



UNDP-CPR/91/114  
旱地农业技术系列丛书



# 旱地农业可持续发展的道路

王鹏新 魏益民 主 编



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EXTENSION OF SUSTAINABLE FARMING  
SYSTEMS FOR RAINFED AGRICULTURE**

**Final Report**

June, 1998

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Northwest Agricultural University  
Qinghai Academy of Agriculture and Forestry Sciences  
Shaanxi Academy of Agricultural Sciences  
Xinjiang Academy of Agricultural Sciences

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西北旱地农业系列丛书由联合国开发计划署(UNDP)援华技术项目(中国西北旱作地区持续农业体系研究示范与推广(CPR/91/114))(实施单位组织编写,联合国开发计划署资助出版,联合国粮食及农业组织(FAO)、中华人民共和国农业部(MOA)和中国国际经济技术交流中心(CICETE)负责执行并指导。

## 序 言

在我们生活的地球上,约占地球陆地面积 34.9%的地区,天然降水不足,地下水资源短缺,无法进行灌溉,属于旱作农业区。

目前,世界人口出生率有所下降,某些国家的水资源短缺状况会有所好转,但工业、农业和生活用水仍很紧张,水资源的不合理开采和浪费现象十分严重,缺水的人数还会继续增长。到 2050 年,全世界生活在缺水状态下的人数有可能增加到 20 亿。在未来 50 年里,全世界至少有 1/4 的人口将面临水资源短缺的威胁。

我国北方和西北地区是水资源严重欠缺的地区。近年来,旱情连年发生,旱区范围趋于扩大,水的供需矛盾极为突出。借助于现代科学技术,提高有限水资源的利用效率,是解决水资源短缺的唯一途径。发展旱地农业,提高天然降水的利用效率,发展节水灌溉技术,势在必行。

中国西北地区滞后发展的主要原因在于恶劣的自然条件、人口的不断增长及农业用水资源短缺等多重压力。西北地区约占中国国土面积的 31.0%,绝大多数地区年降雨量低于 500mm,许多地区的年蒸发量大于降雨量;水土流失与土地沙化严重;一些地区经常发生人畜饮水短缺现象,至今仍有一部分群众生活比较艰苦。发展旱地农业对保证干旱地区的粮食自给、摆脱贫困、改善生态环境、节约水资源和持续发展有着举足轻重的作用。

《中国西北旱作地区持续农业体系研究、示范与推广》项目是由联合国开发计划署(UNDP)援助,中国国际经济技术交流中心(CICETE)执行,中华人民共和国农业部(MOA)、联合国粮农组

织(FAO)负责实施。项目受援单位是西北农业大学、甘肃省农业科学院、陕西省农业科学院、青海省农林科学院、宁夏农林科学院、新疆农业科学院。项目于1993年9月启动实施。

联合国开发计划署援助中国西北地区这一项目,旨在通过引进旱地农业技术和方法,与本地经验和农业生产技术相结合,在黄土高原的不同地区,依据持续性发展和保护农民利益的原则,开发不同作物最佳管理措施,建立一种有效的、基层组织参与的推广体系。通过发展和采用生态学上健全的、经济上实用的农业生产技术,达到减轻地区贫穷和保证粮食自给的最终目的。

联合国开发计划署(UNDP)驻华代表贺尔康(Arthur N. Holcombe)先生在致项目受援单位的信中指出,西北五省区项目受援单位的科技人员为帮助成千上万户农民摆脱贫困做出了杰出的贡献,为在中国广阔的干旱半干旱地区实现可持续发展取得了巨大的成就。在迈向二十一世纪之时,人们应该认识到,为了保证粮食的基本需求和在生态条件脆弱的干旱半干旱地区实现农业的可持续发展所面临的挑战。联合国开发计划署将会继续支持中国实现农业可持续发展及摆脱贫困的战略。

《旱地农业技术系列丛书》由《中国西北旱作地区持续农业体系研究、示范与推广》项目实施单位组织编写,联合国开发计划署资助出版,联合国粮农组织、中华人民共和国农业部和中国国际经济技术交流中心负责执行并给予指导和帮助。

《旱地农业技术系列丛书》是项目受援单位的科技人员多年来在研究、示范、推广农业技术工作中的研究论文、技术报告及工作经验的总结。丛书经作者和编者反复讨论、加工、修改,编辑而形成的集技术性与实用性为一体的专业手册,主要为农业技术管理工作、农技人员和农民服务,是发展旱作农业、生态农业、可持续农业的好教材,是从事这一领域研究人员富有一价值的参考书。

愿《旱地农业技术系列丛书》将《中国西北旱作地区持续农业

体系研究、示范与推广》项目在研究、示范、推广及项目管理方面取得的成果、技术和经验得到更广泛的交流和传播,希望有更多的学者和国际社会能够研究和支持中国的粮食自给、增加农民经济收入、摆脱贫困、保护生态环境和农业可持续发展战略和方针,为二十一世纪中国干旱半干旱地区、西北地区的发展作出较大贡献。

路 明

1998年2月16日

## Preface

Arid and semi-arid agriculture is one of the major types of agriculture in China, especially in the Northwest, which is poor and eco-fragile. It is of strategic importance for the Chinese Government in achieving food security and poverty alleviation in the country.

In 1996, the world was preparing for the World Food Summit, where solutions to the world hunger were to be discussed. The most challenging work facing the Chinese Government before the end of this century is that there is still a large population, at least 58 million people, who do not have sufficient food and clothing. The challenge of alleviating poverty is particularly source in the northwestern provinces.

The main causes of the poverty in Northwest China are the harsh natural conditions, the combined pressures of population growth and lack of water resources for agricultural development. The five provinces and autonomous regions account for almost one quarter of China's territory. The annual precipitation is below 400 mm and high evaporation are common in many places of the region. Serious desert encroachment and soil erosion further exacerbate the problems. Agricultural production is very difficult. Many people are still living below the poverty line set by the State.

The Chinese Government has been giving continuous support to poverty alleviation (PA) in these two regions - the Northwest and the Southwest. Large Government PA funding has been earmarked for the increasing income generation. In response to the Chinese Government strategy and efforts for the poverty alleviation in the Northwest, four years ago, UNDP approved one of its biggest programmes in China:

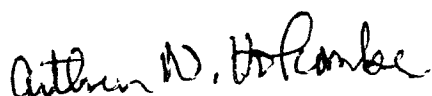
CPR/91/110 - Arid and Semi-Arid Area Agriculture Development in Northwest China. In addition to the huge Government funding, UNDP provided 8.5 million US dollars to assist 8 research institutes, 6 agricultural middle schools and 1 university in the provinces and autonomous regions of Shaanxi, Qinghai, Gansu, Ningxia and Xinjiang. The programme was approved late 1993 and actually started early 1994. The programme consisting of 6 projects, aims at poverty alleviation, food production and sustainable agricultural development. The signing of the Programme Action Plan for the Establishment of Demonstration and Extension Counties in 1995 systematically and extensively promoted these objectives. The programme supports the scientists, teachers and government officials in research, teaching and managing sustainable agricultural technologies. This we call it capacity building, but our assistance was not confined within the laboratories and campuses. Application and dissemination of sustainable agricultural technologies and practices have been extended to the villages and poor households. 25 demonstration and extension counties were established in the region. In every process, women participation and development was a pre-condition for the activity design and implementation.

The project titled "Research, Demonstration and Extension of Sustainable Farming Systems for Rainfed Agriculture" is one of the projects under the programme. The project covers three provinces (Gansu, Qinghai and Shaanxi) and two autonomous regions (Ningxia and Xinjiang), all in the Northwest. As a result, the project has made substantial in improving the capability of the institutions and to the poverty alleviation of local farmers that participated in the demonstration and extension activities. About 100 suitable and practicable agricultural technologies has been introduced and

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developed by the project institutions and these technologies have been extended to 80% households in the demonstration areas. Water use efficiency has already been increased by 24% or more, soil erosion of cultivated land reduced by 20~40%, forest coverage increased to 16%. Per unit yield of grain has been increased by 24% and per capita income increased by 26~31%, about 20~30% of poor households has eradicated the poverty.

I hope the publishing of this special issue *Project Achievement Report* can firstly provide guidelines for developing and disseminating agricultural technologies to households extensively and managing the international projects; and secondly, it may encourage the broad masses of scientists and technical personnel, and international agencies as well to pay forward attention to agricultural development in the Northwest China at the turn of the next century.



Arthur N. Holcombe

Resident Representative, UNDP Beijing

February 20, 1998

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# **1 Project Terminal Evaluation Report**

## **项目终期评估报告**

