MOUNTAIN FARMING SYSTEMS

Discussion Paper Series

**SYSTEMS OF VERTICAL AGRICULTURE
IN THE MOUNTAIN AREAS**

**A COMPARATIVE STUDY OF THE
HENGDUAN AND QILIAN MOUNTAINS OF THE TIBETAN PLATEAU**

Zhao Songqiao, Yang Qinye, and Shen Yuancun

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PREFACE

SYSTEMS OF VERTICAL AGRICULTURE IN THE MOUNTAIN AREAS

A Comparative Study of the Hengduan and Qilian Mountains of the Tibetan Plateau

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I PHYSICAL BACKGROUND

ICIMOD's approach to problem-oriented involves both knowledge reviews and field studies. The focussed reviews and field studies conducted by the Mountain Farming Systems' Division cover various aspects of agricultural development. Since early 1988, a series of 'state of the art' reviews of agricultural policies and programmes were sponsored by ICIMOD in different countries of the HKH Region. The purpose of these studies and the subsequent National Workshops in different countries was to understand some of the constraints and prospects of mountain area development. These exercises were also aimed at acquiring comparative perspectives of development approaches and strategies in different countries.

This paper was a part of this series of studies, commissioned by ICIMOD, and was also presented at the Workshop on "Agricultural Development Experiences in West Sichuan and Xizang, China", held by ICIMOD in October 1988, in Chengdu, China. The paper presents a comparative study of the systems of vertical agriculture in the Hengduan and Qilian mountains of the Tibetan Plateau, and recommends strategies and measures for alleviating constraints and enhancing "permanent agriculture."

Land Types and Comprehensive Regionalization

A. The Hengduan Mountains

B. The Qilian Mountains

II HISTORICAL DEVELOPMENT

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ABSTRACT

The Tibetan Plateau, or the Qinghai-Xizang Plateau, covers an area of about 2.5 million square kilometres and has an average elevation of about 4,000 m.a.s.l. It is the largest and the highest mountain mass in the world (Fig. 1). Hence, it is sometimes called the "third pole". It is also one of the three geographic regions (i.e. the Eastern Monsoon Region, the Northwest Arid Region, and the Tibetan Frigid Plateau Region) of China, and occupies about 25 per cent of China's total land area, while containing only one per cent of the total population and about one per cent of the total farmland. This huge alpine plateau has a harsh environment, an underdeveloped economy, and a sparse population. Therefore, a much more productive and sustainable agricultural system is needed.

The Tibetan Plateau is outstanding not only because of its high elevation and its frigid climate, but also because of the horizontal and vertical differentiation among areas. From the southeastern border to the northwestern border, sub-tropical humid and bioclimatical conditions change step by step into temperate, semi-arid, and arid zones. Vertical zonation (including the agricultural system) is even more overwhelming, owing to the presence of numerous mountains that transverse and tower above the plateau surface and have relative reliefs ranging from several hundreds up to 6,000 - 7,000 m. Four alpine border ranges stand out in particular:

- i) the Himalayan southwestern border where tropical and subtropical montane forests dominate the southern slopes;
- ii) the Hengduan mountains, with needle-leaved forests and alpine meadows, lie on the sub-humid southeastern border;
- iii) the Qilian Mountains, with their montane and alpine grasslands, lie on the semi-arid northeastern border; and
- iv) the Kunlun Mountains, with montane desert-steppe and deserts, lie on the arid northwestern border.

Each of these border alpine ranges has distinct physical features as well as distinct systems of vertical agriculture.

The present paper is a comparative study of the second and the third alpine border ranges and their systems of vertical agriculture. The Hengduan Mountain Area is now the second largest timber-producer in China (second only to the Great and Small Hinggan Mountains in Northeast China), as well as having an important farming and pastoral area in Western Sichuan Province and in Northwestern Yunnan Province, while the Qilian Mountain Area has a very important farming and pastoral region in Qinghai Province as well as an extremely productive pastoral area in Gansu Province.

Fig. 1: A Bird's Eye View of the Tibetan Plateau

Source: Zhao Songqiao et al.