



# **Mountain Population and Employment**

**Discussion Paper Series**

## **OFF-FARM EMPLOYMENT IN THE HENGDUAN MOUNTAIN REGION OF SICHUAN PROVINCE, CHINA**

**Chen Guojie, Chen Zhijian, Huang Xiyi,  
Wang Fei, Yu Side, Zhang Jun**

*MPE Series No. 12*

Each organization-oriented research involves both reviews and field studies. The reviews are part of the Mountain Farming Systems Programme of ICIMOD focus on different mountain development.

A series of "state of the art" reviews on agricultural policies and programmes in the mountainous areas of the world have been sponsored by the Director General of the FAO. The purpose of these studies was to understand the constraints of mountain development. These studies were also used in preparing comparative regional approaches and strategies in different countries.

A paper entitled "Transformation of Mountain Agriculture: Nepal Case Study" was presented at the International Mountain Summit, Kathmandu, Nepal, 1994. The paper focuses on

The opinions expressed in this publication are those of the author(s) and do not necessarily reflect the views of the International Centre for Integrated Mountain Development.

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever, on the part of the International Centre for Integrated Mountain Development, concerning the legal status of any country, territory, city, or area or of its authorities; or concerning the delimitation of its frontiers and boundaries.

**OFF-FARM EMPLOYMENT IN THE HENGDUAN  
MOUNTAIN REGION OF SICHUAN PROVINCE, CHINA**

**Chen Guojie, Chen Zhijian, Huang Xiyi,  
Wang Fei, Yu Side, Zhang Jun**

*MPE Series No. 12*

---

**Chen Guojie, Chen Zhijian, Wang Fei, and Yu Side are associated with the Institute of Mountain Disaster and Environment, Chinese Academy of Sciences, Chengdu.  
Huang Xiyi and Zhang Jun are affiliated with the Institute of Rural Development, Chinese Academy of Social Sciences, Beijing.**

---

December 1991

International Centre for Integrated Mountain Development (ICIMOD)  
Kathmandu, Nepal

## PREFACE

The research on off-farm employment in the Hengduan Mountains began in September, 1990. This report is based on the first phase. The selection of this region for study was based on the following reasons: (a) this region is a part of the Qinghai-Xizang Plateau and, hence, a part of the Himalayan Region. The landscape and economic situation are similar to those in neighbouring countries; (b) this area is a microcosm of undeveloped mountains in West China; this makes it possible to extend the validity of the research results to these mountains in general; (c) the contours in this region make the border quite distinct from the Sichuan Basin and other regions; and (d) the inhabitants consist of mostly minority nationalities and the area is rich in natural resources, but it is one of the most difficult regions in the context of bringing about changes in the rural labour force.

This report is one of a series covering mountain areas in three countries and was guided by Dr. Deepak Bajracharya and Dr. Pitamber Sharma from the International Centre for Integrated Mountain Development (ICIMOD). The outline for the report was discussed and eventually finalised by the participants of the first Planning and Review Meeting in Chengdu in November, 1990. The participants included representatives from ICIMOD, China, Nepal, and Pakistan. The outline was, therefore, a result of collective efforts.

Several authors contributed to this report. Chapter One was written by Chen Guojie and Zhang Jun; Chapter Two by Wang Fei; Chapter Three by Yu Side; Chapter Four by Chen Guojie, Yu Side, and Huang Xiyi; Chapter Five by Chen Zhijian; Chapter Six by Wang Fei; and Chapter Seven by Chen Guojie.

The first draft was completed in March, 1991, and submitted to ICIMOD. Based on the comments and suggestions received from ICIMOD, we modified and reorganized some chapters. In the Second Planning and Review Meeting held at Peshawar, Pakistan, from May 18 to June 5, 1991, the revised report was discussed and commented upon again by the participants. Dr. Deepak Bajracharya offered invaluable advice for further improvements. I take this opportunity to thank all the friends who worked with me over the years. In particular, I would like to thank Dr. Deepak Bajracharya and Dr. Pitamber Sharma for their help and friendship.

In this report, we have made an effort to comply with both the content and form as suggested by ICIMOD. This should be comparable, therefore, to the other reports by the teams from Nepal and Pakistan. At the same time, we have tried our best to highlight specific characteristics and issues pertaining to China. We hope that readers will find these useful and interesting.

Chen Guojie  
Team Leader  
Chinese Study Team

## Foreword

The present discussion paper by Chen Guojie and colleagues, entitled "Off-farm Employment in the Hengduan Mountain Region of Sichuan Province, China" constitutes one of the three studies on the current state of off-farm employment in selected mountain regions in the Hindu-Kush Himalayas. The studies were initiated by ICIMOD in conjunction with the Programme on Population and Off-farm Employment. The general objective of the programme is to identify viable off-farm alternatives and promote practical approaches to employment generation, income enhancement, and sustainability of mountain environments.

The programme is based on the premise that the promotion of off-farm employment and income opportunities in mountain communities is imperative in order to counteract the gradual breakdown of stable relationships between population, economy, and environment. In the absence of adequate employment and income opportunities, rural mountain communities are continually faced with increasing poverty which leads to migration from the hills and rapid environmental deterioration. Comparative advantages provided by mountain conditions and resources must therefore be used as the basis for promoting off-farm opportunities. Further, a systemic perspective is essential to analyse the constraints as well as the potentialities of off-farm employment.

A number of diverse off-farm activities are presently undertaken by mountain households in the Hindu Kush-Himalayas. While many such activities can be labelled "distress employment" because they are not remunerative enough, there are also areas where considerable opportunities exist. Further, off-farm employment in the mountains has been a matter of considerable policy concern and a number of programmes have been implemented in recent decades.

In this context the major purpose of the present study is

- (i) to apply a comprehensive analytical framework to assess critical issues and options in off-farm employment;
- (ii) to determine data and information requirements and identify gaps to facilitate the promotion of off-farm employment;
- (iii) to develop qualitative and quantitative criteria of "success" and identify "constraints" in the promotion of prominent and potential off-farm activities, based on the examination of experiences from different countries;
- (iv) to synthesise experiences from different mountain regions of the Hindu-Kush Himalayas and develop institutional and organizational guidelines, as well as investment and implementation options, for the promotion of environmentally sound off-farm employment activities.

The present study is basically a review and assessment of the off-farm employment situation in the Hengduan Mountain Region of Sichuan Province, China. This study sets the stage for a more in-depth and location-specific analysis of prominent/potential off-farm activities that will be carried out in the second phase of the study and will be published in this series.

This study was made possible by a grant from the International Development Research Centre (IDRC), Canada for which I am extremely grateful. ICIMOD was also fortunate to have working on this study professionals from various national institutions in China, Nepal, and Pakistan. Mutual consultations and a review of on-going and completed work were held at workshops in Chengdu, Sichuan Province, China, and Peshawar, NWFP, Pakistan. The methodological framework and the structure of the studies were mutually agreed upon by participating researchers. From ICIMOD's side the programme was coordinated and executed by Dr. Deepak Bajracharya (now with UNICEF) and Dr. Pitamber Sharma.

Readers might be interested to know that all of the three case studies mentioned above, including the present one, are brought out in the Discussion Paper Series of the Mountain Population and Employment Division. ICIMOD is hopeful that these studies will contribute to a better understanding of the problems and prospects of off-farm employment in the mountains.

E.F. Tacke  
Director General

## TABLE OF CONTENTS

	Page
<b>1. INTRODUCTION</b>	<b>1</b>
<b>Significance of Off-Farm Employment Research</b>	<b>1</b>
<i>From Utter Neglect to Serious Concern</i>	1
<i>Current Thinking about Off-Farm Employment in China</i>	2
<b>A General Survey of Off-Farm Employment in China</b>	<b>5</b>
<b>Regional Differences in Off-Farm Employment in China</b>	<b>6</b>
<b>Introduction to the Hengduan Mountain Region in Sichuan Province</b>	<b>11</b>
<i>Physical Features</i>	12
<i>Social and Economic Development</i>	12
<i>A Summary of Off-Farm Employment Features in the Hengduan Mountain Region</i>	15
<b>2. STRUCTURE AND TRANSFORMATION OF THE LABOUR FORCE</b>	<b>24</b>
<b>Size, Growth, and Density of the Population</b>	<b>24</b>
<b>Age and Sex Breakdowns</b>	<b>24</b>
<i>Age Breakdown</i>	24
<i>Sex Breakdown</i>	29
<b>Urban and Rural Distribution of the Population</b>	<b>29</b>
<b>Structure of Labour Force and Employment</b>	<b>31</b>
<i>Occupational Structure</i>	31
<i>Gender Implications</i>	32
<i>Magnitude of Unemployment and Underemployment</i>	34
<i>Transformation of the Labour Force Structure</i>	36
<i>Patterns of Rural Migration</i>	39
<i>Typical Labour Demand Profile in Agriculture and Its Implications for Off-Farm Activities</i>	39
<b>Demographic Prognosis</b>	<b>42</b>

3.	<b>CURRENT STATE OF OFF-FARM EMPLOYMENT</b>	45
	Nature of Off-Farm Employment	45
	Main Features of Off-Farm Employment	45
	Rural Industry and Its Linkages	53
	Construction and Its Linkages	59
	Transportation and Its Linkages	61
	The Tertiary Sector and Its Linkages	63
	Employment within Agriculture	65
	<i>Livestock and Its Linkages</i>	66
	<i>Horticulture and Its Linkages</i>	68
	<i>Sideline Production and Its Linkages</i>	71
	<i>Cash Crops and Their Linkages</i>	71
	Conclusions and Prognoses	72
4.	<b>POLICY REVIEW</b>	74
	Historical Evolution of the Chinese Rural Employment Policy	74
	Main Policies Affecting Off-farm Employment in China	77
	<i>Policies Before the Eighties</i>	77
	<i>Policies During the Eighties</i>	79
	<i>Policies Pertaining to West Sichuan</i>	80
	<i>An Assessment of China's Policies</i>	81
	Programmes and Projects Related to Off-farm Employment	81
	Implications of Policies and Programmes in the Mountains	82
5.	<b>ANALYSIS OF MAJOR TYPES OF OFF-FARM EMPLOYMENT</b>	84
	Rural Mining Industries	84
	<i>Environmental and Resource Base</i>	84
	<i>Demographic and Spatial Implications</i>	85
	<i>Employment Implications and Development</i>	85
	<i>Considerations</i>	

<b>Rural Logging Industries</b>	87
<i>Environmental and Resource Base</i>	87
<i>Demographic and Spatial Implications and Linkages     with the Farming System</i>	88
<i>Employment Implications and Development     Considerations</i>	89
<b>Horticultural Development</b>	89
<i>Environmental and Resource Base</i>	89
<i>Linkages with Traditional Agriculture and Market(s)</i>	89
<i>Employment Implications and Development Considerations</i>	94
<b>Rural Food-processing Industries</b>	96
<i>Environmental and Resource Base</i>	96
<i>Constraints in the Development of Rural Food-processing     Industries</i>	98
<i>Development Considerations</i>	98
<b>6. ACTIVITY-LEVEL ANALYSIS OF SOME ENTERPRISES</b>	99
<b>Weizhou Cement Plant</b>	99
<i>Type and Size</i>	99
<i>Organisation and Management</i>	99
<i>Technical Innovation</i>	100
<i>Marketing</i>	100
<i>"Success and Failure" in the Mountain Context</i>	101
<b>Lixian Tibetan Printing House</b>	102
<i>Type and Size</i>	102
<i>Organisation and Management</i>	102
<i>Technical Innovation</i>	102
<i>Marketing</i>	103
<i>Indicators of "Success" and "Failure"</i>	103
<b>Nongjiale Hydropower Station</b>	104
<i>Type and Size</i>	104
<i>Organisation and Management</i>	104
<i>Marketing</i>	104
<i>Indictors of "Success" and "Failure"</i>	104

<b>7.</b>	<b>CRITICAL ISSUES AND OPTIONS IN OFF-FARM EMPLOYMENT SUMMARY AND CONCLUSIONS</b>	<b>106</b>
	<b>Critical Issues</b>	<b>106</b>
	<b>Options for Strategies for Labour Transformation and OFE Development</b>	<b>107</b>
	<i>Standards for Evaluating "Success" or "Failure" in Off-farm Employment</i>	<b>107</b>
	<i>Main Features of Proposed Strategies</i>	<b>108</b>
	<i>Institutions and Management</i>	<b>109</b>
	<b>REFERENCES</b>	<b>111</b>
	<b>List of Tables</b>	
1.1	Off-farm Employment from 1978 to 1988	5
1.2	Employment and Output Value in Industry and Commerce and Service Sectors in Rural Enterprises	6
1.3	Employment in Different Off-Farm Enterprises in Towns and Townships of China	7
1.4	Regional Differences in Off-Farm Employment Indicators (1985)	7
1.5	The Composition of Output Value in Township Enterprises by Ownership and by Province (1988)	8
1.6	The Distribution of Township Enterprise Workers by Sectors and by Regions (1988)	10
1.7	The Regional Differences in the Scale of Township Enterprises (1985)	11
1.8	Administrative Divisions in West Sichuan	11
1.9	Vertical Zonation and Its Characteristics in West Sichuan	17
1.10	Land Use in West Sichuan	18
1.11	Comparison of Major Resource Availability Per Capita (1988)	19
1.12	Population of Minority Nationalities in West Sichuan	20
1.13	Population Density and Natural Growth Rate	20

1.14	Comparison of Output Values in Different Sectors of the Economy in West Sichuan	21
1.15	Comparison of Selected Economic Indicators per Capita (1987)	22
1.16	Total Output Value of Agriculture by Sector (1987)	23
2.1	Size, Growth, and Density of Population in West Sichuan	27
2.2	Age Breakdown in West Sichuan	28
2.3	Age and Sex Breakdowns in the Three Prefectures and Panzhihua Municipality	28
2.4	Sex Breakdown of the Population in West Sichuan	30
2.5	Proportion of Males to Females	30
2.6	Structure and Change in the Urban Population	31
2.7	Occupational Structure of the Employed Population in West Sichuan	33
2.8	Occupational Structure of the Employed Female Population	34
2.9	Gender Differences in the Occupational Structure	35
2.10	The Structure of the Unemployed Population	36
2.11	The Change in Rural Labour Force Structure in West Sichuan	37
2.12	Rural Labour Force Structure of West Sichuan	38
2.13	Population Migration at Prefecture-Level in West Sichuan	40
2.14	Migration Pattern from Rural to Urban Areas in West Sichuan	41
2.15	Seasonal Agricultural Labour Demand in Bingli Village, Wenchuan County	43
2.16	Number of Children Among <i>Zhang</i> and <i>Yi</i> Families in West Sichuan (1987)	44
3.1	Employment and Output Value of Off-farm Sectors in West Sichuan	46
3.2	Off-farm Employment, Output Value, and Productivity at Different Levels of Ownership	47

3.3	Comparison of Average Off-farm Employment, Output Value, and Productivity in Sichuan and China (1988)	48
3.4	The Structure of Employment and Output Value in the Off-farm Sector for Different Levels of Ownership	48
3.5	Productivity of Different Off-farm Sectors (1988)	49
3.6	Employment and Output Value of Different Off-farm Sectors in Different Years	50
3.7	The Productivity of Different Off-farm Sectors in Different Years	51
3.8	The Structure of Employment and Output Value in Off-farm Sectors in Different Regions of West Sichuan (1988)	52
3.9	The Level of Employment, Output Value, and Productivity of Off-farm Sectors in Different Regions of the Hengduan Mountains (1988)	52
3.10	The Structure of Employment and the Output Value of Rural Industry in the Three Prefectures of West Sichuan (1989)	56
3.11	The Structure of Rural Industry by Ownership in West Sichuan (1989)	56
3.12	Investment in Fixed Assets and Productivity in Industrial Enterprises at Village Level and Above in Different Areas (1988)	58
3.13	Educational Qualifications of Off-farm Labourers in Township and Village-run Industrial Enterprises	58
3.14	The Structure of Employment and Output Value in the Tertiary Sector in the Hengduan Mountain Region of Sichuan in 1988	65
3.15	Livestock and Meat Output in Different Regions of Sichuan (1987)	66
3.16	Output of Fruits in Different Regions (1988)	69
4.1	Changes in Per Capita and Per Labourer Cultivated Land in China (1952-1987)	78
4.2	Comparison of China's Natural Resources with the World Average (1986)	78
4.3	Responsiveness and Sustainability Implications of Current Policies and Programmes	83

5.1	Main Products in Rural Mining Industries in Aba and Ganzi Prefectures, 1978-1987	84
5.2	The Output Value of Rural Mining Industries in Aba and Ganzi Prefectures between 1978 and 1987	86
5.3	The Forest Resources in the Alpine Region of Western Sichuan	87
5.4	Horticultural Area in Liangshan, Aba, and Ganzi Prefectures, 1970-1985	90
5.5	Area under Various Crops in Liangshan, Aba, and Ganzi Prefectures, 1970-1985	90
5.6	Ratios between the Areas under all Crops, Horticulture, Cereals, and Other Crops, 1970-1985	91
5.7	The Output of Cereal Crops and Principal Cash Crops in Liangshan Prefecture, 1978 and 1988	91
5.8	The Production of Apples in Selected Counties of Liangshan Prefecture, 1970-1985	92
5.9	The Yield of Cocoons in Selected Counties of Liangshan Prefecture, 1970-1985	92
5.10	The Production of Wild Pepper in Liangshan, Aba, and Ganzi Prefectures, 1965-1985	93
5.11	Horticultural Development Targets for the Year 2000	95
5.12	The Livestock Resources in Western Sichuan	97
5.13	The Output Value of Prominent Agro-based Industries in Aba and Ganzi Prefectures	99
6.1	Indicators of "Success" and "Failure" of Weizhou Cement Plant in the Mountain Context	102
6.2	Indicators of "Success" and "Failure" of the Lixian Tibetan Printing House in the Mountain Context	104
6.3	Indicators of the "Success" of Nongjiale Hydropower Station in the Mountain Context	106

## List of Figures

1.1	Administrative Divisions and Agro-ecological Zones of West Sichuan	13
1.2	Regional Variations in Crop Production (output per hectare)	14
2.1	Population Density, 1985 (persons/Km <sup>2</sup> )	25
2.2	Population Pyramids of West Sichuan	26
3.1	Regional Variations in Off-farm Activities (Output Value Per Capita)	54
3.2	Percentage of Labourers and Output Value in Rural Industries	55
3.3	Percentage of Labourers and Output Value in the Construction Sector	60
3.4	Percentage of Labourers and Output Value in the Transportation Sector	62
3.5	Percentage of Labourers and Output Value in the Tertiary Sector	64
3.6	Main Fruit Growing Areas in the Hengduan Mountains of Sichuan	70