined activities at the beginning or end, except for the reason that some migrants return to the native place for the Spring Festival, most do join these festivals because this is exactly their purpose to a certain extent. However, most migrants, except for retirees with time to spare, or migrants living out their retirement, or the unemployed, would rarely return home to join these religious festivals. Nevertheless, if they do participate in religious festivals when they have returned to their original residence, they are generally glad to have joined in. Cities have become important areas for Buddhist communication for a long time. Despite the differences between Tibetan Buddhism and Chinese Buddhism, both of them have the same origin and have communicated frequently for a long time (Popenoe 1988). Hence, some of the large religious festivals have elements in common, so migrants often join these festivals. For example, during the Lantern Festival every year, about 300-400 Tibetan believers will ignite lamps (butter lamps rather than vegetable oil ones) (according to the specific situations of dharma assemblies held by them every year) in Baoguang Temple every day.

Here, the researcher classifies the religious rites of family dharma events as special rites. In Tibetan areas, many people still pray to Buddha for help in the face of birth, ageing, illness and death, expecting to obtain support from clergy and religious rites (Yang and Singga 2011). Nevertheless, many people in cities and towns attach equal importance to medical treatment and to the Lama chanting of scripture. As mentioned by respondents in this research, the required family dharma events would generally be held at the location of their original residence, while only 15 percent of them said that they had held family dharma events in the city. Even if they held these dharma events, property management staff would interfere, due to neighbour's complaints about the loud noise from the chanting of scripture and dharma tools. Therefore, they could not use the dharma tools, even if they chant the scriptures. Many respondents said that they would call families and hold dharma events at their original residence.

Apparently, the religious traditions at the original place of residence are still the reference point for many Tibetan migrants in the city, who have been forced to adapt their beliefs and behaviours. This is part of the adaptation that occurs to original religious beliefs and behaviours during migration. Innovative behaviours will occur, which is the accumulation of traditions in a new settings (Song *et al.* 2006). These innovations are mainly caused by changes in the objective social environment, which are directly influenced by relevant systems. On one hand, heterogeneity of social and religious beliefs at the migrant's destination leads to deficiency in migrant's ability to practice their beliefs and rites, which is mainly manifest in the lack of sacred space, such as, temples (especially the Tibetan Buddhism temples), white towers and scripture halls. On the other hand, some rites are constrained by urban living patterns: 1. Daily rites, such as kowtow and walking while praying, are constrained; 2. some special rights, especially family dharma events are constrained, such that dharma events at the migrant's destination cannot be realised in the Tibetan manner. As a result, migrants alter some of their behaviours at the migration destination or use other means to satisfy their beliefs.

### **7.3.5 Transition of culture identification with national culture and impacts on ethnic development**

Wei (2008) argues that in the development process of nationalities, their cultures are generated by a long cultural accumulation. This is the principal factor in them generating psychological identification with the nation; that is, member's embodying and consciously identifying with the nation. This self-identification of nationalities is principally established through specific religious faith, customs, ceremonies and its achievements as a civilisation (Wei 2008). It can be said that respecting and safeguarding the religious faith, custom, ceremony and civilisation of ethnic minorities are important in maintaining the self-identification of ethnic minorities. The common psychological identification is also the important psychological, conceptual and spiritual foundation of a common national system, which makes nationalities generate powerful centripetal forces, promoting national unity, and providing momentum for progressive national development (Liu and Wang 2010). In the migration process, minority cultures inevitably will experience conflicts, crash or even integrate with local cultures. Such conflict is often reflected in the adaptation of a weak culture to a strong one, ultimately making the weak culture's features less visible or entailing its gradual disappearance and its replacement by the strong culture. This means that minority cultures will present homogeneous and convergent tendencies in other

cultures, especially during the process of exchange, conflict and integration with the mainstream culture (Yang and Singga 2011). Cultural convergence may make it increasingly difficult for people from minorities to identify with their own cultures. So, it is beneficial to maintain viable minority cultures, given their contribution to the development of ethnic minorities.

The concept of metempsychosis in Tibetan Buddhism expresses the Tibetan idea and philosophy of human and god worlds. Therefore, this view of life and death is regarded as an important indicator of religious faith among the survey respondents. This research found that beliefs about metempsychosis among Tibetan migrants is small, but differences have emerged in their view of karma. The study found that about 43.8 percent of Tibetan migrant respondents “have full assurance of” in their belief in an afterlife while 25 percent “have no full assurance” regarding this belief; note, data on this belief only had a response of 68.8 percent. From the perspective of believing in “reincarnation of living Buddha”, the data increased to 78.7 percent. The proportion of respondents “having full assurance” is relatively low, but Tibetan migrants with “no full assurance” are mainly concentrated among people under 25 years old, which is in keeping with the idea that religious faith conflicts with mainstream beliefs. Thus, these respondents are suspicious of transmigration, to some extent. Such a situation is encountered by them in the initial phase of adapting to migrant life. As a matter of fact, “believing in afterlife” and “reincarnation of living Buddha”, namely the philosophy of transmigration, are views on life and death in Tibetan Buddhism. The difference between them represented in these findings may be related to problems in the understanding of respondents. The issue of “*whether you believe in afterlife*” makes respondents reflect on their experience. Thus, the issue is considered and deduced as a scientific proposition. On the other hand, “Living Buddha” has a difference with worldly life and is the non-individual body of life. Another possible cause that may be considered by respondents is to conceal in different occasions.

**Plate 7.2** shows a local Holy mountain about 260 kilometres from Xiangzhide county. The main function of this Holy mountain is that when someone dies nearby, the body is brought here by the family, disposed of by a special priest, and then eaten by vultures and other birds until the body is clean and then the ceremony is complete. It is totally forbidden for people other than Tibetans to enter this Holy mountain.



**Plate 7.2 The local Holy Mountain Near Xiangride County**



Source: Field Survey in Dulan 2012

The survey found that the beliefs about karma among resettled Tibetans has already significantly changed. On the question of “*whether you think that a person living better than you is because he does many good deeds,*” most respondents (72.5 percent) said “No”. In the in-depth interviews, respondents were also asked “*whether a person that recites and turns more scriptures will live a better life in next life,*” the findings were found to be consistent with the above-mentioned results, indicating that Tibetan migrants do not look for “antecedents”, namely pre-existent “karmic justice”, but pursue real life in “this life”. Most people do not consider various situations in this life as the “effects” of pre-existence or do not regard this life as the “cause” of an afterlife. Instead, they believe more in “reality”, indicating that parts of the Tibetan migrant population start to reduce their goal of cultivating themselves according to religious doctrine, and they separate holy and secular domains and false and true claims. They value situations in mundane life. In other words, Tibetan migrants begin the transformation from a focus on the other shore to a focus on happiness on this shore.

### **7.3.6 The transition process of national culture impacts the development of the migration process**

As Steward (1972) said, adaptation is the main process of cultural change. Cultural adaptation has an important link to cultural change in migration. It not only has an important influence on the process of cultural change, but also determines the development of ecological migrants. Whether a culture can be integrated determines whether ecological migration occurs smoothly. Migrants must adapt to the culture of migration and integrate into other forms of productive life and social systems, to avoid becoming different from local residents. On the other hand, they must avoid the awkward situation of “filling”; a dilemma where they are not recognised by people from their original home because they have become “outlanders”. Only by adapting to the natural and human environment can the removal of ecological migrants be complete, so that they can “live and stay” in the settlement and live better.

Shi (2008) argues that in the implementation of the migration process, the place of ethnic minorities’ national traditions and religious cultures is often the most difficult part of cultural adaptation. Ecological migrants in Tarim, Sinkiang, give priority to the Uyghur, unlike the migrants of the Han nationality, the Hui nationality and the Mongol nationality. They have differences in religious faith and national festivals, and these are a barrier preventing migrants from blending into the destination area. Similarly, the ecological migrants of the Yi nationality in Liangshan, due to maladjustment of their customs related to consumption and transitions of religious faith, were willing to go back to their place of origin and their original living conditions (Wei 2008). Consequently, ecological migrants in regions inhabited by ethnic groups need to pay attention to cultural change in ethnic nationalities, and to respect national traditions and religious cultures. Otherwise, migrants may reach a psychological impasse, resulting in the phenomenon of “backward transition”

## **7.4 Cultural adaptation in resettlement migration**

Redfield (1980) claimed that cultural adaptation is used to understand another phenomenon; that is, groups of different cultures change the original cultures of all parties through continuous contact. Cultural change of this type is two-way. That is, the cultural of the two groups in contact

must change. However, the migration group must make more changes in the process of contact. Therefore, Chen (2006) argues that cultural adaptation is an active or passive "borrowing" behaviour, which is a reaction, or contingency measure, that is closely related to its own requirements. This kind of cultural behaviour needs contact with a foreign culture and experience of the difference between that culture and its own. Understanding of the differences then triggers some reaction in response to the stimulation by foreign cultures. This series of reactions is the process of cultural adaptation.

#### **7.4.1 The adaptation of the production mode**

Most migrants in the Xiangba project were from the mountainous area, and predominantly made a living from agriculture and animal husbandry in their original place of residence, with animal husbandry making up a large proportion of their production. There are many grassy slopes on the mountain, so the livestock was grazed and rarely kept in captivity. The earnings from animal husbandry are not only the main source of family income, but it was also a necessary commodity to meet consumptive religious practices.

Survey Case: Husband: aged 41 years with primary school education of Tibetan nationality; Wife: aged 39 years with primary school education of Tibetan nationality. They have a son and a daughter. They originally lived in Ledu County, at an elevation of over 2,000 metres. They grew 3 mu of potatoes and highland barley, as well as 2 mu of radish and potato each year. There were more than 40 sheep and 5 yaks in their home. Ten sheep were killed for their own consumption and 2 were killed for religious sacrifices each year. The income of their livestock was about 3,000 Yuan and it was the main source of the family's economy. They used most of their income to buy food. When they migrated to Dulan County, their mode of production was transformed from the coexistence of agriculture and animal husbandry into single agricultural production. Livestock was only the sideline of the family, and they had a few livestock because there was no grassland and no forest area in their new place. Therefore, when these migrants moved from their original place of residence to their present place, their livestock was reduced by more than 60 percent, and their development of animal husbandry was greatly restricted. People had to take up agriculture as the main means of making a living. In this way, their use and

dependence on the land was increased. Young people chose to go out to work and make a living to find other ways to increase their income.

It was found that people had a simple way of farming at their original location. They grew more and harvested less. Moreover, they seldom used chemical fertilisers and pesticides. However, when they came to their current residence, the land was used to grow economic crops because of its scarcity. Owing to the high land utilisation, intensive and meticulous farming was needed, and a lot of chemical fertilizers and pesticides were used, otherwise, they would have found it difficult to produce a harvest. This, therefore, required that migrants mastered certain production technologies and scientific knowledge.

Survey Case 2: Husband: aged 37 years with primary school education of Tibetan Nationality. Wife: aged 38 years and illiterate of Tibetan nationality. (**Plate 7.3** shows the interviewees' farm growing barley)

They have two sons. They used to live in Ledu County. They grew 6 mu of potatoes and highland barley every year in the original field. They waited for their harvest after sowing and they did not manage their crops. When they migrated to Dulan County, they did not know how to plough, harrow, plant, fertilize and spray pesticide. In a word, the method of production in their new place was unfamiliar to them. When the annual planting season came, the cadres of the village community would go to their home to teach them personally. Three years later, they had basically mastered the knowledge and skills of agricultural production. Now, when this family doesn't know something about production, they will ask others to guide and help.

**Plate 7.3 Interviewees' farm growing barley**



Source: Field Survey in Dulan 2012

To help resettlement migrants adapt to the production methods of their current place as quickly as possible, Dulan County has carried out agricultural science and technology training for almost every household, to allow them to master 1 to 2 scientific farming skills per person. At the same time, many scientific and technical personnel are sent to guide the farmers, to help the migrants adapt to the methods of production in their current place within one or two years.

In the 2012 household survey interview, a male, aged 37 years with primary school education of Tibetan nationality said that:

*“I did not know how to plough the field when we just moved in, because we did not plough the field or planted a flue-cured tobacco before. When we came here, the technician in the village taught us how to sprinkle the seedlings, plant rice, fertilize dust pesticides and breed livestock in captivity. One or two years later, we learned some common techniques, but now we are not very skilled. It will take some time for us to fully master the technology of farmland. Since we have moved here, we will gradually adapt to it.”*

--Interviewee 56, 2012



### 7.4.2 The adaptation to lifestyle

The changes in the living environment and the methods of production will inevitably lead to changes in ways of life. For a long time, the ethnic minorities in the mountainous areas of Ledu County have maintained their distinctive national lifestyles characteristics. After relocation, their lifestyles have had to adapt to their new living environment. **Plate 7.4** shows the new houses for the migrant, which are mainly brick structures, and are stronger and cleaner than keekwilee-house they used to live in. Farmers in the mountainous area of Ledu had previously chosen sheltered and sunny hillsides as their place of residence, and they mostly had clay houses. However, most of them now live in bungalows, planned by the government. People cannot build houses to meet their own wishes, and they have tile-roofed houses, with masonry-concrete structures. The migrants quickly adapted to their new residences, due to their space and brightness, as well as convenient water and electricity. Few people miss their old small and dark houses.

**Plate 7.4** New resettlement migrant house



Source: Field Survey in Dulan 2012

In their old settlements, people mainly wore traditional Tibetan dress. The elderly, women and children previously had to wear the gorgeous national costumes at festivals and wedding related

occasions. However, less than half a year after relocation, it was found that people's dress has changed greatly, and they mostly dress in Han costumes. Tibetan costumes are worn by some people only at wedding related occasions, or traditional festivals, but most usually dress in Han costumes. There are reasons for changing to Han costumes. First, they are needed for production and labour; traditional Tibetan costumes are not convenient for work. Second, Han costumes are cheaper than Tibetan ones and they can be bought in the market. Third, the people around them wear Han costumes, if they continue to wear national costumes, they will appear to be "different".

As expressed by a Tibetan female interviewee aged 34 years who was illiterate:

*"We all wore our costumes in Ledu County, and I'm not used to it after moving here. We have a large amount of work here, and if we wear our costumes, it is not convenient to work. Moreover, the wind and sand are also big here, but our costumes get dirty and hard to wash. The most important thing is that people here wear Han costumes, which are convenient and cheap. When we wear our own costumes, people will look at you in a curious way and this will make you feel bad. In this way, we are too embarrassed to wear our costumes."*

--Interviewee 70, 2012

Living environments and lifestyles are changing, so costumes can only change according to processes of adaptation. The survey found that in respect to diet, the ethnic minorities in Ledu's mountainous areas have a simple life, with potato and highland barley as their staple food, supplemented with beef and mutton. Following relocation, their customs are gradually changing. Most wealthy families go to the market to buy meat. Now, they all pay attention to fine cooking, and few people drink in large bowls and eat large pieces of meat. *"I used to eat meat only with some salt, and now we have learned the seasoning of monosodium glutamate, pepper, soy sauce, etc."* Most of the migrants have begun to grow Chinese cabbage, tomatoes, lotus and so on, because they are close to the market and planting conditions are good. In this way, they gradually adopt the habit of eating fresh vegetables.

#### **7.4.3 The adaptation of religious belief**

Most ethnic minorities in the mountainous areas of Ledu believe in Tibetan Buddhism. Previously, when family members were sick and when things did not go well, they would go to

the temple to worship and pray for God's protection. As **Plate 7.5** shows, there are several important religious celebrations each year, such as the Tibetan New Year and so on. These festivals were very important days in Tibetan areas. People would drop what they're doing and get involved.

**Plate 7.5 Local Buddhist Ceremony**



Source: Field Survey 2012

After moving into their present residence, they only kept the ancestral hall and utux. The number of sacrifices decreased significantly, and the number of livestock in residential areas could not meet the needs of people's religious activities. The scale, time and number of religious activities have been greatly reduced, which restricted people's religious activities, so religious ideas are gradually weakening.

Survey Case 5: Husband: aged 37 years who was illiterate of Tibetan nationality;  
Wife: aged 36 years who was illiterate of Tibetan nationality.

They have two daughters. They used to live in the alpine area of Ledu County. The utux was enshrined upstairs and the ancestral sacrificialaltar was located behind the house. They sacrificed their sheep and chickens to ancestors and ghosts every year



when there was sickness in the family, they would ask the wizard to get rid of the evil spirit. When they came to their present residence, they still believe in gods, but the number of sacrifices has reduced. Sometimes, they are busy watching TV during the festival and they forget to worship the ancestors. Their utux is still placed in the upstairs, and they also imitate the local people by placing a sacrificial desk and posting the family picture in the main hall. When a family member is ill, they sometimes sacrifice chickens or eggs to the ghost, but most of them will go to the township health centre for medical treatment.

**Plate 7.6** *The Sacrificial desk in an interviewee's house*



Source: Field Survey in Dulan 2012

**Plate 7.6** indicates that in the space below the Hada on the middle wall, a picture of the Dalai lama is usually hung for worship, but because of the government's control, now it is just an empty space.

#### **7.4.4 The adaptation of "identity"**

The identity changes of migrants participating in resettlement poverty alleviation are also inevitable. It should be mentioned that identity is formulated in specific conditions, and it is therefore, a relative concept. In their original place of residence, living in a stable and

unchanging society, the shared identity of people become stable. When migrants moved to their new residence, their identity becomes relative to that of the locals, and locals also acquire an identity relative to the migrants. Therefore, the establishment of identity is based on self-identity and the recognition of others. In their new environment, migrants seek the same identity as local residents. That is, they make efforts to become more like locals. Before relocation, Dulan County residents called the ethnic minorities of the mountainous areas, "the people of the mountains". After relocation, the migrants and the local people lived together in a place, and the indigenous people called migrants "outsiders" and "relocated households". Migrants called indigenous people "local people". Due to differences in the methods of production and lifestyles among indigenous and "relocated people", the indigenous people despised the relocated ones. But the relocated people also thought that it was hard for them to integrate into local social life. Therefore, they were ashamed of their different lifestyle. This caused some people to move back to their original location. Other migrants, however, after experiencing setbacks, settled down eventually, having basically adapted to local production methods and lifestyles.

Survey Case 6: Husband: aged 44 years with Tibetan nationality who had primary school education; Wife: aged 44 years old who was illiterate of Han nationality. They have two daughters, a 68-year-old mother: a household total of 5 people. They used live in the alpine area of Ledu County. In 2002, they moved to Xiangride. They lived in poverty in their original residence, with low labour intensity. After relocation, they felt that they did not adapt to production and life there. They thought it was too hard there, and that others looked down on them. As a result, their family soon moved back, leaving only an empty house. However, they had nowhere to live after they went back to their original residence, so they built a shack for shelter. After two months, they moved back to Xiangride. In this way, the family lived in the present residence for a while, and then returned to the original residence for a period of time. After nearly 3 years, they finally settled down in Dulan county.

In general, migrants are still "outsiders" and "relocated people" in the minds of the locals, even twenty or thirty years after relocation. Migrants do not forget their identity as "outsiders" in a short time, and they will usually only be given the identity of a 'local' over a long time period, which usually takes three or four generations.

## **7.5 Countermeasures and solutions to problems generated by cultural change in the migrant process**

Migration in China can solve some problems, including environmental deterioration of the western regions, which are inhabited by ethnic groups living in poverty and underdeveloped economic conditions. However, in the process of migration, some problems are very difficult, such as the above-mentioned cultural ones (AAHB 2011). However, environmental migrants in China are largely government sponsored resettlement migrants and the various problems and defects embodied in the process still require government recognition and attention.

### **7.5.1 Establish the concept of protecting the rights of minority cultures and value them in the migration process**

In the process of implementing migration projects, the government should attach some importance to minority cultures in regions inhabited by ethnic groups. Migration in regions inhabited by ethnic groups is more complicated than migration in areas with poorer environments. One of the important causes of this difference can be attributed to the particular characteristics of minority cultures. In the migration process, from planning to execution, it is necessary to pay attention to the existence of ethnic minorities and their cultures (Jin and Deininger 2007). The cultures of ethnic minorities are a critical factor impacting the execution of migration; the government should firstly establish the concept of protecting the rights of minority cultures. Wu (2008) argues that during the implementation of migration, it should simultaneously consider and address the influence of ethnic minorities' cultures, adhere to the principle of promoting economic development in regions inhabited by ethnic groups, improve the environment in these regions, and maintain diversified minority cultures in these regions. In this way, it can help migrants better adapt to life in their new areas, complete the migration process for migrants, and avoid the phenomenon of "backward migration", caused by poor cultural adaptation and lack of acceptance.

### **7.5.2 Enlarge the subject range of participants and ensure the government, migrants and social organisations participate in the migration process**

In some migration projects, the benefits to migrants are attenuated to a large extent because they lack participation rights (Wu 2008). Thus, they cannot take part in formulating migration policies. Moreover, ecological migrants in China largely participate in government organised projects. Further, there is also a lack of participation by professional social organisations. Related data show that, though NGOs in the current Chinese environment had developed rapidly, therefore, no relevant NGO devoted to engaging with migrants. From the perspective of protecting minority cultures in the migration process, it is better to protect and develop minority culture in areas of resettlement.

It is necessary to enlarge participation rights and bring the government, migrants and social organisations into the field of participation (Voigt *et al.* 2007). On the one hand, migrants should be brought into the migration planning and implementation process. Moreover, legal procedures should ensure that migrants can express their perspectives (Deng *et al.* 2011). On the other hand, it is necessary to develop the role of NGOs, and other social organisations, to establish a bridge between government and migrants, to provide opinions and advice on implementing migration from a professional perspective. Thus, cultural change is likely to be valued by organisers and participants in the process of ecological migration and solutions likely to be developed for emerging problems.

### **7.5.3 Reinforce laws, systems, supporting facilities, and policies to ensure the smooth implementation of migration**

Implementation of migration projects involve more than just environmental or cultural engineering but must entail comprehensive economic, cultural and environmental responses. In the migration process, it should be ensured that migrants are not only moved to destination areas but must have corresponding support facilities there. In addition, laws, systems and policies need to be in place to ensure that migrants can live a better life in these areas and avoid the various problems that may cause return migration.

In terms of migrant projects, implementation is based on regulations and rules, such as *Ecological Environmental Protection and Overall Planning of Construction in Qinghai's Three Rivers Source Area*, but these have no strong legal basis (Wang 2007). Meanwhile, these regulations also have problems connecting with the unique basic law, *Law on Regional Ethnic Autonomy*, operating in regions inhabited by ethnic groups and are short on specific operational

detail. Thus, to ensure the success of migration, it must reinforce legislation in these aspects, and provide legal safeguards for the migrant population.

In addition, it is necessary to reinforce some supporting facilities, and establish and publicise policies to assist in solving specific problems encountered in the migration process (Wang 2007). For example, to establish a compensation mechanism, it must include objective compensation, ways of supporting settlement, and a series of policies, related to various aspects of politics, the economy and culture. As for culture, it only needs to stipulate that settlement planning for migrants should respect their production, religion and lifestyle as well as the manners and customs of ethnic minorities in migration regulations. There is also a need to formulate supporting policies to standardise responses to some specific problems, such as which production methods, lifestyles, manners and customs of ethnic minorities should be respected, who should identify with them, and how to undertake compensation for pricing, and so on.

## **7.6 Conclusion**

In Tibetan areas, morality and values for integrating into society are provided by Tibetan Buddhism, which proposes a worldly philosophy that is a completely different value system from the pursuit of money, egoism, hedonism and consumerism. The fact that migrants continue living in migration areas indicates that differences between them are reconciled and that this can be attributed to the secondary structural system of Tibetan Buddhism (Liu and Wang 2010). Human accommodation, or modern transformation, made on the level of accepting universal salvation, offers a basis for modern transformation of the traditional or inner concepts of believers. Furthermore, the results of the survey found that urban Tibetan migrants show less conflict in belief, which may be evidence of the transformation of their inner beliefs or due to the fact that they conform more easily.

Another feature for migrants, believing in modern transformation, is the generation of functional substitutes. In traditional Tibetan areas, Tibetan Buddhism provides a meaningful explanation for Tibetans and integrates Tibetan society in the form of morality. In hinterland cities, the diversification of society supplies migrants with a set of norms that replace their past beliefs. In addition, religious faith gives rise to positive and negative functions in social integration. Within ethnic groups, belief is still an important component of social integration. It not only integrates

migrants in areas of migration, but also connects migrants within Tibetan areas. However, in the process of ordering migrant life, it can hinder the interaction between migrants and mainstream society, to some extent. However, as the above-mentioned discussion shows, worldly beliefs and values do not result in the final disappearance of religion and this summarises the tendency and features of modern religious change, to a great extent. Such change allows accommodation of secular and non-secular, which may mean religions do not perish but become part of the multi-religious tradition of modern cities.

In general, Tibetan migrants actively pursue their religious traditions and regulations. All of them advocate the approach of actively looking for solutions. Such regulation makes their traditional habits more effective. As for the modern transformation of Tibetan Buddhism and migrant faith, there are many different voices, which can hinder modernisation. Conservative forces again and again have obstructed the enlightened measures of people who advocate modernisation of armies and governments to safeguard Tibetans. This is also an important factor in military failure. The Temple Group does its utmost to obstruct the realisation of modernisation in the bkav-shag government. In their opinion, modernisation not only harms the economic foundation of temple life but is also not beneficial to the monopolisation of “values” by Tibetan Buddhism. There are many potential points of conflict between tradition and reform. However, at every turning point, the Temple Group, and allies in the bkav-shag, support the most conservative propositions.

There is no denying that the government-led resettlement migration program, especially in ethnic minority areas, will have impacts on ethnic minority migrants, to varying degrees. For example, not enough religious facilities have been built, the coordination role in the process of multi-ethnic settlement is not adequate, and there is not enough support for the activities of some ethnic minorities. All of this makes migrants somewhat resistant to the government. Ultimately, it will affect the overall outcome of migration

## **Chapter 8 Conclusion**

### **8.1 Introduction**

The research focuses on Ledu County as an out-migration region and Dulan County, located in the Qinghai Tibetan Autonomous Prefecture, as an area of in-migration. The study has focused upon rural areas in western China where ecological vulnerability has had a dramatic effect on migration. The study area has also been experiencing extreme poverty and ethnic conflict. This research analysed the complicated relationship between environmental deterioration, poverty and resettlement migration in western China. Specifically, this research investigated human mobility options and made some recommendations for policymakers in the context of rapid environmental change. At an institutional level, the study examined economic, social, belief and policy factors that were important drivers of human migration and mobility, and most importantly the role played by government. This research seeks to generate an increased understanding of the mediating role that national and local institutions can play in the process of policy formulation in response to environment degradation and poverty. The research was undertaken mainly through surveys and in-depth interviews in rural areas of western China with extremely vulnerable ecologies. Based on a combination of questionnaires and interviews, representative cases were researched, to establish the adaptability of migrants after resettlement

This chapter concludes the thesis by summarising its major findings, discussing their implications for migration and resettlement policies, considering the contribution to environmental-migration theory, assessing any study limitations and outlining some future research directions.

### **8.2 Major Findings**

The key findings of this study as they relate to the research questions are set out below.

#### **8.2.1 Reasons for Migration**

The impact of environmental change has become one of the most important reasons for poverty in the impoverished areas of China, with about 95 percent of population in areas with extremely

fragile ecologies living in absolute poverty. Population migration is one of the mechanisms for adapting to environmental change for impoverished rural populations. Populations living in areas unsuitable for human survival and development are increasingly being relocated, so that the dual goals of poverty elimination and ecological improvement can be realised. As a matter of fact, environmental degradation results in poverty, while poverty makes local people make excessive claims on the environment, forming a vicious circle of poverty and environmental degradation. As a result, poverty is not only the outcome of environmental degradation, but is also an important cause for its acceleration. Because of the environmental deterioration in the area, its population fails to receive effective and timely governance to alleviate poverty. With the further expansion of the area that is ecologically degraded and poverty-stricken, more areas become continuously poor.

This has been a major reason for the national-level implementation of resettlement migration in China, particularly in areas such as provinces of Ningxia, Gansu, Shaanxi and Qinghai, where environmental-induced migration is relatively concentrated. The study found that in the Ledu Area, Qinghai, China, migration is mainly caused by environmental change, which has led to poor livelihoods, and because of poverty, the residents cannot any longer live a normal life. Migrant resettlement projects are on their own accord, but the process is still organised, planned and financed by the central and provincial governments.

The study looked at both the positive and negative factors influencing the migration of rural people. The survey found that migrants were mainly composed of people aged 30 or less, and that young people seldom stayed in local places. Most of them went out to work in other areas all year round, leaving young children at home. On the other hand, it was noted that people above 30 years of age were more likely to stay in the resettlement area because the government of that area provided migrants with high quality land to grow cotton and other economically viable crops, and also provided some job opportunities.

The overall educational level among migrants was relatively low. This was because, first, local educational resources were very limited; second, income levels were low, and migrants were unable to afford education. Third, some ethnic minorities were not willing to accept education that had Han origins because of cultural differences. Most migrants in the Qinghai Tibetan Area are Tibetans who have lived on high-altitude pastures for generations. They mostly speak only the Tibetan language and cannot understand or speak Chinese. In the relocation areas, they do



not own pastures, cattle and sheep, or land, making their traditional skills for survival redundant. They face huge changes in production methods, lifestyle and cultural customs. Due to difficulties with language, they find the changes enormous. Even migrants of the same Tibetan nationality, may differ due to regional differences in cultural customs. Governments, at both the origin and destination sites, have encouraged them to adapt to life after resettlement, and to find employment as soon as possible, but such attempts did not always achieve desired results until recently. Many migrant families could not comfortably make the changes and had to return to plateaus and continue their former activities.

The survey found that due to poor environmental conditions, preferential policies and national religious beliefs, migrants had relocated to their current residential areas, and majority migrants had successfully relocated, but it was found that nearly 10 percent of the migrants continue to live very difficult lives due to the lack of employment and loss of livelihood, and they frequently returned to their place of origin. Their readiness for living and working in peace and contentment, and whether they possess enough knowledge and capacity to adapt to different types of life, or work, are important issues in the success of resettlement projects. Undoubtedly, for migrants to leave and successfully resettle, the country, the society and migrants themselves must make an enormous effort. But overall, the resettlement migration project in Qinhai province was a success and achieved the desired goals of ecological restoration and poverty alleviation.

### **8.2.2 Public Compensation for Migration**

In migration projects before 2000, China failed to provide enough compensation for migrants especially in Western China. As a result, their living standards were lower than those of non-migrants. This study found that rational government compensation becomes a key measure to relieve the current problems in resettlement migration. A rational compensation mechanism, under a fair market economic system, needs to be established. Governments and migrants should better manage economic relationships in the process of resettlement, and jointly negotiate compensation, as well as ensuring that migrant's living standards improve following migration. In this way, both government and migrants' benefit from migration.

By analysing deficiencies in existing migration compensation, the study considers the removal of migrants from an area as being like a commodity available for free trade. In a market economy, the removal of migrants can be compared to commodities provided by migrants to the market.

According to the value attributes of commodities, the research proposes that compensation can be made in three areas to address: in-kind asset loss, loss of some elements of public service and psycho-social costs. Migration data are used to calculate and analyse migration compensation. The feasibility of the calculation method for the provision of public services, as a compensation factor, is also verified. A rational compensation mechanism is a key point in relocation and resettlement because it aims to let migrants fairly share in resource development with governments. However, resettlement issues are complex and are difficult to accurately quantify. Dulan County falls behind prefecture and provincial performance in regard to public services. Provincial level public compensation funding is allocated to the prefecture level, while the allocation practises of prefecture-level governments still need to be assessed. The survey found that migrants who had come from minority areas with poor environments did not care very much about some public services deemed necessary for modern urban life. Rather, they preferred direct material compensation, such as cash and in-kind support. Another major finding is that compensation problems in respect to resettlement are not transparent, or public. Hence, compensation obtained during relocation and resettlement is generally insufficient.

### **8.2.3 Economic Changes**

For migrants in a developing country, income is a basic demand and a foundation for their development. The survey found that the economic situation of migrants changed significantly after resettlement in western China. They experienced losses in fixed assets, productive properties and income sources, and consequently their living standards and economic status significantly changed. In addition, their original income and developmental capacity also influenced prospects of migrant families in resettlement areas. The results showed that the economic recovery of a migrant family was influenced by familial factors and the household owner's characteristics. However, these differ in their influence on the economic recovery of migrant families in different locations among different ethnicities.

In different areas, the factors related to the economic recovery of migrant families varied, due to differences in geography, culture, production methods and type of migration. Hence, the study suggests that it is impossible to make uniform arrangements for migrant compensation and later-stage support policies. Therefore, it is necessary to have targeted policy arrangements, according to geography, culture and other factors operating in different areas. Specifically, in some areas where migrant families suffer from serious losses in human capital and lack sustainable

developmental capacity, mere capital support will very likely cause dependency and impede their development. Hence, in the long run, it is necessary to support and cultivate migrant's developmental ability to enable them to become self-sufficient.

#### **8.2.4 Cultural Changes**

The study found that resettlement migrants in Qinghai were subject to cultural and psycho-social changes. The results revealed that many minority communities were damaged by resettlement migration. In addition, migrants who had been shifted away from their relatives and friends, found that their social networks were ruined. In their new environments, migrants failed to blend into destination areas due to differences in language and lifestyle, as well as changes in their interpersonal networks. In comparison with migrants from other areas, those coming from minority areas had to adapt to changing production systems and lifestyles, as well as a different social structure and culture. Specifically, some migrant communities pointed to religious deficiencies, such as lack of religious facilities, at their new destinations. According to Tibetan migrants, there needs to be God Mountains at each place, while temples, living Buddhas and celestial burial platforms need to be established. Existing communities did not satisfy herdsmen's religious needs and, therefore, the daily religious activities of believers in migrant communities were considered unsatisfactory, and some migrants chose to return to their home communities.

The implementation of resettlement engineering not only brings spatial changes to production and the living conditions of migrants, but also results in changes in their production methods, lifestyle and social structure and culture. In its new environment, the minority culture faces collision and possible blending with other cultures. For this reason, some traditional ethnic cultures will disappear, while others will be changed through adaptation. Hence, during the implementation of resettlement programs, it is necessary to consider providing support services and advocate the retention of traditional culture. Ethnic cultural characteristics should be considered during migrant community management and in plans for their housing needs.

Due to diversity in the ethnic cultures of minority areas, resettlement migration is more complicated than is usually planned for. Implementation of resettlement migration projects will also influence national culture and cause corresponding cultural changes. Only by understanding, and attaching importance to this problem, can resettlement programs accommodate minority cultures.

### **8.2.5 The relationship between ecological degradation, poverty and migration**

The survey found that the Ledu area is a typical area of ecological degradation and economic backwardness. For a long time, local minorities failed to fully understand the relationship between survival and development. This has resulted in ecological degradation and has trapped local people in poverty. The high natural population growth rate, poor human capital and the inadequate policy system in the area further weakened the ecology, while the fragile ecology, in turn, deepened the degree of ecological poverty. The local topographic features indicate that there is a strong correlation between fragile ecologies and poverty.

This research shows that poverty intensifies ecological fragility in the migration area. It is difficult to fundamentally protect the environment only by virtue of technology, financial resources and manpower. Degradation of the environment is also attributed to its long-term fragility. In addition, the majority of migration areas have given priority to agriculture and lack the means to develop other economic activities and reduce the risk that these poor areas will become poorer in the long term. This demonstrates that poverty or environmental degradation is affected by a series of complicated factors, and the emphasis of traditional studies on the linear relation between poverty and ecological environment is too simple and arbitrary. However, the factors resulting in fragile ecologies involve more than poverty, but poverty makes it difficult for minority areas to develop their economies. The population of such areas do not have much capacity to change the status quo and given population increases the destructive use of natural resources will continue.

Therefore, poverty is intricately linked with fragility and environmental deterioration in the Qinghai migration area, so the anti-poverty policy in this area was due for change. Transfusion-style poverty alleviation through economic growth is ineffective in relieving the vicious circle between poverty and ecological deterioration. Hence, relocation and resettlement policy is used to alleviate poverty. Regional transfer of population and the development of industry are used to relieve the pressure on the environment. It is widely believed that resettlement policy not only fundamentally solves the problem that local people destructively use natural resources in ways that entrench poverty, but also provides a possible way for residents to rapidly change their impoverished status. With the guidance of the government, these outcomes can be achieved in the shortest time. This research shows that resettlement policy indeed is a good solution to weaken poverty and promote environmental recovery if undertaken in the context of

understanding the main issues.

### **8.2.6 The government plays an important role in resettlement migration**

The study found that the Xiangride resettlement migration project which has been planned, organised and subsidised by the government. So, the local government had obligations during the entire process. Arrangements for the migration process and addressing placement problems after migration are mainly the government's responsibility. In the migration process, it is therefore extremely important to define the function and role of government.

The study found that resettlement migration is a systematic project that integrates populations, resources, the ecology, the environment, society and the economy. It is hard to implement resettlement migration spontaneously, so it must be organised by the government. Beneficiaries of resettlement migration are intended for all migrants and their descendants, so the cost of resettlement should be undertaken by the government through transfer payments. This is a necessary requirement for uniting efficiency and fairness. The survey found that the Xiangride resettlement project indicates that if the government's role is significant, migrant's productive capacity and lifestyle will improve. Hence, the results show that the government has several functions in resettlement migration:

First, the study found that as the principal actor in resettlement migration, the government needs to develop practises that resolve conflicts of interest in the implementation process. Resettlement migration is basically public welfare activity, so migrant's interests should not be sacrificed to public interests. Therefore, all losses must be compensated. The government also should guarantee the basic interests and rights of migrants, while also considering the interests of stakeholder groups, to maximise the balance between competing interests. The government mobilises social power to encourage participation in resettlement migration and to guarantee smooth implementation of the project. Moreover, it is essential for the government to formulate compensation mechanisms and coordinate the various interests involved in the process. When migration groups move out of their familiar environments, their original interests are destroyed, and social cohesion is weakened. In order to protect migrant's economic interests, it is necessary for the government to plan for migrants and listen to their opinions, so as to increase migrant's trust in the government. This helps migrants fully understand the national migration policy and their own rights. The government should actively supervise policy implementation and

compensation during the process.

Secondly, the study found that the government has responsibility for natural resources. As the principal actor in environmental management, the government is the primary provider of ecological public regulations. The study found that during the process of implementing resettlement migration, it is necessary to construct mechanisms that recognise government action and market operation. To define the government's ecological responsibility requires standardising governmental behaviour, but also promoting the effective implementation of ecological protection. It is necessary to shoulder the responsibility for providing compensation for loss of natural assets, while developing and using environmental resources. The government should implement timely ecological compensation and invest capital in ecological construction for the state's long-term interests. The government should also promote both ecological health and sustainable development for economic development to relieve pressure on the environment.

Thirdly, the survey found that social services in the migration areas were one of the main issues of concern expressed by migrants. In order to safeguard the interests of migrants, the government should provide a guarantee of social welfare and promote social fairness by developing constructive education, age pensions, medical and sanitation safeguards. It should also offer preferential policies, and guide migrants to change their modes of production and their lifestyles. These actions would help migrants adapt to the new environment and offer them capital and technical support. It is essential to develop the economy and improve migrant income levels to satisfy the survival and developmental aspects of migration. In terms of the environment, the government should undertake management and recovery tasks in the emigration area and strictly constrain the scale of population in ecologically fragile areas. Moreover, the local government should target the local situation and, through institutional innovation, implement policies based on public interests.

### **8.3 Recommendations for Resettlement Policies**

Based on the above findings, the study makes several suggestions, set out below.

### **8.3.1 Ensure population planning takes account of environmental carrying capability, as well as social and economic development**

The three most important factors in a migration plan include population, land, and water resources. Chen and Silverstein (2000, 35) claim that “Population carrying capability for (an) ecologic environment” should be taken as the standard to determine whether it is necessary to undertake migration, the location of the migrant destination, and how to implement migration. The carrying capability includes meteorological conditions, exposure to climatic disasters, water resources, as well as biologic output and land carrying capability. Other factors include social system factors, such as education, infrastructure construction and social security. Traditional research on environmental carrying capability assumes that the climate is only an exogenous factor. Ma *et al* (2012) argues that with the predicted changes in temperature, rainfall, and the probability, frequency and strength of extreme climatic events, due to climate change, there will be an impact on water resources, agricultural production and population carrying capability. By rationally formulating migration plans that consider climate-related carrying capability, problems such as ecological and environmental damage at migration destinations, migrant poverty and return migration caused by limited adaptation may be avoided.

### **8.3.2 Incorporate environmental migration planning into national and local adaptation strategies**

Migration planning requires the coordination and consideration of a range of factors and requires strategic consideration of the future. Scientific and rational migration planning not only facilitates long-term regional development and social stability, but it can also promote regional urbanisation and industrialisation, and realise regional sustainable development via the application of migration resources (Bright *et al.* 2000). Specifically, Tian (2012) claims that overall migration planning requires consideration of climate change, as well as other goals, such as national and local mid-term and long-term development planning. Strengthening adaptability can also promote sustainable development and its incorporation into development policies and projects could facilitate local economic development. In this way, input into climate protection infrastructure, adaptability and governance can be gradually improved. In western China, the provinces requiring a solution to large-scale migration problems, such as urbanisation, need preferential policies related to energy, fiscal policy, tax, investment, loans and other factors to overcome the stress associated with employment and development. In this way, these areas can

obtain more capital through development and solve the problems created by the urbanisation of rural populations and finding employment for migrants.

### **8.3.3 Improve the participation of the resettled migrant group in decision-making processes**

Government-led migration reduces uncertainty, which can be advantageous. However, there are disadvantages, because people undertake migration passively and are not given enough choice. Due to different conditions in different places, it is impossible to design a uniform goal, or plan (Fan 1999, Tan *et al.* 2013). Opinions and suggestions from different sides should, therefore, be fully considered during the migration decision-making process to strengthen the participation of different interest groups. To achieve this, it is imperative that differences in access to information in migrant's decision making should be reduced before migration. It is also necessary to respect the rights of migrant groups. In addition, the willingness, and strengths and weaknesses of different migration groups, should be fully understood so that migration schemes can be designed to be more flexible in response to different needs. Initiative, rather than passivity, should be encouraged to reduce poor decisions. In this way, various problems and contradictions, which may be caused by migration, can be reduced as much as possible. The stress of social issues and development on governments can also be relieved. Moreover, difficulties and demands, appearing during the migration adaptation and transition period, should be anticipated in advance, and interaction and communications should be strengthened.

### **8.3.4 Pay attention to fairness and efficiency in environmental migration decision-making**

As with other social and economic decisions, it is necessary to define and counteract the effects of government and the market to balance two goals – maximum efficiency and fairness. In view of the scarcity of migrant capital and usable resources (such as land, water resources and registered residences), governments should distribute limited resources, related to a range of factors, to realise efficiency and fairness.

On one hand, compensation should be made to address basic livelihood losses caused by relocation, and for the creation of development opportunities, and other conditions, for migrant groups. On the other hand, special policies should be implemented for fragile areas and for specific groups. For example, the Ministry of Civil Affairs, should consider a special education subsidy, a medical insurance subsidy, a pension guarantee and other social policies. Social



security should be provided for migrant groups as far as possible, within the scope of capital and policy. In addition, governments should make full use of market mechanisms to create innovation in the migration system. It is necessary to relieve governmental burdens, and to reduce the risks and costs of migration.

### **8.3.5 Protect ethnic culture**

National manners and customs should be respected, while the ethnic cultures of minorities should be protected, developed and their inheritance should be facilitated. Cultural diversity is a fundamental condition for national continuity. To prevent the disappearance of some national cultures in the migration process, local governments should prudently consider the development of national, or regional, traditional cultures during migrant resettlement, to avoid return migration. It is necessary, though such measures, to guarantee that migrants can live in resettlement areas long-term. In addition, relevant government departments should attempt to prevent the conditions encouraging migrant removal by paying more attention to just how migrants will adapt to the productive methods and lifestyles at their destinations. To realise this, it is important to also strengthen consultation related to psycho-social issues, so migrants can live stable lives at their destination sites.

It is necessary to formulate special migration policies and to respect minority customs in the minority areas in western China. Measures should be put in place to effectively protect the cultures of minorities and to promote diversified national cultural development. Socio-cultural characteristics, involving national religion, folk culture, folk knowledge and other factors in western areas, not only play an important role in traditional ecological protection, but are also precious parts of human culture (Liang 2001). Hence, migration engineering should consider diversity and difference in western areas. By inclusive development of various types of cultures in migration destinations, the original cultures of many minorities' cultures can be effectively protected, developed and transmitted to the next generation.

### **8.3.6 The government is the coordinator of interests in resettlement migration.**

The study found that the government organises and manages the resettlement migration project and provides public goods. However, there is always various stakeholders who do not clearly understand the government's role and the way it functions. So, it is paramount to define the role

of the government during the resettlement migration progress.

The object of the Dulan resettlement migration project is not a homogenous entity but a model that should recognise differences in nationality, religion and traditional customs. In this resettlement migration, each party that participates constitutes an interest group. Each stakeholder has their own goals and interests; thus, it is possible for contradiction or conflict between stakeholders to arise, which can damage the interests of one or many subjects. Under these circumstances, it is necessary to have a department that can solve conflicts and coordinate diverse interests. The role of an interest coordinator and compensator can only be shouldered by the government, given its position and resources. During the process of implementing resettlement, the government also has its own interests, but these only include environmental improvement and the prosperity of migrants or other political interests, rather than purely economic interests. In order to coordinate the relationship between interest groups the government must pay attention to the legal construction of interest groups' rights. Due to different ethnicities and cultural backgrounds, it is easy to trigger conflict during the migration resettlement process. The government should formulate regulations to restrain and eliminate conflicts caused by interest maximisation and opportunistic behaviour, so that each stakeholder is treated equally and can satisfy their interests in an orderly way. Thus, constructing sound legal policy systems for the resettlement of migrant's project is also an important governmental responsibility.

### **8.3.7 The government is responsible for resolving social conflicts in resettlement**

The government is responsible for intervening in social conflicts in migration. The government cannot just target migrants in the short term but should systemically “stabilise and enrich” them in the longer-term. The government should focus on selecting settlement points, compiling settlement plans and investigating settlement intentions in the early stage. After settlement, the government can't reduce its work, but should recognise the importance of migration in this stage and positively concern itself with social adaptation, production, lifestyle transformation, income recovery and improvement, and conflict resolution in settlement areas, especially during the early stage of settlement.

This research shows that the government has the responsibility and ability to protect the environment. The government should develop a dominant role in ecological migration, but it

does not mean it is solely the government's responsibility. Even with the government having a central role in the entire migration process, issues such as cultural changes among minorities, insufficient economic compensation, inadequate adaptation by migrants, and too much dependence on governmental assistance remain. If the migration process is dominated by the government, it will not be possible to realise the sustainable resettlement of migrants. Benign and successful resettlement migration should be achieved by interaction between the government and migrants.

## **8.4 Contributions of this Research**

This study has enhanced the understanding of resettlement migration in the region of the Qinghai-Tibet Plateau in western China which is an area inhabited by one of the largest minority groups of the population in China, specifically the Tibetan. Moreover, the research, combined with data provided by local government on its knowledge of resettlement migration, allows an evaluation of the current production and lifestyles of relocation and resettlement, and the expectations of the government. It is important to note that considerable amount of government data used in this research were internal data that are not publicly reported but used for the government policy design. This research combines existing methods with scenarios that determine the relationship between environmental deterioration, poverty and resettlement migration. The research identified some outstanding problems among the migrants, including their livelihoods and incomes after migration, cultural changes and the adaptation of minorities in the migration process. Changes in minority culture reveal the cultural adaptation issues faced by migrating minorities and it is a key issue in evaluating ecological migration among them. Finally, the study proposes possible risk aversion approaches, and relevant policies. This study makes the following contributions to both policy making and theory:

Firstly, the study focuses upon both the areas migrants leave and those in which they settle. By comparing data obtained about the situation of migrants before and after migration, there are some new insights into the causes of non-migration and migration, the various ways of migration, as well as changes that take place after migration.

Secondly, the application of relevant economic models to analysing demographic challenges further extends the frontiers of demographic research. In this study, a combination of relevant

models based upon survey and secondary data, were applied to relevant problems. For example, data analysis was carried out to understand the compensation involved in public policies.

Lastly, relevant research involving western China, especially its Tibetan areas, is always very sensitive and inadequate due to the influence of government and the international community. This research not only collected and analysed detailed data on Tibetan areas, it also concentrated on Tibetan families and local governments. In this context, many first-hand materials and relevant local government documents have been acquired and analysed. These materials are highly valuable and can be used as reference in future research.

## **8.5 Limitations of this Study**

This study has the following limitations. Firstly, there is not a lot relevant research on resettlement migration in Tibetan areas of Qinghai, China. Therefore, this study has not been able to draw on a large field of literature in relation to certain topics. Secondly, most migrants in the survey area are resettlement migrants, which are organised by the government, so data obtained from the survey questionnaire are quite similar to data provided by government. For example, most issues, such as government compensation and migration type, show few differences in the two sources of information. As a result, in later-stage computation, rational normal distribution could hardly be displayed. Design and examination of the model became exceedingly difficult. Thirdly, during the research, the researcher used documents and materials collected from local governments. However, the authenticity of some of these documents, or materials, could not be verified. Lastly, the case study area is a Tibetan cluster area in China and research in this area has been highly sensitive and constrained for a long time. Hence, during data collection, the researcher encountered many inconveniences and less than helpful influences. For example, a large number of interviewees cannot understand Chinese, so there will be some inaccuracies when they try to answer the survey questions. In addition, most of the interviewees were not well educated, so their understanding of some survey questions was somewhat biased. Finally, some respondents deliberately avoided sensitive questions because they were worried about the government.

## 8.6 Conclusion

As an important policy measure used in ecological and environmental construction, and in economic support for and development of poverty-stricken areas of western China, resettlement migration has been widely implemented in many areas. Migration in areas of western China is a kind of systematic engineering, involving the economy, society, resources, and the environment. Sustainable resettlement of migrants is a fundamental and important measure to realise economically, socially and environmentally sustainable development in western areas. Research on migration issues is not only a theoretical problem but, more importantly, it has pertinence to contemporary problems. This research, on sustainable development and ecological migration in western areas, sought to comprehensively analyse the historical experience of resettlement migration. It also discussed ecological and environmental protection, and construction, in the rural pasturing areas of western regions, as well as changes in production and modes of life among resettlement migrants. It has gone some way to identifying the means to realise the sustainable development of farming and stockbreeding areas for farmers and herdsman. It also considered theory about the influential factors in resettlement system selection, externality theory, and theories about influencing factors. In terms of methodological design, the research combined field survey and in-depth interviews, and focussed on analysis of both quantitative and qualitative data.

Resettlement migration results from an interaction between fragile environments and poverty. The Qinghai migration area suffers a relatively complicated two-way causality. The fragile ecology of the area leads to this area's poverty, while poverty also results in ecological fragility and ecological degradation. On the one hand, the influence of the fragile ecology on poverty, poor carrying capacity, frequent natural hazards, and lower natural productivity results in ecological poverty. On the other hand, the influence of poverty on the fragile ecology gives rise to the underdevelopment of industry, extensive business patterns reliant on exploitive agriculture, a shortage of ecological investment funds, as well as lower educational levels and limited capacity to engage with scientific research, which further lead to an unproductive and fragile ecology.

Based on a comprehensive analysis of existing literature on resettlement migration research, from domestic and foreign academic circles, the research took domestic and foreign experience as a reference point. In view of relevant government policies in the case study area, the study

investigated migration issues from the perspective of sustainable development. The study also made a rational and scientific evaluation of the conditions for sustainable development in resettlement migration, within the whole western region. On one hand, the study has facilitated an extension of environmental migration theory and provided support for future migration and sustainable development research. On the other hand, by highlighting problems faced by resettlement migrants and limited sustainable development, the research makes some recommendations on how to successfully achieve the goals of relocation and resettlement migration and protect the well-beings of migrants in the process in western China and in other developing countries.

## Appendix

### Appendix 1: Survey on climate change and adaptation in Dulan 2012

This survey is part of the research project Adaptation to Climate Change and Mobility of People in the Rural Areas of China conducted by Qinghai Normal University and the University of Adelaide titled. We would like you to spend some time for this survey. All information to be collected via this survey is for the purpose of research only. We will keep the family and individual information confidential and will Not be disclosed to any third part according to the regulations concerned. If you agree to participate in the survey, please tick ✓

#### Chinese Rural Residents' Perception of and Adaptation to Climate Change

Code of the survey		Name of the principal respondent		Contact address and phone No. of the respondent		Name/code of the interviewer	
Province/County(City)		Town		Village		Date of the interview (yyyy/mm/dd)	

#### Part I Family Background and Movement

##### A1 Family Members

A1a	Are you the household head?	1 Yes <input type="checkbox"/> 2 No <input type="checkbox"/>							
A1b	Codes of all people living in the same household: <i>Serial number 1 refers to the respondent; from Serial number 2 to 8 people are sorted in a descending order from the oldest to the youngest age.</i>	1	2	3	4	5	6	7	8
	Relationship to the household head or de facto household head: 0.Yourself 1.Spouse 2.Child 3.Parent 4.Parent in law 5.Grandparent 6.Child in law 7.Grandchild 8.Brother or sister 9.Other								
A1c	Gender:1.Male 2.Female								

A1d	Year of birth: (yyyy)									
A1e	The place of your current Hukou: (When you select 2-7, please give the names of places.) 1. the same town where you are living Now 2.other town within the same county/city 3.other counties within the same city/district 4.other cities/counties/districts within the same province 5.the cities/counties/districts in other provinces 6.Hong Kong, Macau, or Taiwan 7.other countries									
A1f	Your current Hukou status: 1.Agricultural Household 2.Urban Resident Household 3. Hong Kong, Macau, or Taiwan 4.Other countries (please specify which country)									
A1g	Marital status:1.Married 2.Divorced/Separated 3.Widowed 4.Single									
A1h	Ethnicity:1.Han 2.Hui 3.Tibetan 4.Dongxiang 5.Tujia 6.Man 7.Yugu 8.Bao'an 9.Inner Mongolia 10.Sala 11.Kazak 12.Zhuang 13.Miao 14.Uyghur 15.Yi 16.Other									
A1i	Education: 1.Never been to school 2.Primary School 3.Middle School 4.Senior High School 5.College Diploma 6.Bachelor Degree 7.Masters Degree 8.PHD									
A1j	Students pursuing studies: 1.Yes 2.No									
A1k	Political affiliation: 1. Communist Party member 2.Democratic Party member 3.Non party affiliated									

**A2 Movements in 2008-2012**

*(Movement: whole family or family members live outside of the original town for six months and above. If did Not move → A3)*

A2a	household: : the living in the same between 2006 and did you migrate from the earliest to move? (yyyy/mm- from the earliest to did you migrate between 2006 and living in the same household: : the	d1.Move in Hukou	d2.Move out Hukou	d3. Live in the family for 6 months and above without moving in Hukou	d4. Live outside of the family for 6 months and above without moving out Hukou	e. Way of movement: 1.self-arranged 2.government arranged	n was provided by government or
		Hukou 3.Live in the family for 6 months and above without moving in					



					The place of your previous Hukou before it was transferred to the current household <i>(please give the names of places):</i> 1.other town within the same county/city 2.other counties within the same city/district 3.other cities/counties/districts within the same province 4.the cities/counties/districts in other provinces 5.Hong Kong, Macau, or Taiwan 6.other countries	Your Hukou status before it was transferred to the current household: 1.Agricultural Household 2.Urban Resident Household 3. Hong Kong, Macau, or Taiwan 4.Other countries (please specify which country)	The Hukou was transferred to <i>(please give the names of places):</i> 1.other town within the same county/city 2.other counties within the same city/district 3.other cities/counties/districts within the same province 4.the cities/counties/districts in other provinces 5.Hong Kong, Macau, or Taiwan 6.other countries	Came from <i>(please give the names of places):</i> 1.other town within the same county/city 2.other counties within the same city/district 3.other cities/counties/districts within the same province 4.the cities/counties/districts in other provinces 5.Hong Kong, Macau, or Taiwan 6.other countries	Went to <i>(please give the names of places):</i> 1.other town within the same county/city 2.other counties within the same city/district 3.other cities/counties/districts within the same province 4.the cities/counties/districts in other provinces 5.Hong Kong, Macau, or Taiwan 6.other countries	3.government and company arranged 4.company and rural household arranged 5.government, company and rural households arranged 6.company recruitment 7.recruitment agent 8.to join the army 9.to pursue education 10. move with other family members 11.other: _ _ _ _ _ _ _ _ _ _	
A 2 a 1	1		1								
			2								
			3								
			4								
			5								
A 2 a 2	2		1								
			2								
			3								
			4								

			5										
A 2 a 3	3		1										
			2										
			3										
			4										
			5										
A 2 a 4	4		1										
			2										
			3										
			4										
			5										
A 2 a 5	5		1										
			2										
			3										
			4										
			5										
A 2 a 6	6		1										
			2										
			3										
			4										
			5										

A 2 a 7	7	1									
		2									
		3									
		4									
		5									
A 2 a 8	8	1									
		2									
		3									
		4									
		5									

A2b	For the households which moved the residential place of the whole family since 2008 (If did Not move the whole family →A3)	1	2	3	4	5
A2b1	When did you move the residential place of the whole family? (yyyy/mm)					
A2b2	Moved from: Province/City/County (District)/Town					
A2b3	Moved to: Province/City/County (District)/Town					
A2b4	Way of movement: 1.self-arranged 2.government arranged 3.government and company arranged 4.company and rural household arranged 5.government, company and rural households arranged 6.other: _ _ _ _ _					
A2b5	Way of resettlement: 1.large size centralised resettlement (more than 10 households) 2.samll size centralised resettlement (2-10 households) 3.individual household resettlement					
A2b6	Ethnic Character of the resettlement village/community: 1.one ethnicity 2. Han and minor ethnicity 3.different minor ethnicities					

A2b7	What support did your family receive when moving residential places? <i>Please tick and fill the amounts of the subsidies/compensation/loan (Yuan, a-e only)</i>	a. compensation for infrastructure (e.g. water and electricity facilities, road construction, etc.)	<input type="checkbox"/> ___	<input type="checkbox"/> ___	<input type="checkbox"/> ___	<input type="checkbox"/> ___	<input type="checkbox"/> ___
		b. compensation/subsidy for housing	<input type="checkbox"/> ___	<input type="checkbox"/> ___	<input type="checkbox"/> ___	<input type="checkbox"/> ___	<input type="checkbox"/> ___
		c. subsidy for production	<input type="checkbox"/> ___	<input type="checkbox"/> ___	<input type="checkbox"/> ___	<input type="checkbox"/> ___	<input type="checkbox"/> ___
		d. living allowance	<input type="checkbox"/> ___	<input type="checkbox"/> ___	<input type="checkbox"/> ___	<input type="checkbox"/> ___	<input type="checkbox"/> ___
		e. loan from government/bank	<input type="checkbox"/> ___	<input type="checkbox"/> ___	<input type="checkbox"/> ___	<input type="checkbox"/> ___	<input type="checkbox"/> ___
		f. production and vocational training	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		g. to arrange employment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		h. other: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### A3 Movement Plan in Next Two Years (Now-2014)

A3a	The possibility of movement of your family or some members in next two years: <i>please circle the selected number. If there is No plan of movement, please skip to A4 after answer this question.</i>	a. removal of entire family: 0(very unlikely) 1 2 3 4 5(neutral) 6 7 8 9 10(very likely)							
		b. removal of some family members: 0(very unlikely) 1 2 3 4 5(neutral) 6 7 8 9 10(very likely)							
		c. No moving plan: 0(very unlikely) 1 2 3 4 5(neutral) 6 7 8 9 10(very likely)							
A3a1	If there is a plan to move the WHOLE HOUSEHOLD, where do you plan to move to? <i>Please tick and give names of places.</i> <input type="checkbox"/> 1.other town within the same county/city: _____ <input type="checkbox"/> 2.other counties within the same city/district : _____ <input type="checkbox"/> 3.other cities/counties/districts within the same province : _____ <input type="checkbox"/> 4.the cities/counties/districts in other provinces : _____ <input type="checkbox"/> 5.Hong Kong, Macau, or Taiwan : _____ <input type="checkbox"/> 6.other countries: _____								
A3a2	Which kind of location do you prefer to move to?	<input type="checkbox"/> 1.rural village	<input type="checkbox"/> 2.urban outskirts	<input type="checkbox"/> 3.town centre	<input type="checkbox"/> 4.county capital	<input type="checkbox"/> 5.medium or big city			
A3b	Removal plan of FAMILY MEMBERS								
A3b1	Codes of all people living in the same household: <i>Same as A1b</i>	1	2	3	4	5	6	7	8
	Which family members plan to move? <i>Please tick</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A3b2	Where do you plan to move?( <i>please fill the number and give the names of places</i> ) 1.other town within the same county/city                      2.other counties within the same city/district 3.other cities/counties/districts within the same province    4.the cities/counties/districts in other provinces 5.Hong Kong, Macau, or Taiwan                                      6.other countries								

### A4 Perception of movement

A4a	Is there new migrant moving into your village since 2008?	<input type="checkbox"/> 1.Yes <input type="checkbox"/> 2.No
A4b	Please indicate the voluntary degree of your family and family members' past movement(s): <i>Please circle the selected number. If did Not move, please skip to A4c</i>	0(completed forced) 1 2 3 4 5(neutral) 6 7 8 9 10(completely voluntary)
A4c	Are your family and family members willing to move in the future? <i>Please circle the selected number.</i>	0(very reluctant to) 1 2 3 4 5(neutral) 6 7 8 9 10(very willing to)
A4d	Under what kind of situation, your family or family members will consider leaving original residential place for 6 months and above? <i>Please tick 1 or 2; if 1 is chose, please answer: under what kind of situation, your family and family members will move; if 2 is chose, please skip to next question.</i>	
a	Will your family or family members move when facing climatic hazards (e.g. drought, flood, land slid/mud flow, heat wave, sand storm, etc.)?	<input type="checkbox"/> 1.Yes <input type="checkbox"/> 2.No
	If choose 'Yes', your family or family members will move when within one year, climatic hazards happen: 1.once 2.twice 3.three times 4.four times and above	(1) removal of entire family
		(2) removal of family members
b	Will your family or family members move when climatic hazards last for a considerable long time in one year?	<input type="checkbox"/> 1.Yes <input type="checkbox"/> 2.No
	If choose 'Yes', your family or family members will move when within one year, climatic hazards last for: 1.less than a month 2. 1-3 months 3. 4-6 months 4. 7 months and above	(1) removal of entire family
		(2) removal of family members
c	Will your family or family members move when climatic change causing reduction in production?	<input type="checkbox"/> 1.Yes <input type="checkbox"/> 2.No
	If choose 'Yes', your family or family members will move when the reduction reach to: 1.less than 20% 2. 20%-40% 3. 40%-60% 4. 60%-80% 5.more than 80%	(1) removal of entire family
		(2) removal of family members
d	Will your family or family members move when climatic change causing reduction in income?	<input type="checkbox"/> 1.Yes <input type="checkbox"/> 2.No
	If choose 'Yes', your family or family members will move when the reduction reach to: 1.less than 20% 2. 20%-40% 3. 40%-60% 4. 60%-80% 5.more than 80%	(1) removal of entire family
		(2) removal of family members
e	Will your family or family members move when climatic change causing fatality or health problems of family members?	<input type="checkbox"/> 1.Yes <input type="checkbox"/> 2.No
	If choose 'Yes', your family or family members will move when climate change causing someone in	(1) removal of entire family

	<p>your family: 1.feel uncomfortable but do Not need to seek medical treatment</p> <p>2.need to seek medical treatment but is completely treatable 3.have post effects after treatment but can work and perform daily life activities 4.lose certain ability to work but can perform daily life activities 5. Completely lose ability to work but can perform daily life activities 6.canNot independently perform daily life activities 7.pass away</p>	(2) removal of family members	
f	Will your family or family members move when climatic change causing decrease of resources (e.g. water, electricity, fuel, etc.)?	<input type="checkbox"/> 1.Yes <input type="checkbox"/> 2.No	
	If choose 'Yes', your family or family members will move when climate change causing:	(1) removal of entire family	
	1.increased price of resources 2.resources cannot fully meet the needs of production and daily life	(2) removal of family members	
	3.resources completely cannot meet the basic needs of production and daily life		

## Part II Effects of Climate Change and Measures for Adapting to Climate Change

### B1 Effects of Climate Change

B1a	a. Did local people experience remarkable climate change (e.g. decrease in rainfall, desertification, sand storm, drought, flood, landslide, heatwave, cold injury, etc.) by 2007? <i>(please circle the selected number)</i>	0(very rare) 1 2 3 4 5(neutral) 6 7 8 9 10(very often)
	By 2007, did local climate change adversely impact on: <i>(please circle the selected number)</i>	
	b. agricultural production	0(not at all) 1 2 3 4 5(neutral) 6 7 8 9 10(most severe impacts)
	c. land quantity	0(not at all) 1 2 3 4 5(neutral) 6 7 8 9 10(most severe impacts)
	d. soil fertility	0(not at all) 1 2 3 4 5(neutral) 6 7 8 9 10(most severe impacts)
	e. water quantity	0(not at all) 1 2 3 4 5(neutral) 6 7 8 9 10(most severe impacts)
	f. water quality	0(not at all) 1 2 3 4 5(neutral) 6 7 8 9 10(most severe impacts)
	g. living cost	0(not at all) 1 2 3 4 5(neutral) 6 7 8 9 10(most severe impacts)
	h. income	0(not at all) 1 2 3 4 5(neutral) 6 7 8 9 10(most severe impacts)
	i. health conditions	0(not at all) 1 2 3 4 5(neutral) 6 7 8 9 10(most severe impacts)
j. housing	0(not at all) 1 2 3 4 5(neutral) 6 7 8 9 10(most severe impacts)	
k. transportation and communication	0(not at all) 1 2 3 4 5(neutral) 6 7 8 9 10(most severe impacts)	

## B2 Measures for Adapting to Climate Change

B2a	How do you agree with the statements about adapting to climate change? <i>(please circle the selected number)</i>	a. with appropriate measures, human could effectively adapt to climate change	0(strongly disagree) 1 2 3 4 5(neutral) 6 7 8 9 10(strongly agree)			
		b. my family has adequate adaptive capacity to cope with the adverse impacts of climate change and bear all the loss brought about by climate change	0(strongly disagree) 1 2 3 4 5(neutral) 6 7 8 9 10(strongly agree)			
		c. migration is one of the most effective strategies strengthening adaptive capacity to climate change	0(strongly disagree) 1 2 3 4 5(neutral) 6 7 8 9 10(strongly agree)			
		d. in-situ adaption is one of the most effective strategies strengthening adaptive capacity to climate change	0(strongly disagree) 1 2 3 4 5(neutral) 6 7 8 9 10(strongly agree)			
		e. my family will adopt migration only when in-situ adaptation measures are carried out but fail.	0(strongly disagree) 1 2 3 4 5(neutral) 6 7 8 9 10(strongly agree)			
B2b	Has your household adopted the following means to adapt to adverse impacts of climate change? <i>Please tick</i>					
		(1) Have adopted	(2) Will adopt		(1) Have adopted	(2) Will adopt
	a. improving irrigation	<input type="checkbox"/>	<input type="checkbox"/>	h. using renewable energy (e.g. solar energy, wind energy, hydropower, etc.)	<input type="checkbox"/>	<input type="checkbox"/>
	b. adopting water-saving cultivation	<input type="checkbox"/>	<input type="checkbox"/>	i. reinforcing house	<input type="checkbox"/>	<input type="checkbox"/>
	c. improving access to weather information	<input type="checkbox"/>	<input type="checkbox"/>	j. permanent migration (5 years and more)	<input type="checkbox"/>	<input type="checkbox"/>
	d. planting drought-resistant crops	<input type="checkbox"/>	<input type="checkbox"/>	k. using air-conditioning facilities	<input type="checkbox"/>	<input type="checkbox"/>
	e. protecting and improving soil fertility	<input type="checkbox"/>	<input type="checkbox"/>	l. decreasing usage of electricity and water	<input type="checkbox"/>	<input type="checkbox"/>
	f. land reclamation	<input type="checkbox"/>	<input type="checkbox"/>	m. long-term migration (more than 1 year but less than 5 years)	<input type="checkbox"/>	<input type="checkbox"/>
g. family members taking short-term migration (6 months to 1 year)	<input type="checkbox"/>	<input type="checkbox"/>	n. planting cash crops	<input type="checkbox"/>	<input type="checkbox"/>	

B2c	To what extent does your family benefit from the local institutional adaptations to climate change? 0(no benefit) 1 2 3 4 5(neutral) 6 7 8 9 10(the greatest benefit)		
	a. climate forecasting systems and emergency plans on disaster relief		f. renewable energy program
	b. ecological rehabilitation projects		h. training on agricultural technology
	c. protection of water resources		i. subsidies to agricultural production
	d. development of irrigation systems		j. promoting sale of agricultural products
	e. planting drought resistant crops		k. investment in local educational and medical services
			l. investment in local infrastructure

### B3 Perception of and Participation in Climate Change Adaptation Related Policies and Strategies

		2007	
B3a	Please answer following questions regarding your perception of and participation in climate change adaptation related policies and strategies. <i>Please select from 0 to 10</i>		/
	a. How much help did government provide to your family when you facing difficulties? 0(very little) 1 2 3 4 5(neutral) 6 7 8 9 10(very much)		
	b. How much did your family benefit from governments' anti-poverty or economic development policies and programs? 0(very little) 1 2 3 4 5(neutral) 6 7 8 9 10(very much)		
	c. How do you agree with the statement 'households in my community equally benefit from government's environment protection and economic development policies and programs'? 0(strongly disagree) 1 2 3 4 5(neutral) 6 7 8 9 10(strongly agree)		
	d. Are your family willing to join in government-arranged migration? 0(very reluctant to) 1 2 3 4 5(neutral) 6 7 8 9 10(very willing to)	Ecological migration/anti-poverty relocation	
Labour export			
Project-induced relocation			



	e. How would you like to participate in policy-making process of climate change adaptation? 0(very reluctant to) 1 2 3 4 5(neutral) 6 7 8 9 10(very willing to)	
	f. How satisfied (or dissatisfied) you are with your chance to participate in the policy-making processes? 0(Not satisfied at all) 1 2 3 4 5(neutral) 6 7 8 9 10(very satisfied)	
	g. How do you rate the conditions of public medical and educational services in your community? 0(very insufficient) 1 2 3 4 5(neutral) 6 7 8 9 10(very sufficient)	
	h. Does your family receive adequate information of climate change and disaster preparation and relief? 0(very insufficient) 1 2 3 4 5(neutral) 6 7 8 9 10(very sufficient)	
	i. How frequent does your family use public assets and facilities of your community (e.g. public irrigation equipment, public recreational facilities, etc.)? 0(very rarely) 1 2 3 4 5(neutral) 6 7 8 9 10(very often)	
B3b	Which projects were implemented in your community? <i>(please use ',' to separate different choices )</i> 1.ecological migration/anti-poverty relocation 2. labour export 3. project-induced relocation 4.water-saving agriculture 5.development of renewable energy 6.cooperative marketing	
B3c	Which projects did your family participate in? <i>(please use ',' to separate different choices )</i> 1.ecological migration/anti-poverty relocation 2. labour export 3. project-induced relocation 4.water-saving agriculture 5.development of renewable energy 6.cooperative marketing	
B3c1	Which project brings the greatest influence on your family?	
B3d	How does each stakeholder share the burden of coping with adverse impacts brought about by climate change on your family? <i>(please fill the percentages for each stakeholder, which sum up to be 100% )</i>	/
	a. local government at and above county level	
	b. local government at township level and village committee	
	c. employers	
	d. Non-government organisations	
	e. household and individuals	
	f. other social stakeholders (e.g. government of other cities and districts, industry, other people, etc. )	

**Part III 2007-2011: Conditions of Different Aspects of the Family**  
**C Employment Status, Livelihood condition and Economic Condition**

**C1 Employment and Social Security**

C1a	Codes of all people living in the same household: <i>Same as A1b</i>	1	2	3	4	5	6	7	8
	Has any person aged 16 or older in your family taken up paid jobs at this moment? 1.Yes 2.No								
C1b	Which family members are seeking jobs at the moment? ( <i>tick✓</i> )	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C1c	How many times did you change your jobs since 2008? ( <i>If you did Not change any job, please fill in '0'.</i> )								
C1d	Please indicate the occupation type of your family members 1. agricultural, forestry, husbandry and fishery production 2. small private business 3. labour work in manufacturing, construction and transportation industry 4. labour work in service industry 5. sales in business industry 6. business administration and management 7. technical or professional work 8. enterprise operation 9. service in public institutions (e.g., education, science and technology, culture, health work) 10. government officers 11. Other: _ _ _ _ _	2007							
C1e	Please provide the information of annual income of each people taking up paid jobs. ( <i>Yuan</i> )	2007							
C1f	For family members who took up paid work over the period from 2007 to 2011: How satisfied (or dissatisfied) you are with your job? 0(Not satisfied at all) 1 2 3 4 5(neutral) 6 7 8 9 10(very satisfied)	2007							
C1g	What kinds of social security do your family members have? ( <i>please use ';' to separate different choices</i> ) 1.social security of government and public institution 2.social security of urban employee 3.social security of urban resident 4.new rural pension insurance 5.new rural cooperative medical insurance 6.comprehensive insurance for migrants 7.other: _ _ _ _ _ 8.No social security at all	2007							

## C2 Production, Marketing and Land Use

			2007
C2a	How many contracted land did your family have in 2007? <i>Please tick if you own this type of land and fill the quantity (Boyle et al.) of the land.</i>	a. dry land	<input type="checkbox"/> ___
		b. irrigable land	<input type="checkbox"/> ___
		c. livestock husbandry land	<input type="checkbox"/> ___
		d. other: _____	<input type="checkbox"/> ___
C2b	How does your family use the land? <i>Please tick if you use the land in this way and fill the quantity (Boyle et al.) of the land.</i>	a. used by self	<input type="checkbox"/> ___
		B .rent to others	<input type="checkbox"/> ___
		c. land vacancy	<input type="checkbox"/> ___
		d. land acquisition by government	<input type="checkbox"/> ___
		e. reallocation to new in-migrants	<input type="checkbox"/> ___
		f. lose it to land consolidation	<input type="checkbox"/> ___
C2c	What production types are adopted by your family? <i>(please use ',' to separate different choices )</i> 1.crops 2.animal husbandry 3.working off-farm 4.samll business 5.to cooperate with industry 6.high returns plants and fruits 7.high returns livestock and poultry 8.forestry 9.vegetables 10.medical plants 11.fishery 12.other:_____		
C2c1	Which is the main production type of your family?		
C2d	Is there any public land in your community? 1.Yes 2.No		
C2d1	How often do you use the public land? <i>Please select from 0 to 10: 0(very rarely) 1 2 3 4 5(neutral) 6 7 8 9 10(very often)</i>		
C2e	Which marketing channel does your family adopt to sell your products? 1.self-selling 2.small scale cooperative marketing 3.big scale cooperative marketing 4.government-arranged purchase/selling		
C2f	How are your products selling? <i>Please select from 0 to 10: 0(very poor) 1 2 3 4 5(neutral) 6 7 8 9 10(very good)</i>		
C2g	Does your family receive adequate support and training on agricultural production? <i>Please select from 0 to 100(very insufficient) 1 2 3 4 5(neutral) 6 7 8 9 10(very sufficient)</i>		
C2h	Does your family receive adequate support and training on off-farm skills? <i>Please select from 0 to 10</i> 0(very insufficient) 1 2 3 4 5(neutral) 6 7 8 9 10(very sufficient)		

### C3 Economic Conditions

		2007
C3a	What was your household's annual income?( <i>Yuan</i> : (including all sources of income before tax and insurances are taken). For a-e, how many percentages does each income source contribute to the total annual income of your family? Please fill the percentages for each income source, which sum up to be 100%.	
	a. primary industry production (including farming, animal husbandry, fishery, forestry)	
	b. Non-agricultural production and business (including mining, manufacturing, construction, tourism and services, etc.)	
	c. wages and salaries	
	d. social security, subsidy and compensation from government	
C3b	Please estimate your family's total annual consumptive expenditure ( <i>Yuan</i> ) : For a-f, how many percentages does each category contribute to the total annual expenditure of your family? <i>Please fill the percentages for each category, which sum up to be 100%.</i>	
	a. daily life consumption (including food, clothes, Non-food groceries, etc.)	
	b. housing and family equipment	
	c. education, sports, leisure and entertainment	
	d. medical and health services	
	e. investment into production or business	
C3c	If you selected 'e' in C3b, Please tick the industries to which you invested and fill the percentages for each ticked industry, which sum up to be 100%.	a. primary industry production (including farming, animal husbandry, fishery, forestry) <input type="checkbox"/> ( )
		b. private industry/factory <input type="checkbox"/> ( )
		c. tourism, catering, service and retailing <input type="checkbox"/> ( )
C3d	Accumulative total family savings ( <i>Yuan</i> ):	
C3e	Accumulative total family debts ( <i>Yuan</i> ):	
D3g	Please rate the gap between rich and poor in our village: <i>Please select from 0 to 10</i> 0(very small) 1 2 3 4 5(neutral) 6 7 8 9 10(very large)	
D3h	Please indicate the economic ranking of your family in the village: <i>Please select from 0 to 10</i> 0(very low) 1 2 3 4 5(neutral) 6 7 8 9 10(very high)	
D3i	Please rate the rich-poor gap between your village and other nearby villages: <i>Please select from 0 to 10</i> 0(very small) 1 2 3 4 5(neutral) 6 7 8 9 10(very large)	

### D Housing and Transportation

		2007
D1	<b>Source of the property:</b> 1. rent housing 2. temporary but free accommodation provided by the government, employer, relatives or friends 3.self-built 4.cooperatively built 5.pay for others to build 6.purchased second hand property 7.others: _____	
D2	<b>Construction structure of the property:</b> 1.mud 2.wood 3.brick 4.concrete 5.tent 6.thatch 7.other: _____	
D3	<b>How large was your house? (m2):</b>	
D4	<b>Please tick if your property has the facilities.</b>	a. tap water <input type="checkbox"/>
		b. electricity <input type="checkbox"/>
		c. renewable energy (e.g. solar power, wind power, bio-gas, etc.) <input type="checkbox"/>
		d. toilet <input type="checkbox"/>
		e. separated room for livestock and poultry <input type="checkbox"/>
		f. air-conditioning equipment <input type="checkbox"/>
D5	<b>How do you agree with the statement 'my house is totally resistant to various disasters':</b> <i>Please select from 0 to 100(strongly disagree) 1 2 3 4 5(neutral) 6 7 8 9 10(strongly agree)</i>	
D6	<b>How satisfied (or dissatisfied) you were with your house? Please select from 0 to 10</b> 0(Not satisfied at all) 1 2 3 4 5(neutral) 6 7 8 9 10(very satisfied)	
D7	<b>Please indicate, Normally, the average time taken to reach the destinations from your home (minutes):</b>	a. (if No tap water) the nearest water resource
		b. the most distant workplace
		c. school
		d. market usually visited
		e. the nearest public transportation

### E Social Capital

		2007
E1	<b>Who provided help when your family faced difficulties? (please use ';' to separate different choices)</b> 1.relatives and friends 2.neighbors and village fellows 3.colleagues and classmates 4.government	

	5.Non-government originations 6.others: _____	
E1a	Who provided the main support?	
E2	What kinds of help did your family receive? <i>(please use ',' to separate different choices)</i> 1. money and goods loan 2. money and goods donation 3.assistance in production or housework 4. providing information 5. emotional support 6. assistance in family member care 7. providing transportation 8. providing accommodation 9. other : _____	
E2a	Which is the biggest help to your family?	
E3	Please rate the social relationship of your family: <i>Please select from 0 to 10</i> 0(very poor) 1 2 3 4 5(neutral) 6 7 8 9 10(very good)	
	a. relationship between family members	
	b. relationship with neighbours and village fellows	
	c. relationship with relatives and friends	
	d. relationship with colleagues	
	e. relationship with government cadres	
	f. relationship with other ethnicities	
E4	How often did your family participate in the following affairs? <i>Please select from 0 to 10</i> 0(never) 1 2 3 4 5(neutral) 6 7 8 9 10(always)	
	a. discussion of public affairs in your village	
	b. organising public activities in your village	
	c. providing advice to other villagers	
	d. solving conflicts between other villager	
E5	Is any of your relatives and good friends a cadre of the village, township or county? 1.Yes 2.NO	
E6	Is any of your relatives and good friends a successful entrepreneur? 1.Yes 2.NO	
E7	Do your family and family members join in any production and marketing cooperative organisation? 1.Yes: _____ 2.NO	

E8	What information sources are accessible for your family? <i>(please use ',' to separate different choices)</i> 1.internet 2.mobile phone 3.land line phone 4.TV 5.radio broadcast 6.newspaper 7.told by relatives/friends/neighbours 8.Notice from workplace/school/village committee 9.report and advocacy activities from government 10.other: _____	
E8a	Which is the main information source of your family?	
E9	What kinds of help did your family provide to others? <i>(please use ',' to separate different choices)</i> 1.gaving money and goods 2.lending money and goods 3.providing housing 4. taking care of family members 5.helping with production and housework 6.provided transportation 7.relieing mental pressure 8.providing information of employment, production and marketing 9.other : _____	What kinds of help did you provide?
		Which is the biggest help?
		In cash equivalent
E10	Were any of your relatives and good friends living in other counties within the same city? 1.Yes 2.NO	
E11	Were any of your relatives and good friends living in other cities/counties/districts within the same province? 1.Yes 2.NO	
E12	Were any of your relatives and good friends living in other provinces? 1.Yes 2.NO	

### F Health Status

F1	Codes of all people living in the same household: <i>Same as A1b</i>	1	2	3	4	5	6	7	8
F2	In general, would you say your family members' health is: <i>Please select from 0 to 10</i> 0(very poor) 1 2 3 4 5(neutral) 6 7 8 9 10(very good)	2007							
F3	Do your family members have following health conditions? <i>(please use ',' to separate different choices)</i> 1.sensory 2.intellectual 3.physical 4.psychological 5.No health condition	2007							
F4	What degree of limitation on core-activity (communication, mobility and self-care) is caused by the health conditions? 1.mild core-activity limitation 2.moderate core-activity limitation 3.severe core-activity limitation 4.profound core-activity limitation	2007							
F5	Please indicate the daily hours used in caring the family members having health	2007							

conditions.									
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**G Perception of the Significance of Each Aspect of the Family Life**

H1	How do you rate the significance of different aspects of life? <i>Please select from 0 to 10</i> 0(Not important at all) 1 2 3 4 5(neutral) 6 7 8 9 10(very important)		
		2007	2007
	a. agricultural production		g. health status of family members
	b. household income		h. good relationship between family members
	c. career development and education of family members		i. social capital
	d. conditions of infrastructure , education and medical services		j. government's policies of agriculture, economy and environment
	e. housing condition		k. religion, culture and customs
	f. climatic condition and natural environment		l. other: _____
H2	In general, how satisfied (or dissatisfied) you are with your life? <i>Please select from 0 to 10</i> 0(Not satisfied at all) 1 2 3 4 5(neutral) 6 7 8 9 10(very satisfied)		

\_\_\_\_\_ **The End, Thank You** \_\_\_\_\_



## Appendix 2: Interview with the village officials on the impacts of climate change on migration of rural residents in Dulan

This survey is part of the research project Adaptation to Climate Change and Mobility of People in the Rural Areas of China conducted by Qinghai Normal University and the University of Adelaide. We would like you to spend some time for this interview. All information to be collected via this survey is for the purpose of research only. We will keep the information confidential and will not be disclosed to any third part according to the regulations concerned. If you agree to participate in the survey, please tick ✓\_\_\_\_\_.

### The Impacts of Climate Change on Migration of Rural Residents

#### Interview with Village officials

Name of Respondent		Age		Sex	
County/City		Town		Village	
Employer		Occupation		Ethnicity	
Name/code of the interviewer		Date of the interview (yyyy/mm/dd)		Code of Survey	

Part A. Effects of climate change and adaptation to Climate Change

1. What kind of climate change has the most severe impacts on your village?
2. How has climate change impacted on economic, social and environmental conditions in your village?
3. Please estimate the direct and indirect economic loss caused by events associated with climate change. (Yuan/Year)
4. What measures has your village adopted, and will adopt, to cope with the adverse impacts of climate change?
5. In what ways did villagers participate in planning and operating these adaptation programs?

Part B. Population and migration

6. Please provide the number of: (1) registered population; (2) residential population; (3) in-migrants; and (4) out-migrants.
7. What support did your village provide to in-migrants and out-migrants respectively?
8. What are the influences of in-migration and out-migration on your village?

Part C. Conditions of different aspects of the village

9. Please estimate net income per capita in your village.
10. What is the absolute poverty ratio in your village?
11. What are the main income sources of the villagers?
12. How many acres of usable land in your village?
13. How much is the per capita water capacity in your village? (m<sup>3</sup>)
14. How much is the per capita power capacity in your village? (Bohle *et al.*)
15. Please describe the development of new energy in your village.
16. Please provide the information of cooperative organisation in your village.
17. Please describe the participation of households in rural pension system and new rural cooperative medical insurance system.

18. Which institutions have been involved in adaptation programs in your village?

19. How did your village spend its public funding?

**\_\_\_\_\_The End, Thank You\_\_\_\_\_**

### Appendix 3: Questions and coding of explanatory and control variables

#### Appendix 3.1: Questions and coding of measures of household's economic status in Dulan

Name of measure	Survey questions	Coding
Household income	What was your household's annual income in 2007?  How many members did your family have in 2007?	Numerical number: the annual income per capita (Yuan)
Income diversity	Please indicate the occupation type of your family members in 2007?  1. agricultural, forestry, husbandry and fishery production 2. small private business 3. labour work in manufacturing, construction and transportation industry 4. labour work in service industry 5. sales in business industry 6. business administration and management 7. technical or professional work 8. enterprise operation 9. service in public institutions (e.g., education, science and technology, culture, health work) 10. government officers 11. other	For each income source, the responses are coded 1 if the family had this source and 0 otherwise. Then the coding values of each income source are summed up to get the total number of income sources owned by the family, ranging from 0 to 11.

Land size	How many contracted land did your family have in 2007? (mu) How many members did your family have in 2007?	Numerical number: the quantity of land per capita (mu)
Living size	How large was your house in 2007? (m2) How many members did your family have in 2007?	Numerical number: the living size per capita (m2)
Satisfaction with housing	How satisfied (or dissatisfied) you were with your house in 2007?	The responses are coded from 0 (least satisfied) to 10 (most satisfied). 0 and 1 are recoded to 'very unsatisfied'; 2 and 3 are recoded to 'unsatisfied'; 4, 5 and 6 are recoded to 'neutral'; 7 and 8 are recoded to 'satisfied'; 9 and 10 are recoded to 'very satisfied'.

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### Appendix 3.2: Questions and coding of measures of household's social status in Dulan

Name of measure	Survey questions	Coding
Relationship	<p>Please rate the relationship between family members in 2007.</p> <p>Please rate the relationship of your family with neighbours and village fellows in 2007.</p> <p>Please rate the relationship of your family with relatives and friends in 2007.</p> <p>Please rate the relationship of your family with colleagues in 2007.</p> <p>Please rate the relationship of your family with government cadres in 2007.</p>	<p>The responses are coded from 0 (the poorest relationship) to 10 (the best relationship). 0 and 1 are recoded to 'very poor'; 2 and 3 are recoded to 'poor'; 4, 5 and 6 are recoded to 'neutral'; 7 and 8 are recoded to 'good'; 9 and 10 are recoded to 'very good'.</p>
<p>Connection with government officer or entrepreneur</p>	<p>Is any of your relatives and good friends a cadre of the village, township or county in 2007?</p> <p>Is any of your relatives and good friends a successful entrepreneur in 2007?</p>	<p>The responses are coded 1 if yes and 0 otherwise</p>
<p>Spatial connection (connection with people living outside the original township)</p>	<p>Were any of your relatives and good friends living in other counties within the same city in 2007?</p> <p>Were any of your relatives and good friends living in other cities/counties/districts within the same province?</p>	<p>For each question, the responses are coded as 1 if yes and 0 otherwise. Then the coding values of each question are summed up to get the total number of other places where the family's relatives and good friends</p>

Were any of your relatives and good friends living in, ranging from 0 to 3.  
living in other provinces?

Assistance  
received

What kinds of help did your family receive by  
2007?

1. money and goods loan
2. money and goods donation
3. assistance in production or housework
4. providing information
5. emotional support
6. assistance in family member care
7. providing transportation
8. providing accommodation
9. others

For each kind of help/assistance, the responses are coded 1 if the family received this kind of help/assistance and 0 otherwise. Then the coding values of each kind of help/assistance are summed up to get the total number of types of help/assistance received by the family, ranging from 0 to 9.

### Appendix 3.3: Questions and coding of measures of households' cultural status in Dulan

Name of measure	Survey questions	Coding
Education	Please indicate your family members' educational attainment.	The highest educational attainment in a family is coded as 1=no schooling, 2=primary school, 3=middle school, 4=high school, 5=college diploma, 6=undergraduate degree, and 7=postgraduate degree.



### Appendix 3.4: Questions and coding of measures of households' symbolic status in Dulan

Name of measure	Survey questions	Coding
<b>Symbolic status</b>		
Occupational prestige	<p>Please indicate the occupation type of your family members in 2007?</p> <ol style="list-style-type: none"> <li>1. agricultural, forestry, husbandry and fishery production</li> <li>2. small private business</li> <li>3. labour work in manufacturing, construction and transportation industry</li> <li>4. labour work in service industry</li> <li>5. sales in business industry</li> <li>6. business administration and management</li> <li>7. technical or professional work</li> <li>8. enterprise operation</li> <li>9. service in public institutions (e.g., education, science and technology, culture, health work)</li> <li>10. government staff</li> </ol>	<p>Based on Li (2005)'s occupational prestige ranking system of China, occupation type 1 and 4 are recoded to ranking score 2, occupation type 2, 3, 5 are recoded to ranking score 3, occupation type 6, 7, 8, 9 are recoded to ranking score 4, occupation type 10 are recoded to ranking score 5. The highest ranked occupation in a family is coded as from 0 (the lowest ranking score) to 7 (the highest ranking score).</p>
Local reputation	<p>How often did your family participate in discussion of public affairs in your village by 2007?</p> <p>How often did your family members organise public activities in your village by 2007?</p>	<p>The responses are coded from 0 (never) to 10 (always). 0 and 1 are recoded to 'very rare'; 2 and 3 are recoded to 'rare'; 4, 5 and 6 are recoded to 'neutral'; 7 and 8 are</p>

How often did your family members provide advice to other villagers by 2007? recoded to 'often'; 9 and 10 are recoded to 'very often'.

How often did your family members solve conflicts between other villagers by 2007?

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### Appendix 3.5: Questions and coding of measures of household's political status in Dulan

Name of measure	Survey questions	Coding
Political affiliation	Do you have a family member who is a member of CPC?	The responses are coded 1 if yes and 0 otherwise
Government officer	Do you have a family member who is a government officer?	The responses are coded 1 if yes and 0 otherwise
Government assistance	How much help did government provide to your family when you facing difficulties by 2007?	The responses are coded from 0 (very little) to 10 (very much). 0 and 1 are recoded to 'very little'; 2 and 3 are recoded to 'little'; 4, 5 and 6 are recoded to 'neutral'; 7 and 8 are recoded to 'much'; 9 and 10 are recoded to 'very much'.
Satisfaction with participation	How satisfied (or dissatisfied) you were with your chance to participate in the policy-making processes?	The responses are coded from 0 (least satisfied) to 10 (most satisfied). 0 and 1 are recoded to 'very unsatisfied'; 2 and 3 are recoded to 'unsatisfied'; 4, 5 and 6 are recoded to 'neutral'; 7 and 8 are recoded to 'satisfied'; 9 and 10 are recoded to 'very satisfied'.

### Appendix 3.6: Questions and coding of demographic factors that influence the impacts of climate change on households

Name of measure	Survey questions	Coding
Health	Does any family member have disability or chronic disease in 2007?	The responses are coded 1 if yes and 0 otherwise.
Male ratio	Please indicate the gender of each of your family members.	The ratio of male aged 15 years or older to the total number of the household members aged 15 years or older.
Household size	How many members did your family have in 2007?	The number of people in the household.
Age of household head	Which year was the household head born?	The household head's age.
Household with elderly member(s)	Which year were the family members born?	The responses are coded 1 for each family member aged 60 years or older and 0 otherwise. Then the coding values are summed up to get the total number of aged people in the family.
Dependency ratio	Which year were the family members born?	The responses are coded 1 for each family member aged 60 years or older and 14 years or younger and 0 otherwise. The coding values are summed up to get the total number of dependent people in the family. Then the ratio of dependent people to the total

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number of the household members is calculated.

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#### Appendix 4: The policies that consider inequality

Policy	Issued by	Time	Source
<b>Climate change</b>			
<i>National</i>			
China's Policies and Actions for Addressing Climate Change (2008)	National Development and Reform Commission	2008	<a href="http://www.gov.cn/zwzk/2008-10/29/content_1134378.htm">http://www.gov.cn/zwzk/2008-10/29/content_1134378.htm</a>
China's Policies and Actions for Addressing Climate Change (2009)	National Development and Reform Commission	2009	<a href="http://www.ccchina.gov.cn/WebSite/CCChina/UpFile/File572.pdf">http://www.ccchina.gov.cn/WebSite/CCChina/UpFile/File572.pdf</a>
China's Policies and Actions for Addressing Climate Change (2010)	National Development and Reform Commission	2010	<a href="http://www.fdi.gov.cn/1800000121_21_3394_0_7.html">http://www.fdi.gov.cn/1800000121_21_3394_0_7.html</a>
China's Policies and Actions for Addressing Climate Change (2011)	National Development and Reform Commission	2011	<a href="http://www.scio.gov.cn/zxbd/tt/Document/1052047/1052047.htm">http://www.scio.gov.cn/zxbd/tt/Document/1052047/1052047.htm</a>
China's Policies and Actions for Addressing Climate Change (2012)	National Development and Reform Commission	2012	<a href="http://www.ccchina.gov.cn/WebSite/CCChina/UpFile/File1323.pdf">http://www.ccchina.gov.cn/WebSite/CCChina/UpFile/File1323.pdf</a>
China's National Climate Change Programme	National Development and Reform Commission	2007	<a href="http://www.ccchina.gov.cn/WebSite/CCChina/UpFile/File189.pdf">http://www.ccchina.gov.cn/WebSite/CCChina/UpFile/File189.pdf</a>
<i>Regional</i>			
Qinghai Province's Climate Change Programme	Qinghai Province Government	2009	<a href="http://www.qhepb.gov.cn/xwzx/gzdt/stdt/201305/t20130524_58405.html">http://www.qhepb.gov.cn/xwzx/gzdt/stdt/201305/t20130524_58405.html</a>
<b>Ecology and environment</b>			
<i>National</i>			
Key Management Planning for Shiyang River Basin	National Development and Reform Commission, Ministry of Water Resources	2007	<a href="http://www.sdpc.gov.cn/fzgggz/fzgh/ghwb/115zxgh/200806/P020080721336132336246.pdf">http://www.sdpc.gov.cn/fzgggz/fzgh/ghwb/115zxgh/200806/P020080721336132336246.pdf</a>

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People's Republic of China on the of China [9.html](http://www.stats.gov.cn/tjsj/tjgb/ndtjgb/qgndtjgb/200602/t20060227_3001)  
2005 National Economic and Social  
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2006 National Economic and Social  
Development

Statistical Communique of the People's Republic of China on the 2007 National Economic and Social Development	National Bureau of Statistics of China	2007	<a href="http://www.stats.gov.cn/tjsj/tjgb/ndtjgb/qgndtjgb/200802/t20080228_30022.html">http://www.stats.gov.cn/tjsj/tjgb/ndtjgb/qgndtjgb/200802/t20080228_30022.html</a>
Statistical Communique of the People's Republic of China on the 2008 National Economic and Social Development	National Bureau of Statistics of China	2008	<a href="http://www.stats.gov.cn/tjsj/tjgb/ndtjgb/qgndtjgb/200902/t20090226_30023.html">http://www.stats.gov.cn/tjsj/tjgb/ndtjgb/qgndtjgb/200902/t20090226_30023.html</a>
Statistical Communique of the People's Republic of China on the 2009 National Economic and Social Development	National Bureau of Statistics of China	2009	<a href="http://www.stats.gov.cn/tjsj/tjgb/ndtjgb/qgndtjgb/201002/t20100225_30024.html">http://www.stats.gov.cn/tjsj/tjgb/ndtjgb/qgndtjgb/201002/t20100225_30024.html</a>
Statistical Communique of the People's Republic of China on the 2010 National Economic and Social Development	National Bureau of Statistics of China	2010	<a href="http://www.stats.gov.cn/tjsj/tjgb/ndtjgb/qgndtjgb/201102/t20110228_30025.html">http://www.stats.gov.cn/tjsj/tjgb/ndtjgb/qgndtjgb/201102/t20110228_30025.html</a>
Statistical Communique of the People's Republic of China on the 2011 National Economic and Social Development	National Bureau of Statistics of China	2011	<a href="http://www.stats.gov.cn/tjsj/tjgb/ndtjgb/qgndtjgb/201202/t20120222_30026.html">http://www.stats.gov.cn/tjsj/tjgb/ndtjgb/qgndtjgb/201202/t20120222_30026.html</a>

***Provincial***

Statistical Communique of Qinghai Province on the 2008 National Economic and Social Development	General Office of People's Government of Qinghai Province	2008	<a href="http://www.qhei.gov.cn/ghyfz/tjgb/201305/t20130524_296990.shtml">http://www.qhei.gov.cn/ghyfz/tjgb/201305/t20130524_296990.shtml</a>
Statistical Communique of Qinghai Province on the 2009 National Economic and Social Development	General Office of People's Government of Qinghai Province	2009	<a href="http://www.qhei.gov.cn/ghyfz/tjgb/201305/t20130524_330355.shtml">http://www.qhei.gov.cn/ghyfz/tjgb/201305/t20130524_330355.shtml</a>



Economic and Social Development Province

Statistical Commune of Qinghai General Office of People's 2010 [http://www.qhtjj.gov.cn/tjData/yearBulletin/201103/t20110302\\_4373.html](http://www.qhtjj.gov.cn/tjData/yearBulletin/201103/t20110302_4373.html)  
Province on the 2010 National Government of Qinghai  
Economic and Social Development Province

Statistical Commune of Qinghai General Office of People's 2011 [http://www.qhtjj.gov.cn/tjData/yearBulletin/201202/t20120228\\_4374.html](http://www.qhtjj.gov.cn/tjData/yearBulletin/201202/t20120228_4374.html)  
Province on the 2011 National Government of Qinghai  
Economic and Social Development Province

***Regional***

Statistical Commune of Haixi General Office of Haixi 2008 <http://www.tjcn.org/tjgb/201001/3315.html>  
Prefecture on the 2008 National Prefecture Government  
Economic and Social Development

Statistical Commune of Haixi General Office of Haixi 2009 [http://www.tjcn.org/tjgb/29qh/10778\\_3.html](http://www.tjcn.org/tjgb/29qh/10778_3.html)  
Prefecture on the 2009 National Prefecture Government  
Economic and Social Development

Statistical Commune of Qinghai General Office of Haixi 2010 <http://www.tjcn.org/tjgb/29qh/19126.html>  
Province on the 2010 National Prefecture Government  
Economic and Social Development

Statistical Commune of Qinghai General Office of Haixi 2011 <http://www.tjcn.org/tjgb/29qh/24357.html>  
Province on the 2011 National Prefecture Government  
Economic and Social Development

***Local(Ledu County)***

Statistical Commune of Ledu General Office of Ledu 2002 <http://www.ledu.gov.cn/html/781/List.html>  
County on the 2002 National County Government  
Economic and Social Development

Statistical Communitise of Ledu County on the 2003 National Economic and Social Development	General Office of Ledu County Government	2003	<a href="http://www.ledu.gov.cn/html/781/List.html">http://www.ledu.gov.cn/html/781/List.html</a>
Statistical Communitise of Ledu County on the 2004 National Economic and Social Development	General Office of Ledu County Government	2004	<a href="http://www.ledu.gov.cn/html/781/List.html">http://www.ledu.gov.cn/html/781/List.html</a>
Statistical Communitise of Ledu County on the 2005 National Economic and Social Development	General Office of Ledu County Government	2005	<a href="http://www.ledu.gov.cn/html/781/List.html">http://www.ledu.gov.cn/html/781/List.html</a>
Statistical Communitise of Ledu County on the 2006 National Economic and Social Development	General Office of Ledu County Government	2006	<a href="http://www.ledu.gov.cn/html/781/List.html">http://www.ledu.gov.cn/html/781/List.html</a>
Statistical Communitise of Ledu County on the 2007 National Economic and Social Development	General Office of Ledu County Government	2007	<a href="http://www.ledu.gov.cn/html/781/List.html">http://www.ledu.gov.cn/html/781/List.html</a>
Statistical Communitise of Ledu County on the 2008 National Economic and Social Development	General Office of Ledu County Government	2008	<a href="http://www.ledu.gov.cn/html/781/139010.html">http://www.ledu.gov.cn/html/781/139010.html</a>
Statistical Communitise of Ledu County on the 2009 National Economic and Social Development	General Office of Ledu County Government	2009	<a href="http://www.ledu.gov.cn/html/781/139011.html">http://www.ledu.gov.cn/html/781/139011.html</a>
Statistical Communitise of Ledu County on the 2010 National Economic and Social Development	General Office of Ledu County Government	2010	<a href="http://www.ledu.gov.cn/html/781/139012.html">http://www.ledu.gov.cn/html/781/139012.html</a>
Statistical Communitise of Ledu County on the 2011 National	General Office of Ledu County Government	2011	<a href="http://www.ledu.gov.cn/html/781/List.html">http://www.ledu.gov.cn/html/781/List.html</a>

## Economic and Social Development

### *Local (Dulan County)*

Statistical Communique of Dulan County on the 2002 National Economic and Social Development	Dulan Civil Affairs Bureau	2002	<a href="http://www.qh.xinhua.org/dlzf/zw.htm">http://www.qh.xinhua.org/dlzf/zw.htm</a>
Statistical Communique of Dulan County on the 2009 National Economic and Social Development	Dulan Civil Affairs Bureau	2009	<a href="http://www.qh.xinhua.org/dlzf/zw.htm">http://www.qh.xinhua.org/dlzf/zw.htm</a>
Statistical Communique of Dulan County on the 2010 National Economic and Social Development	Dulan Civil Affairs Bureau	2010	<a href="http://www.qh.xinhua.org/dlzf/zw.htm">http://www.qh.xinhua.org/dlzf/zw.htm</a>
Statistical Communique of Dulan County on the 2011 National Economic and Social Development	Dulan Civil Affairs Bureau	2011	<a href="http://www.qh.xinhua.org/dlzf/zw.htm">http://www.qh.xinhua.org/dlzf/zw.htm</a>

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### **Migrants Construction Situation**

#### *Local(Ledu County)*

The Migrants Construction Situation Report in Ledu County from 2000 to 2005	Ledu County Poverty Alleviation and Development Bureau	2006	<a href="http://www.ledu.gov.cn/html/9107/List.html">http://www.ledu.gov.cn/html/9107/List.html</a>
The Migrants Construction Situation Report in Ledu County from 2006 to 2012	Ledu County Poverty Alleviation and Development Bureau	2013	<a href="http://www.ledu.gov.cn/html/9107/List.html">http://www.ledu.gov.cn/html/9107/List.html</a>

#### **Water and land**

#### *National*

Key Management Planning for Shiyang River Basin	National Development and Reform Commission, Ministry of Water Resources	2007	<a href="http://www.sdpc.gov.cn/fzgggz/fzgh/ghwb/115zxgh/200806/P020080721336132336246.pdf">http://www.sdpc.gov.cn/fzgggz/fzgh/ghwb/115zxgh/200806/P020080721336132336246.pdf</a>
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**Education**

*National*

Several Opinions of the General Office of the State Council of the People's Republic of China, on Further Supporting Economic and Social Development of Gansu Province	General Office of the State Council	2010	<a href="http://www.gov.cn/zwggk/2010-05/06/content_1600275.htm">http://www.gov.cn/zwggk/2010-05/06/content_1600275.htm</a>
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The Outline of the National Plan for Medium and Long-Term Education Reform and Development	Ministry of Education	2010	<a href="http://www.gov.cn/jrzq/2010-07/29/content_1667143.htm">http://www.gov.cn/jrzq/2010-07/29/content_1667143.htm</a>
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*Regional*

The Outline of Qinghai Province's Plan for Medium and Long-Term Education Reform and Development	Department of Education Qinghai Province	2010	<a href="http://www.moe.edu.cn/publicfiles/business/htmlfiles/moe/s6338/201203/132681.html">http://www.moe.edu.cn/publicfiles/business/htmlfiles/moe/s6338/201203/132681.html</a>
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*Local*

The Outline of Ledu county's Plan for Medium and Long-Term Education Reform and Development	Ledu County Party Committee, Ledu County Government	2011	<a href="http://www.cdrf.org.cn/plus/view.php?aid=531">http://www.cdrf.org.cn/plus/view.php?aid=531</a>
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**Poverty Alleviation and Development**

*Local (Ledu County)*

The Progress of Poverty Alleviation and Development Report in Ledu County 2002	Ledu County Poverty Alleviation and Development Bureau	2002	<a href="http://www.ledu.gov.cn/html/9107/List.html">http://www.ledu.gov.cn/html/9107/List.html</a>
The Progress of Poverty Alleviation and Development Report in Ledu County 2003	Ledu County Poverty Alleviation and Development Bureau	2003	<a href="http://www.ledu.gov.cn/html/9107/List.html">http://www.ledu.gov.cn/html/9107/List.html</a>
The Progress of Poverty Alleviation and Development Report in Ledu County 2011	Ledu County Poverty Alleviation and Development Bureau	2011	<a href="http://www.ledu.gov.cn/html/9107/List.html">http://www.ledu.gov.cn/html/9107/List.html</a>

***Local (Dulan County)***

Progress in Poverty Alleviation and Development in Dulan County 2007	Dulan County Poverty Alleviation and Development Bureau	2007	<a href="http://www.qh.xinhua.org/dlzf/zw.htm">http://www.qh.xinhua.org/dlzf/zw.htm</a>
Progress in Poverty Alleviation and Development in Dulan County 2008	Dulan County Poverty Alleviation and Development Bureau	2008	<a href="http://www.qh.xinhua.org/dlzf/zw.htm">http://www.qh.xinhua.org/dlzf/zw.htm</a>
Progress in Poverty Alleviation and Development in Dulan County 2009	Dulan County Poverty Alleviation and Development Bureau	2009	<a href="http://www.qh.xinhua.org/dlzf/zw.htm">http://www.qh.xinhua.org/dlzf/zw.htm</a>
Progress in Poverty Alleviation and Development in Dulan County 2010	Dulan County Poverty Alleviation and Development Bureau	2010	<a href="http://www.qh.xinhua.org/dlzf/zw.htm">http://www.qh.xinhua.org/dlzf/zw.htm</a>

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**Relocation and Poverty Alleviation**

***Local(Ledu County)***

Proposed Program for Relocation of Poverty Alleviation in Ledu County	Ledu County Poverty Alleviation and	2002	<a href="http://www.ledu.gov.cn/html/9107/List.html">http://www.ledu.gov.cn/html/9107/List.html</a>
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2002	Development Bureau				
Proposed Program for Relocation of Poverty Alleviation in Ledu County 2003	Ledu County Poverty Alleviation and Development Bureau	2003			<a href="http://www.ledu.gov.cn/html/9107/List.html">http://www.ledu.gov.cn/html/9107/List.html</a>
Proposed Program for Relocation of Poverty Alleviation in Ledu County 2012	Ledu County Poverty Alleviation and Development Bureau	2012			<a href="http://www.ledu.gov.cn/html/9107/List.html">http://www.ledu.gov.cn/html/9107/List.html</a>
Report on Implementation of Centralized Resettlement Project in Ledu County 2002	Ledu County Poverty Alleviation and Development Bureau	2002			<a href="http://www.ledu.gov.cn/html/9107/List.html">http://www.ledu.gov.cn/html/9107/List.html</a>
Report on Implementation of Centralized Resettlement Project in Ledu County 2003	Ledu County Poverty Alleviation and Development Bureau	2003			<a href="http://www.ledu.gov.cn/html/9107/List.html">http://www.ledu.gov.cn/html/9107/List.html</a>
Report on Implementation of Centralized Resettlement Project in Ledu County 2012	Ledu County Poverty Alleviation and Development Bureau	2012			<a href="http://www.ledu.gov.cn/html/9107/List.html">http://www.ledu.gov.cn/html/9107/List.html</a>

***Local(Dulan County)***

Farmers and Ferdsmen of the Whole Village Relocation Project Research Report Materials in Dulan County 2010	Dulan County Poverty Alleviation and Development Bureau	2010			<a href="http://www.qh.xinhua.org/dlzf/zw.htm">http://www.qh.xinhua.org/dlzf/zw.htm</a>
Farmers and Ferdsmen of the Whole Village Relocation Project Research Report Materials in Dulan County 2011	Dulan County Poverty Alleviation and Development Bureau	2011			<a href="http://www.qh.xinhua.org/dlzf/zw.htm">http://www.qh.xinhua.org/dlzf/zw.htm</a>

Dulan County Poverty Alleviation and Development Work Report Materials 2010	Dulan County Poverty Alleviation and Development Bureau	2010	<a href="http://www.qh.xinhua.org/dlzf/zw.htm">http://www.qh.xinhua.org/dlzf/zw.htm</a>
Dulan County 2010 Project Progress	Dulan County Poverty Alleviation and Development Bureau	2010	<a href="http://www.qh.xinhua.org/dlzf/zw.htm">http://www.qh.xinhua.org/dlzf/zw.htm</a>
Dulan County 2011 Project Progress	Dulan County Poverty Alleviation and Development Bureau	2011	<a href="http://www.qh.xinhua.org/dlzf/zw.htm">http://www.qh.xinhua.org/dlzf/zw.htm</a>

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**New energy**

*National*

China's 12th Five-Year Plan for Energy Development	State Council	2012	<a href="http://www.gov.cn/zw/gk/2013-01/23/content_2318554.htm">http://www.gov.cn/zw/gk/2013-01/23/content_2318554.htm</a>
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*Regional*

Qinghai Province's 12th Five-Year Plan for New Energy and Renewable Energy Development	General Office of People's Government of Qinghai Province	2012	<a href="http://www.qhfhq.com/index.php?m=content&amp;c=index&amp;a=show&amp;catid=89&amp;id=33">http://www.qhfhq.com/index.php?m=content&amp;c=index&amp;a=show&amp;catid=89&amp;id=33</a>
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