

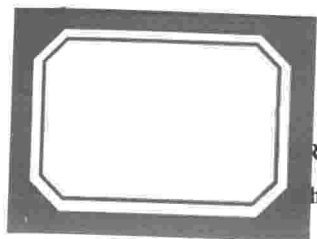
CHINA'S AGRI-CULTURAL
HERITAGE SYSTEMS SERIES
Editor-in-Chief: LI Wenhua

903

DYNAMIC CONSERVATION AND ADAPTIVE MANAGEMENT OF CHINA'S GIAHS: THEORIES AND PRACTICES (III)

Edited by MIN Qingwen HE Lu

China Environmental Press

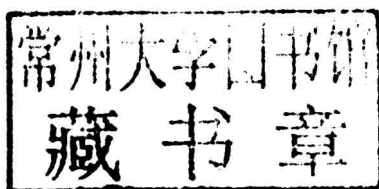


RAL HERITAGE SYSTEMS SERIES

hua

**Dynamic Conservation and Adaptive
Management of China's GIAHS:
Theories and Practices (III)**

Edited by MIN Qingwen HE Lu



China Environmental Press

图书在版编目(CIP)数据

重要农业文化遗产的动态保护和适应性管理: 理论与实践, 3=Dynamic Conservation and Adaptive Management of China's Giahhs: Theories and Practices III: 英文 / 闵庆文, 何露主编. —北京: 中国环境出版社, 2013.6
(农业文化遗产研究丛书)
ISBN 978-7-5111-1463-1

I. ①重… II. ①闵…②何… III. ①农业—文化遗产—保护—文集—英文 IV. ①S-53

中国版本图书馆 CIP 数据核字(2013)第 106679 号

出版人 王新程
责任编辑 曲 婷 李恩军
文字编辑 曲 婷 安子莹
责任校对 唐丽虹
封面设计 金 喆

出版发行 中国环境出版社
(100062 北京市东城区广渠门内大街 16 号)
网 址: <http://www.cesp.com.cn>
电子邮箱: bjgl@cesp.com.cn
联系电话: 010-67112765 (编辑管理部)
发行热线: 010-67125803, 010-67113405 (传真)

印 刷 北京中献拓方科技发展有限公司
经 销 各地新华书店
版 次 2013 年 6 月第 1 版
印 次 2013 年 6 月第 1 次印刷
开 本 880×1230 1/32
印 张 14.50
字 数 420 千字
定 价 55.00 元

【版权所有。未经许可请勿翻印、转载, 侵权必究】

如有缺页、破损、倒装等印装质量问题, 请寄回本社更换

China's Agri-Cultural Heritage Systems Series
Editorial Committee

Advisers: Parviz Koochafkan LU Liangsu REN Jizhou
XIONG Wenyu YOU Xiuling

Editor-in-Chief: LI Wenhua

Members:	MaryJane DelaCruz	CAO Xingsui	CHENG Shengkui
	DAI Weidong	HU Ruifa	LI Baotian
	LIANG Luohui	LIU Hongying	LIU Xunhao
	LU Qi	LUO Shiming	MIN Qingwen
	WANG Siming	WEI Jian	WU Wenliang
	WU Dianting	XU Wangsheng	YUAN Li
	ZHANG Renwu	ZHAO Lijun	

Secretary: MIN Qingwen

PREFACE

World natural and cultural heritage is a human civilization treasure which formed through the multiple roles of the long-time geologically historical evolution and the human activities. With the population continuously growing, its effect to the environment gets worse and worse, at the same time the natural and cultural heritage has to face the threats of modernization. In order to strengthen the research and protection of natural and cultural heritage, UNESCO had passed the “world natural and cultural heritage conservation law” in November, 1972 (World Heritage Convention) which received positive responses from many countries.

To some extent, natural and cultural heritage conservation shows the degree of civilization progress and the development level of education, science and technology and culture of one country. Being the world cultural heritage, it can strengthen the visibility of one country, one region, one city, even making some unknown areas famous in one night. Particularly, it was worthy of note that carrying out the heritage conservation education contributes to reinforcement of human beings' identity and pride to the world's natural resources and their own culture, and establishes the nation's self-esteem and self-confidence. Meanwhile it teaches them how to get along with other culture around the world. Loving the nature and enhancing the awareness of environmental protection and sustainable development are playing an irreplaceable role in maintaining the world peace and promoting the common development of all countries.

In “United Nations Year for Cultural Heritage 2002”, in order to commemorate the “World Heritage Convention” being held for 30 years, the world heritage committee passed the *Budapest Declaration on World Heritage*: “to ensure an appropriate and equitable balance between conservation, sustainability and development, and then World Heritage properties can be protected through appropriate activities contributing to the social and economic development and the quality of life of our communities.” Protection to the world heritage is in favor of natural conservation, environmental conservation, ecological balance and the contribution and development for the local economic and culture.

It should be noted that besides the *world heritage list* in the general sense of the word, there are a number of other significant heritage styles that need our concerns and conservation. Currently, apart from some world natural heritage, cultural heritage, natural and cultural heritage, cultural landscapes heritage and intangible cultural heritage which are listed in the world natural and cultural heritage list by UNESCO, there are also a great number of international organizations attaching great importance to this area of work and building some international networks to facilitate the conservation and management for different heritage styles, such as World Network of Biosphere Reserves, International Important Wetlands, World Geopark, World Monuments Heritage and the FAO's Globally Important Agricultural Heritage Systems Initiatives, which are the prominent representatives of the international heritage conservation.

Besides the agricultural culture and technical knowledge in the general sense of the word, agricultural heritage systems include the historical and structured traditional agricultural landscapes and agricultural production systems. In order to protect the agricultural heritage systems, FAO of the United Nations have selected five oldest agricultural systems in the world to be the first “Globally Important

Agricultural Heritage Systems” pilot systems for dynamic conservation. Based on FAO definition, globally important agricultural heritage systems are “remarkable land use systems and landscapes which are rich in globally significant biological diversity evolving from the co-adaptation of a community with its environment and its needs and aspirations for sustainable development”. According to the plan, FAO will select 100 to 150 globally important agricultural heritage systems in the next few years to promote adaptive management of agricultural heritage systems.

Our country has an excellent tradition of protecting the nature since ancient times, and has simple and rich experiences through long time practicing of traditional agricultural systems. Since thousands years, the holistic concept of ancient Chinese philosophy, theory of harmony between man and nature, and the allelopathy theory have been fully reflected and applied in the traditional agricultural development, of which, lauded the foundation for the development of modern eco-agriculture and became one important aspect of the sustainable agricultural development. Thousands of years’ agri-cultural histories with the natural and the humanities are great different among different areas which formed a wide range, obvious characteristics of agricultural heritage systems where economic and ecological value have high degree of unity, just as Dujiangyan Water Conservancy Project, Qanat, Gravel fields, Intercropping, Silt Dam, dyke-pond system, Terrace farming, Agroforestry and Rice-fish culture etc. These all are significantly valuable for agricultural sustainable development and the new socialist countryside building. However, with the economic development and the application of modern technology, these traditional agricultural heritage systems are facing severe challenges. In this case, it is very important to carry out an innovative campaign and conservation development of agriculture heritage systems.

At this time that conservation and research of agricultural heritage gain more and more international scientists' concerns, specially after the active promotion of Lu Yongxiang, the President of the Chinese Academy of Sciences, we set up the "Center for Natural and Cultural Heritage" in Institute of Geographic Sciences and Natural Resources Research (IGSNRR). President Lu demanded: "we should open one direction in IGSNRR and establish one research centre employing 3 to 5 people to strengthen the cooperation among academy, domestic and international institutions and to research the China natural and cultural heritage conservation and to apply its rational use and development." President Lu also believed that "this work for the civilization heritage and natural heritage conservation has a lot of value to the world or to China itself and even to scientific development".

The development goal of the Centre for natural and cultural heritage, as envisioned by President Lu, with support from the Bureau of Science and Technology for Resources and Environment, CAS and IGSNRR, should enhance science, improve team building to gradually form a stable, active and competitive research team, and set up a "small centre, huge net" pattern while gradually making the centre become the research "platform" of the natural and cultural heritage, the "link" of theoretical study and national needs, and the "window" of heritage conservation research. At the same time, we address various disciplines to meet the national needs. As a first step, with support from the FAO Initiative, the Center for Natural and Cultural Heritage identifies development idea of "making the agricultural heritage conservation as the starting point, to start the comprehensive study of the natural and cultural conservation and utilization in the pilot agricultural systems".

We have actively taken part in building the national eco-agriculture counties, and have published several books one after another, for example the "Agri-forestry in China", "Agri-Ecological Farming

Systems in China” and “Eco-Agriculture Technologies and Models” and others. These publications have formed the basis of carrying out the agricultural heritage systems. Meanwhile, in the preparatory process, we have started the Globally Important Agricultural Heritage Systems declaration and launched, to protect the preparation of planning of its related research, and to continually respond to technological innovation that the project might need for implementation. All of these are expected to provide a platform to carry out the agricultural heritage study.

The study of agricultural heritage conservation and utilization is a new topic, which needs the active participation of the multi-stakeholders and multidisciplinary research group. Being different from the natural or cultural heritage conservation, agricultural heritage conservation is typically society-economy-nature complex ecosystem which can be better reflecting the natural and cultural combined effects. However, there is a need for better coordination between conservation and development.

Through this series of books, I hope the Institute (China in particular) to make significant contributions—not only for theoretical research and development practices but to raise awareness and understanding and support to international recognition and dynamic conservation of the FAO’s Initiative “Globally Important Agricultural Heritage Systems”.

Li Wenhua

Academician of the Chinese Academy of Engineering

5 September 2006

FOREWORD

Since 2005 when the first GIAHS pilot site, Qingtian Rice-Fish Culture System in Zhejiang province, was designated, much progress and many new developments around GIAHS have been made in China. Through the eight years efforts, GIAHS has changed from “nobody knows” to “a rising star” in China and is attracting increasing attentions from scientists, governments, the public and the media. Especially in the last three years the increasing popularity of GIAHS among decision makers has been noticeable. Following the “Dynamic Conservation and Adaptive Management of China’s GIAHS: Theories and Practices (I) and (II) were published in 2009 and 2012 by China Environmental Press, this monograph is a collection of 17 English articles from academic journals, 8 English articles from *China Daily* and 14 English abstracts of Chinese articles on GIAHS during the last year. These books will provide a good channel for more people to get to know GIAHS project’s implementation in China from the academic perspective.

China is one of the first countries to be involved in the GIAHS project. The experiences from China are appraised by FAO and worthy to be extended at home and abroad. On 5 September, 2012, the Food and Agriculture Organization of the United Nations (FAO) officially

recognized China's Pu'er Traditional Tea Agrosystem in Yunnan Province and Aohan Dryland Farming System in Inner Mongolia as two new GIAHS sites. The two candidate systems, Shaoxing Kuaijishan *Torreya* Community and Urban Agricultural Heritage of Xuanhua Grape Gardens are expected to be recognized as new GIAHS sites in May, 2013, during the International Forum on GIAHS in Japan. Until then, China will have 8 GIAHS sites in all. The concept and idea of protection of agricultural heritage is also extended to other areas. Many governments actively participate in the action to conserve the agricultural heritage and carry out the declaration work.

With the country's promoting the great development and flourishing of socialist culture and highlighting the construction of ecological civilization, the importance of GIAHS which are excellent models for sustainable agriculture development and agro-culture conservation are increasingly recognized at the national level. GIAHS is one of the six Priority areas of expanded and deepened collaboration in the Memorandum of Understanding (MoU) between the Ministry of Agriculture and the FAO. And, MOA has already started the identification and conservation of China's Nationally Important Agricultural Heritage Systems (China-NIAHS) since 2012. The first 19 traditional agricultural systems will be recognized next month.

The public awareness of GIAHS and their development in China has increased rapidly and there is a growing interest and commitment to conserve the rich agricultural heritage of the nation. Multiple media

attention has all reported on the activities and research results related to GIAHS in China and have received highly positive reactions. Especially *China Daily* reported Qingtian Rice-fish Culture System in Zhejiang Province, Hani Rice Terraces System in Yunnan Province and Wannian Rice Culture System in Jiangxi Province respectively since last year. All the eight reports are included in this book. Furthermore, since 18 Jan, 2013, *Farmers' Daily* has been reporting a series of papers to introduce the significance of the conservation of agricultural heritage and Chinese experiences every Friday in *GIAHS Special Topic*.

The dynamic conservation and adaptive management of GIAHS and other traditional farming systems is the core of GIAHS research. GIAHS are compound systems so that inter-disciplinary/multi-disciplinary research is needed. The center for Natural and Cultural Heritage (CNACH) at Institute of Geographic Sciences and Natural Resources (IGSNRR) in Chinese Academy of Sciences (CAS), the national facilitator of GIAHS in China has actively designed and led the research tasks of GIAHS. Researches from many different disciplines have been involved. Hence, GIAHS has become an attractor around which traditional and emerging researches are being integrated and topics and frameworks are initiated. The research is carried out from multiple aspects including Biodiversity and Adaptation of GIAHS to Climate Change, Environmental Effects, Ecosystem Services and Sustainability Evaluation, Ecological Agriculture and Multi-functional Agriculture Development, Tourism Development Potential and Sustainable Tourism

Development Countermeasures and so on. The study areas are extended to other systems from rice cultivation systems. Tens of scholarly papers have been published in national and international journal. It is necessary to collect and summarize achievements regularly in order to help to orientate better promotion of GIAHS in the future. The paper collected in this book has summarized the valuable experiences of conserving the GIAHS from different perspective. It will be a good reference for any future work on GIAHS.

This year will be the last year of the GIAHS project supported by GEF. The future of GIAHS is bright and China is going to participate more actively in both GIAHS and China-NIAHS. There is still a long way to go to realize the “dynamic conservation and adaptive management” of GIAHS. We encourage more people to get to know GIAHS and to protect the rich agricultural heritage systems of China.

Min Qingwen

2 April, 2013

CONTENTS

Part I Articles

Conceptual Framework for Economic Evaluation of Globally Important Agricultural Heritage Systems (GIAHS): The case of Rice Fish Culture in China	3
The Role of Multi-functionality of Agriculture in Sustainable Tourism Development in Globally Important Agricultural Heritage Systems (GIAHS) Sites in China	31
Community Perspective to Agricultural Heritage Conservation and Tourism Development	53
A Study of Agri-Cultural Heritage Tourism Impacts Based on Residents' Perception Taking the Longji Terrace Site in Guilin, Guangxi, China as an Example.....	77
Identifying Landscape Pattern Metrics for the Hani Terrace in Yunnan, China.....	98
Cultural Heritage Resources of Traditional Agricultural Landscapes.....	121
Adapting to Droughts in Yuanyang Terrace of SW China:Insight from Disaster Risk Reduction.....	139
Strengthening the Socio-ecological Resilience of Forest-Dependent Communities:The Case of the Hani Rice Terraces in Yunnan, China.....	163
Landscape Pattern and Sustainability of a 1300-year-old Agricultural Landscape in Subtropical Mountain Areas, Southwestern China	185

Indigenous Ecological Knowledge and Natural Resource Management in the Cultural Landscape of China's Hani Terraces.....	208
Evidence of Duck Activity Induce Anatomical Structure Change and Lodging Resistance of Rice Plant	255
Changes of Phosphate and Ammonium Nitrogen in Irrigated Waters of Hani Terrace Wetlands Along the Elevation Gradients.....	270
Understanding Indigenous Knowledge in Sustainable Management of Natural Resources in China Taking Two Villages from Guizhou Province as a Case.....	277
Rural Tourism Development in China: Principles, Models and the Future	300
Biodiversity and Phytochemical Quality in Indigenous and State-supported Tea Management Systems of Yunnan, China	335
Agri-Cultural Landscapes in China: Types and Significances	356
Research Review on Agricultural Heritage Systems and Its Tourism Development.....	377

Part II Abstracts

Effects of Improved Traditional Rice-fish System Productivity on Field Water Environment	397
GIAHS: The Heritage of Agricultural Civilization and Foundation for Modern Agricultural Development	399
An Analysis on the Eco-environment Effect of Circular Agriculture Mode of Planting-Culture in the Paddy Field.....	401
An Ecological Exploration of Rice Planting Culture and Terrace Landscape ——Taking Longji Terrace as an Example.....	403
A Study of Courtyard Circular Economic Development Mode in Guizhou Karst Mountainous Countryside.....	404

Agri-cultural Heritage Research and Conservation Practices in China: Progresses and Perspectives	405
Research on the Sciences of Human Settlements to Hani Terraces from the View of the World Heritage	406
Research Review on Agricultural Heritage Systems and Its Tourism Development.....	407
Agri-cultural Heritage Protection and New Countryside Construction.....	408
Difficulties and Countermeasures of Agri-cultural Heritage Protection.....	409
Progresses and Perspective on Research and Practice of Rice-duck Farming in China.....	410
Agricultural Heritage Value of Ancient <i>Torreya Grandis</i> cv. <i>Merrillii</i> in Kuaiji Mountain	411
On the Heritage and Value of Red Agricultural Culture: Heritage of Lijiazhai Agricultural Culture.....	412
Guizhou Congjiang Forest Food for Sustainable Mode were Analyzed	413

Part III China Daily

Hani Harmony.....	417
Dragon Lady of the Terraces.....	422
Son of the Red River.....	425
Red Rice, Paradise	429
Locavores from the Hani Hills.....	433
Rice of Ages.....	436
Fishing for Solutions.....	440
Cultivating Perspectives on Ancient Agriculture	443

Part I Articles