

青藏高原横断山区科学考察丛书

横断山区干旱河谷

中国科学院青藏高原综合科学考察队



青藏高原横断山区科学考察丛书

横断山区干旱河谷

中国科学院青藏高原综合科学考察队

张荣祖 主编

科学出版社

1992

THE SERIES OF SCIENTIFIC EXPEDITION TO HENGDUAN
MOUNTAINS, QINGHAI-XIZANG PLATEAU

THE DRY VALLEYS OF THE
HENGDUAN MOUNTAINS REGION

The Comprehensive Scientific Expedition to the Qinghai-Xizang Plateau,
Chinese Academy of Sciences

Editor in Chief

Zhang Rongzu

Science Press, Beijing

1 9 9 2

(京)新登字 092 号

内 容 简 介

本书是青藏高原横断山区科学考察丛书之一。它是在多年实地考察的基础上,较全面、深入地分析与研究了现有的各种资料,对横断山区干旱河谷的成因、分类、分布、各类型的自然特征与农业生产条件以及环境整治等问题作了系统的阐述,是一部综合性、生产性较强的科学专著。

本书可供有关地方建设部门、行政管理与业务干部以及大专院校师生参考应用。

青藏高原横断山区科学考察丛书

横 断 山 区 干 旱 河 谷

中国科学院青藏高原综合科学考察队

责任编辑 严梵璿 李 红

科学出版社出版

北京东黄城根北街16号

邮政编码:100707

北京怀柔县黄坎印刷厂印刷

新华书店北京发行所发行 各地新华书店经售

1992年8月第一版 开本:787×1092 1/16

1992年8月第一次印刷 印张:15

印数:1—800 字数:313 000

ISBN 7-03-002916-X/P·574

定价:14.20元

《青藏高原横断山区科学考察丛书》顾问

王云章 刘东生 李星学 吴征镒 吴传钧 杨敬之
郑作新 郑丕留 胡淑琴 陶诗言 秦仁昌 徐仁
涂光炽 席承藩 高由禧 贾慎修 施雅风 黄秉维

《青藏高原横断山区科学考察丛书》编委会

主任：孙鸿烈

副主任：李文华 程 鸿 佟 伟 章铭陶 郑 度 赵徐懿

委员：王金亭 王富葆 孔昭宸 刘照光 李吉均 李承彪

李炳元 张玉泉 张谊光 张荣祖 陈宜瑜 陈挺恩

林永烈 武素功 郎楷永 唐邦兴 黄文秀 韩裕丰

温景春 蔡 立 臧 穆 谭福安 樊 平 潘裕生

作者名录

中国科学院
国家计划委员会 地理研究所

张荣祖 郑 度 杨勤业 李炳元 刘燕华

中国科学院
国家计划委员会 自然资源综合考察委员会

孙尚志 李明森 陈传友 张谊光

中国科学院昆明植物研究所

武素功 刘伦辉

中国科学院
水利部 成都山地灾害与环境研究所

唐邦兴 柳素清

中国科学院成都生物研究所

吕荣森

中国科学院动物研究所

林永烈

中国科学院南京土壤研究所

刘朝端

水利部成都水利勘测设计院

刘立彬 林远谟

THE CONTRIBUTORS

Institute of Geography, Chinese Academy of Sciences and State Planning Commission

Zhang Rongzu Zheng Du Yang Qinye Li Bingyuan Liu Yanhua

Commission for Integrated Survey of Natural Resources, Chinese Academy of Sciences and State Planning Commission

Sun Shangzhi Li Mingsen Chen Chuanyou Zhang Yiguang

Kunming Institute of Botany, Chinese Academy of Sciences

Wu Sugong Liu Lunhui

Chengdu Institute of Mountain Disasters and Environment, Chinese Academy of Sciences and Ministry of Water Resources

Tang Bangxing Liu Suqing

Chengdu Institute of Biology, Chinese Academy of Sciences

Lu Rongsen

Institute of Zoology, Chinese Academy of Sciences

Lin Yonglie

Nanjing Institute of Soil Science, Chinese Academy of Sciences

Liu Zhaoduan

Chengdu Academy of Hydrological and Design Survey, Ministry of Water Resources

Liu Libin Lin Yuanmo

THE FIGURES

- 1.1 Variation of rainfall depends on altitude and latitude
- 1.2 Forming factors and their relationships of the dry valleys
- 1.3 Climatic patterns of a section through Hengduan Mountains
- 1.4 Distribution of the dry valleys in Hengduan Mountains
- 1.5 Deteriorational cycle of soil and vegetation under overgrazing and other human activities
- 1.6 Reasons of environment distortion in the dry valleys
- 1.7 Environmental conditions and their relationship in mountain land-use system
- 1.8 Integrated management of the dry valleys
- 2.1 Monthly prevailing and sub-prevailing wind system along the profile of 30°N
- 2.2 Average wind system of China
- 3.1 Distribution of geomorphological patterns of the dry valleys in Hengduan Mountains
- 3.2 Valley profile of Jinsha River near Benzilan
- 3.3 Valley profile of Datu River near Jinchuan
- 3.4 Valley profile of Anning River near Xichang
- 3.5 Valley profile of Yuanjiang River near Yuanjiang County
- 4.1 Altitudinal variation of annual temperature and rainfall in the mountains of Eastern China
- 4.2 Altitudinal variation of annual temperature and rainfall in the dry valleys of Hengduan Mountains
- 4.3 Distribution of annual temperature in Hengduan Mountains
- 4.4 Distribution of mean temperature of warmest month in Hengduan Mountains
- 4.5 Distribution of mean temperature of coldest month in Hengduan Mountains
- 4.6 Accumulation temperature of daily mean temperature $\geq 10^{\circ}\text{C}$ in Hengduan Mountains
- 4.7 Distribution of annual rainfall in the dry valley of Hengduan Mountains
- 4.8 Annual rainfall variation on longitudinal and latitudinal dimensions in the dry valleys of Hengduan Mountains
- 4.9 Distribution of aridity index in the dry valleys of Hengduan Mountains
- 4.10 Distribution of solar radiant energy in the dry valleys of Hengduan Mountains
- 5.1 Inversional succession of vegetation in hot-dry valleys of Hengduan Mountains
- 5.2 Inversional succession of vegetation in warm-dry valleys of Hengduan Mountains
- 5.3 Inversional succession of vegetation in temperate-dry valleys of Hengduan

Mountains

- 6.1 Natural reserve regions in Hengduan Mountains
- 8.1 Landuse patterns in Lujiangba
- 8.2 Landuse patterns in Miyi, Anning River
- 8.3 Landuse patterns in Jingchuan, Dadu River
- 9.1 Transformational relationship within water system in Hengduan Mountains
- 9.2 River system and Hydroconservancy-constructions in Hengduan Mountains
- 9.3 Distribution of iso-runoff in Hengduan Mountains
- 9.4 Annual mean discharge curve of the six big rivers in Hengduan Mountains (1940—1980)
- 9.5 Mean discharge curve of driest month of the six big rivers in Hengduan Mountains (1940—1980)
- 9.6 Farmland patterns in the dry valleys of Hengduan Mountains
- 10.1 Distribution of debris flow damages (Serious, middle and light) in the dry valleys
- 10.2 Tendency of activity along the area of Cheng-Kun Railway
- 10.3 Enlargement of gorges with mud-debris flow in Baishui River
- 10.4 Integrated management of debris flows
- 11.1 Vertical differentiation of landuse in Lijiang, Yunnan (1983)

THE TABLES

- 1.1 Lengths, areas and vertical amplitudes of varied typed of the dry valleys
- 1.2 Patterns of the dry valleys in Hengduan Mountains
- 2.1 Comparison of criteria on aridity index used by different authors
- 2.2 Criteria of types on dry-valley classification
- 2.3 Criteria of subtypes on dry-valley classification
- 2.4 Patterns of the dry valleys
- 2.5 Comparison of annual rainfall between lee-ward and wind-ward slopes
- 2.6 Variation of the rainfall before and after the forest being destroyed in the upper reaches of Minjiang River
- 3.1 Geomorphological patterns of the dry valley in Hengduan Mountains
- 4.1 Comparison of the highest elevation of the vegetation between Eastern China and the dry valley
- 4.2 Altitudinal variation of annual rainfall in Longchuan River valley
- 4.3 Altitudinal variation of annual rainfall in Anning River valley
- 4.4 Comparison of rainfall and humidity between eastern and western slopes in Baimaxiushan
- 4.5 Comparison of temperature vertical progressive decrease rate between the dry

- valley in Hengduan mountains and Eastern China
- 4.6 Temperature vertical progressive decrease rate in different locations of Longchuan river valley
 - 4.7 Temperature vertical progressive decrease rate in Baimaxueshan
 - 4.8 Annual temperature vertical progressive rate on eastern and western slopes in Gaoligon Mountain
 - 4.9 Days with temperature inversion of 07:0'clock during December to March
 - 4.10 Temperature inversion in winter (Dec.—Feb.) of Anning River valleys
 - 4.11 Data of temperature in the area of the dry valleys
 - 4.12 Comparison on differentiation of earth-surface temperature, air temperature, and extreme earth-surface temperature between the dry valleys in Hengduan area and some locations of northwest China
 - 4.13 Water ampleness and deficit in the dry valleys
 - 4.14 Distribution of solar radiant energy in the dry valleys of Hengduan Mountains
 - 4.15 Distribution of solar light energy in the dry valleys of Hengduan Mountains
 - 4.16 Classification of dry periods (months) in the dry valleys
 - 4.17 Classification of heat resources in the dry valleys
 - 4.18 Agroclimatic patterns and resources of solar-light heat and water in the dry valleys
 - 5.1 Regionalization of vegetation in the dry valleys of Hengduan Mountains
 - 5.2 Comparison of vegetation between the past decades and present in the dry valley of Hengduan Mountains
 - 6.1 Abundance of some plant genera in the dry valleys
 - 6.2 Utilized wild-plants in the dry valleys
 - 6.3 Oil-contents of major oil-contained plants in the dry valleys
 - 6.4 Important, economic plants introduced in the dry valleys
 - 6.5 Meterological data of apple-producing areas in the dry valleys and some locations in abroad
 - 6.6 Comparison of meterological data between Dechang, Sichuan, China and California, U. S.
 - 6.7 List of wild animal-resources in the dry valley of Hengduan Mountains
 - 6.8 Comparison of species numbers between the dry valleys of Hengduan Mountains and whole China
 - 6.9 Comparison of protected animals between the dry valleys of Hengduan Mountains and whole China
 - 7.1 Temperature criteria for soil classification in the dry valleys
 - 7.2 Water criteria for soil classification in the dry valleys
 - 7.3 Soil classification based on soil temperature and soil water condition
 - 7.4 Nutrition and exchangeability of soil in the dry valleys

- 7.5 Physical composition of soil in the dry valleys
- 7.6 Nutrient differentiation of cultivated soil between the dry valleys and Southeastern China
- 7.7 Comparison of organic matter and nitrogen contents between the dry valleys of Hengduan mountains, forest of Southeastern China and steppe of North-western China
- 8.1 Suitability of landuse patterns in the dry valleys of Hengduan Mountains
- 9.1 Hydrologic characteristics of the six big rivers in Hengduan Mountains
- 9.2 Water resources in Hengduan Mountains
- 9.3 River classification based on depth of runoff in the river valleys of Hengduan Mountains
- 9.4 Monthly distribution of run-off in the big rivers of Hengduan Mountains
- 9.5 The CV value of the big rivers in Hengduan Mountains
- 9.6 Insurable amounts of irrigating water in dry valleys of Hengduan Mountains
- 9.7 Current amounts of water utilization (Industry, Animal husbandry and Human life)
- 9.8 Hydroconservancy constructions in Hengduan Mountains
- 9.9 Processing of runoff during dry season at Zipingpu station of Mingjiang River
- 9.10 Records of runoff at Zipingpu station of Mingjiang River
- 9.11 Records of runoff at Daton station of Jinsha River
- 9.12 Coefficient of silt-transportation and erosion of Shaojuche
- 9.13 Amounts of bacteria-contents in several hydrologic stations
- 9.14 Monitorial records of water-quality during 1981—1983 in Dukou section of Jinsha River
- 9.15 Predication of water utilization after the coming decades in Hengduan Mountains
- 9.16 Budget of pumping water for irrigation
- 10.1 Statistics of mud-debris flows and floods in the dry valleys (1981-1985)
- 10.2 Yield decrease of crops due to spring-summer drought in the dry valleys (1980, 1983)
- 10.3 Frequences of drought (Spring, Spring-Summer, Summer) in the dry valleys
- 10.4 Strong intensive rainfall in Nujiang River District (Oct, 1979)
- 10.5 Damaging debris flows in the dry valleys
- 10.6 Records of strong intensive rainfall and debris flows (1981—1984)
- 10.7 Occurring-altitude of debris flows in the dry valleys
- 10.8 Occurrences of debris flows in the dry valleys
- 10.9 Species of trees and shrubs suitable for greening of Hengduan Mountains
- 11.1 Index of agricultural production in the dry valleys of Hengduan Mountains
- 11.2 Agriculture regionlization in the dry valleys of Hengduan Mountains

《青藏高原横断山区科学考察丛书》序

辽阔的青藏高原，包括西藏全部、青海南部，以及四川西部和云南西北部，大部分地区海拔在4000m以上，四面以巨大的落差急剧下降，衬托出世界屋脊的磅礴气势，素有世界第三极之称。由于青藏高原独特的地质历史和自然条件，丰富的生物组成和生物群落类型，成为地球上一个独具特色的地理单元。青藏高原蕴藏着丰富的自然资源，又是许多少数民族生活和居住的地区，且地处边陲，合理保护和开发这一地区的自然资源，对发展经济，改善人民生活，以及巩固民族团结和加强国防建设都有重要的意义。

为了探索青藏高原形成和演变的历史，研究自然条件的特点及其对周围环境的影响，研究自然资源的数量和质量及其合理开发利用的途径。解放以后，中国科学院对这里进行了多次科学考察，特别是自1973年起组织了青藏高原综合科学考察队，对这一地区进行了更为全面、系统的综合性研究。

1973—1980年期间，考察队重点对西藏自治区进行了考察。其科学成果将集中反映在陆续出版的《青藏高原科学考察丛书》（西藏部分）及论文集和画册中。有些成果在实际生产中已得到推广和应用，在国际和国内产生了深远的影响。

考察队从1981年起将考察研究的重点转移到横断山区。横断山地处我国西南的藏东、川西和滇西北一带，是青藏高原的一个组成部分。在行政区域上包括西藏自治区的昌都地区，四川省阿坝、甘孜、凉山及云南省丽江、迪庆、怒江和大理等地（州）区，总面积约50万平方公里。

横断山脉在地质构造上处于南亚大陆与欧亚大陆镶嵌交接带的东翼，是我国东部环太平洋带与西部古地中海带间的过渡地带。地质构造复杂，新构造运动活跃。本区地势由西北向东南倾斜，大部为高山峡谷，山脉、河流南北纵贯，相间并列，高差很大，自然地理条件独具一格，生物区系绚丽多彩，且富含古老和孑遗类型，是研究生物和地学中许多重大理论问题的关键性地区。

横断山脉自然资源丰富，尤以多种矿产、水利、森林、草场等资源最为丰富。但是随着人口的增长和开发利用的加剧，自然资源承受的人类压力日益加大，有些地区生态平衡遭到了破坏。为了合理利用自然资源，必须研究本区的自然资源特点，探索其合理保护利用与开发的方向和途径。

横断山区科学考察工作主要围绕六个课题进行：（1）横断山脉形成的原因和地质历史；（2）横断山区自然地理特征及其与高原隆起的关系；（3）横断山区自然垂直地带的结构及其规律；（4）横断山区生物区系的组成；（5）横断山区自然保护与自然保护区；（6）横断山区自然资源的评价及其合理开发利用。

为了使科学考察研究更密切地与当地的经济开发工作结合起来，在自然资源评价与开发利用方面着重抓了农业自然资源条件与自然资源系列制图；亚高山暗针叶林采伐与

更新；地方能源的综合利用；畜牧业发展战略及干旱河谷农业自然条件与开发利用等五项综合专题的考察研究。

横断山区的综合科学考察研究工作由中国科学院 - 国家计划委员会自然资源综合考察委员会负责组织领导。参加此次考察研究的包括中国科学院有关研究所、高等院校和地方科研与生产部门等单位计 40 余个，约 300 多人，涉及 40 多个专业。

《青藏高原横断山区科学考察丛书》将系统地总结青藏高原综合科学考察第二阶段的成果。

《青藏高原横断山区科学考察丛书》计划由横断山区农业自然条件与农业自然资源评价、四川省金川县农业自然条件与农业自然资源评价、横断山区的地方能源资源、横断山区亚高山暗针叶林采伐与更新的研究、横断山区(川西部分)畜牧业战略发展的研究、横断山区干旱河谷、横断山区地质构造、横断山区的沉积岩及沉积盆地演化、横断山区基性超基性岩、横断山区富碱侵入岩带地球化学和成矿、横断山区花岗岩类地球化学、横断山区锡矿带地球化学、横断山区地层、横断山区古生物、横断山区哺乳动物化石与生活环境、横断山区地热与水热活动区名录、腾冲地热、横断山区自然地理、横断山区地貌与第四纪地质、横断山区气候、横断山区的冰川、横断山区泥石流、横断山区土壤地理、横断山区森林、横断山区草场、横断山区植被、横断山区沼泽与泥炭、横断山区湖泊综合研究、横断山区中小河流及水资源、横断山区自然垂直带结构特征及分布规律、横断山区植物、横断山区家畜种群生态、横断山区鱼类、横断山区哺乳动物、横断山区鸟类、横断山区两栖爬行动物志、横断山区甲壳动物、横断山区昆虫、横断山区土地资源开发与农业布局等专著组成。我们希望这些著作能在探索青藏高原的奥秘和我国社会主义建设中发挥积极的作用。

中国科学院青藏高原综合科学考察队

THE SERIES OF THE SCIENTIFIC EXPEDITION TO THE HENGDUAN MOUNTAINS OF THE QINGHAI-XIZANG PLATEAU

PREFACE

The vast Qinghai-Xizang Plateau, consisting of the Xizang (Tibet) Autonomous Region, the southern part of Qinghai, western part of Sichuan and northwestern part of Yunnan Provinces, is often eulogized as the third polar of the world. The major parts of the Plateau are 4 000 metres above sea level, while the areas around drop drastically setting off the tremendous momentum of the roof of the world. The particularities of the geological history and physical conditions, the variety of biological composition and the different types of bio-communities make the Qinghai-Xizang Plateau a unique geographical unit. As the Plateau, being rich in natural resources, lies on the border regions where inhabit many national minorities, the rational conservation and utilization of the natural resources in this region are of particular importance in developing economy, improving the local livelihood and consolidating national solidarity as well as strengthening national defence.

Ever since the foundation of new China, many scientific surveys have been carried out in this region so as to make a better understanding of the history of the formation and evolution of the Qinghai-Xizang Plateau, to study the characteristics of its natural conditions, their effects on the environment around and the quantity and quality of the natural resources and thus, to find a way of exploiting and utilizing them rationally. Especially after the forming of the Comprehensive Scientific Expedition to the Qinghai-Xizang Plateau in 1973, an even more comprehensive, systematic integrated research has being made on this region.

A survey was mainly carried out on the Xizang (Tibet) Autonomous Region during the period of 1973—1980. The scientific findings of the survey, part of which have already been extended and applied to actual production and have brought a far-reaching influence both in and outside China, will be concentratedly compiled in the series of the scientific expedition to the Qinghai-Xizang Plateau (Xizang Volume), proceedings and pictorials. Since 1981, the survey team has shifted its major researching area to the Hengduan Mountains Region which is a constitutional part of the Qinghai-Xizang Plateau and is located in the east of Xizang, west of Sichuan and northwest of Yunnan Provinces in southwest China. The total area of this region is about 0.5 million square kilometres and administratively speaking including the Qamdo district of Xizang, Erba, Cangzi, Liangshan of Sichuan and the Lijiang, Nujing and Dali districts of Yunnan.

The Hengduan Range is complicated in geological structure and active in new tectonic movements. It lies on the east flank of the juncture area where south Asia and Eurasia are mounted. It is the transition region between the east zones encircling the Pacific and the west zones of ancient mediterranean. The altitude of this area declines from northwest to southeast. Most parts of the area are characterised by a series of paralleled mountain ranges and rivers from south to north, and with a sharp altitudinal differentiation. Its unique physical conditions and variety ecosystems being rich in flora and funa with abundant relic species, give the area a critical nature for the fundamental research in the field of biology and earth science.

The Hengduan Mountains Region is abundant in natural resources, among which multi-mineral products, hydrological resources, forest and grasslands account for the great part. But with fast growth of the population and an extensive exploitation and utilization of the natural resources, the human pressure on natural resources has vastly increased which even caused ecologic equilibrium damage in some part of the area. In order to make a more reasonable utilization of natural resources, it is necessary to study the characteristics of the resources in this region so as to work out certain ways and methods for protecting, utilizing and exploiting them rationally.

There are six major subjects in the research work being carried out in the Hengduan Mountains;

1. The geological history of the Hengduan Range;
2. The physiographical characteristics of the Hengduan Mountains and their relationship with the rise of the Plateau;
3. The structure and rule of the altitudinal belts of the Hengduan Mountains;
4. The composition of bio-communities in the Hengduan Mountains;
5. The natural conservation and nature reserves in the Hengduan Mountains;
6. Evaluation of the natural resources in the Hengduan Mountains and their rational development and conservation.

Five integrated projects have also been given special attention in the research on natural resources evaluation, exploitation and utilization. They include as following; compilation of a series of maps on the conditions of agricultural resources; deforestation and regeneration of subalpine coniferous forest in subalpine areas; the multiple utilization of local energy resources; strategy for the development of animal husbandry and finally the management of the natural resources in the arid valleys. This has been done in line with the purpose of linking scientific research closely to the development of the local economy.

The integrated survey on the Hengduan Mountains Region is organized by the Commission for Integrated Survey of Natural Resources, Chinese Academy of Sciences and the State Planning Commission. There are more than 300

people, coming from more than 40 institutions including different institutes of the Chinese Academy of Sciences, universities and local scientific research and production departments engaged in natural resources research. A series of scientific publications on the Hengduan Mountains will provide the results acquired from the second phase of the integrated scientific survey in the Qinghai-Xizang Plateau. It is designed that this series will be consisted of 39 volumes and 48 monographs. It is also expected that this series will play an important role in exploring the wonders of the Qinghai-Xizang Plateau and in the construction of China.

The Comprehensive Scientific Expedition to the Qinghai-Xizang Plateau,
Chinese Academy of Sciences

前 言

中国科学院青藏高原综合科学考察队于1981年将考察重点转移到横断山区。该区自然条件复杂，资源丰富，特别是矿产、森林和水资源等藏量极丰。但是随着人口的增长，自然资源承受的人类生产活动压力日益增大，不少地区生态平衡遭到破坏，自然灾害增多，特别是泥石流频繁，而首当其冲的就是河谷地带。本区的许多河谷相对于周围的山地而言，通常是一个“干热”的环境，当地称之为“干坝”或“干热坝子”，一般统称其为“干旱河谷”。由于这些坝子的热量条件较好、水资源丰富、耕地集中（耕地面积占全区土地总面积的90%），并且集中了全区绝大多数的人口与城镇，是本区经济发达的中心，也是横断山区的“宝地”。所以，很早以来，它们就吸引着邻近地区移民来此从事垦殖（最早可追溯至公元前110年左右的汉武帝时）。解放以后，本区干旱河谷的农业和经济作物生产有了很大的发展，特别是在中、南部亚热带河谷，其重要性日益明显。近年来，在全国普遍重视山区开发的形势下，本区工矿业的兴起，又赋予本区这些河谷农区以特殊的使命。同时，亦为河谷地区的经济发展开拓了新的道路。但是，目前许多地区的水利建设跟不上农业发展形势的要求，农事缺水日益突出。又由于生态环境的恶化，水土流失严重，有些河谷发生了人为的“荒漠化”现象。因此，改善干旱河谷的生态环境，使其适应近期与远期经济发展新形势的要求，包括与其息息相关的下游地区的利益（减少水土流失、控制河流泥沙含量），早已迫在眉睫。近年来，川、滇两省的专业技术人员和干部为此已经开展了不少关于治理干旱河谷的研究。1982年6月，四川省民族地区农业现代化研究会、四川省林学会和阿坝州林学会还联合举行了“干旱河谷综合治理学术讨论会”，并刊有专册¹⁾。

根据四川、云南两省的要求，考察队有关专业（自然地理、气候、地貌、土壤、水利、植物、土地资源、动物、泥石流与农业经济）组成“横断山区干旱河谷综合考察组”，对本区干旱河谷的环境条件与农业开发利用问题，展开了综合性的调查与研究。1981—1983年，各专业分别在干旱河谷地区进行了野外实地考察；1984年各专业又互相配合，选择了元江、怒江坝、奔子栏、德钦澜江河谷、攀枝花、元谋、米易、茂汶等典型干旱河谷地区进行综合考察。我们力图以生态系统的观点，将各专业的研究课题与中心课题联系起来（见图1-7）。

考察内容涉及社会与自然两方面的因素，但在实际上，对极其重要和复杂的社会因素的调查研究仅只列上了一个重点，显然过于单薄与不足。对于自然因素，虽然是作为重点，列上了11个重点，但是对于同样极其复杂的诸自然因素间的相互关系来说，我们所能了解的，目前也仍是很有有限的。同时，又限于我们的人力和时间以及工作水平，即

¹⁾ 四川省干旱河谷综合治理学术讨论会选编，1982。