



农业生物多样性可持续管理

Annette von Lossau 黎青松 主编

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社会科学文献出版社
SOCIAL SCIENCES ACADEMIC PRESS (CHINA)

农业生物多样性可持续管理

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图书在版编目 (CIP) 数据

农业生物多样性可持续管理/(德) 鲁索 (Lossau, A. V.),
黎青松主编. —北京: 社会科学文献出版社, 2011. 1

ISBN 978 - 7 - 5097 - 2036 - 3

I. ①农… II. ①鲁…②黎… III. ①农业 - 生物多样性 -
可持续发展 - 研究 IV. ①S18

中国版本图书馆 CIP 数据核字 (2010) 第 264355

农业生物多样性可持续管理

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出 版 人 / 谢寿光

出 版 者 / 社会科学文献出版社

地 址 / 北京市西城区北三环中路甲 29 号院 3 号楼华龙大厦

邮政编码 / 100029

编 辑 / 孙以年 侯培岭

校 对 / 周志静

责任印制 / 郭 妍 岳 阳 吴 波

总 经 销 / 社会科学文献出版社发行部

(010) 59367081 59367089

读者服务 / 读者服务中心 (010) 59367028

印 刷 / 北京千鹤印刷有限公司

开 本 / 889mm × 1194mm 1/16

印 张 / 16.25

字 数 / 551 千字

版 次 / 2011 年 1 月第 1 版

印 次 / 2011 年 1 月第 1 次印刷

书 号 / ISBN 978 - 7 - 5097 - 2036 - 3

定 价 / 128.00 元

本书如有破损、缺页、装订错误,
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序 言

2010年是国际生物多样性年，为提高人们对生物多样性重要性的认识，世界各地举办了各类活动。这些活动聚焦生物多样性丰富程度的持续降低，探索其原因和影响，同时展示了生物多样性可持续利用的潜能。

农业生物多样性在此方面占有特殊地位，尤其是全球粮食危机爆发及有关气候变化的讨论进行之后，其地位更显重要。

农业生物多样性对于中德两国都不是新课题，尤其是近十年来，两国许多相关的机构在作物品种异地保护方面做了许多工作。

在此背景下，中德双方于2003年共同发起了一项旨在推动中国农业生物多样性可持续利用的项目。该项目于2005年在湖南、海南率先实施，并于2007年在欧盟的资助下扩大至安徽、湖北和重庆。

项目首要任务之一是加强人力资源发展及知识管理。为此，项目在德国经济发展与合作部的支持下出版了系列专题文集，探讨与农业生物多样性以及保护农业生物多样性的途径相关的课题。专题文集涵盖的问题涉及多个领域，例如农业生物多样性在应对气候变化方面有怎样的贡献？知识产权对农业生物多样性有何影响？生物多样性对粮食安全有何贡献？

中国农业部、联合国发展计划署和德国技术合作公司于2010年9月共同举办国际农业生物多样性研讨会。在此背景下，我们将所有专题文集编辑成册，希望能为科研机构、学校和咨询顾问提供相关背景知识、案例研究以及农业生物多样性的行动建议。

若本书能够激发您在工作中关注相关议题，我们将备感欣慰，也希望您从其他机构及德国发展合作积累的成功经验中获益。德国技术合作公司自2011年1月起正式更名为德国国际合作机构。



Annette von Lossau
农业生物多样性高级顾问
德国国际合作机构



Dr. Christine Martins
德国国际合作机构项目主任
中德农业生物多样性可持续管理项目

前言

德国技术公司 (GTZ)/ 海南大学经济与管理学院及低碳经济政策与产业技术研究院合作编译并出版了《农业生物多样性可持续管理》一书，这是促进我国农业生物多样性可持续管理工作的好事。该书的出版，为该领域的教学和科研人员提供丰富的国际案例参考，将为开展生物多样性培训和普及生物多样性知识，增强农业生物多样性保护相关单位和个人的可持续管理理念，如政府官员、科学家、私营业主、地方社区、非政府机构和农民，更好地管理我国生物的多样性，保障我国农业可持续发展。

海南大学和 GTZ 公司一直有着良好的合作。2005 年，受德国经济合作发展部 (BMZ) 委托，GTZ 与中国农业部合作，共同实施中德农业生物多样性可持续管理项目，并首先在湖南和海南两省实施。海南大学经济与管理学院的黎青松老师作为中德项目的技术顾问，参与了项目的设计和规划，并一直负责该项目的监测和评估工作。

海南大学先后承担了中德项目在海南的 3 项重要调研工作。杨晓波教授 2007 年完成了生物多样性资源调查，金山教授 2008 年完成了乡土知识的调查，同年本人完成了社会经济的调查。我校许多年轻的教师 and 在校研究生也参与了以上 3 项基础调研。调研结果为项目的实施提供了重要参考资料。

海南大学与中德项目合作，先后在海甸和儋州校区举办了 2 次“中国农业生物多样性图片展”，近万名师生观看了展览，前任德方项目办主任吴敏乐先生做了“农业生物多样性与原地保护”专题报告，拓宽了师生们的视野，提高了生物多样性的保护意识。学校教师参与了项目的相关培训与研讨会。

海南大学于 2010 年 3 月成立了低碳经济政策与产业技术研究院。研究院将认真研究海南发展低碳经济的政策，为海南低碳经济发展提供强有力的技术支撑，力争使研究院成为海南省委省政府可以信赖的智囊库，成为企业界充分倚重的技术平台。目前研究院承担着海南省三亚市和保亭县“低碳经济发展战略规划”的编制工作，生物多样性可持续管理已纳入规划。

我们希望今后能和 GTZ 公司在生物多样性可持续管理及低碳经济发展等领域开展更广泛和深入的合作，为我国，特别是海南的生物多样性与低碳经济建设做出应有的贡献。

傅国华教授
海南大学副校长

缩略词汇表

ABS	Access and Benefit Sharing 获取与收益分享
BCH	Biosafety Clearing-House mechanism 生物安全信息交换所
BESH	Bäuerliche Erzeugergemeinschaft Schwäbisch Hall (farmer producer cooperative in Schwäbisch Hall, Germany) 施瓦本农民生产者协会, 德国
BMELV	Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz (German Federal Ministry of Food, Agriculture and Consumer Protection) 德国联邦营养、农业与消费者保护部
BMZ	Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung (German Federal Ministry for Economic Development and Cooperation) 德国经济合作与发展部
BT	<i>Bacillus thuringiensis</i> 苏云金芽孢杆菌
BTFP	Biotrade Facilitation Programme 生物贸易促进项目
CBD	Convention on Biological Diversity 《生物多样性公约》
CBI	Centre for the Promotion of Imports from Developing Countries, The Netherlands 荷兰发展中国家进口促进中心
CGIAR	Consultative Group on International Agricultural Research 国际农业研究咨询组
CIAT	International Centre for Tropical Agriculture 热带农业国际中心
CIP	International Potato Center 国际马铃薯中心
CIPR	Commission on Intellectual Property Rights 知识产权委员会
COP	Conference of the Parties (生物多样性公约) 缔约方大会
CIMMYT	International Maize and Wheat Improvement Center 国际玉米小麦改良中心
DNA	Desoxyribonucleic acid 脱氧核糖核酸
DUS	Distinctiveness, uniformity and stability 特异性、一致性和稳定性
EED	Evangelischer Entwicklungsdienst (Church Development Service - An Association of the Protestant Churches in Germany) 德国基督教发展服务社
EFSA	European Food Safety Authority 欧洲食品安全局
EGE	European Group on Ethics in Science and New Technologies of the European Commission 欧洲委员会下属的欧洲科学与新技术伦理小组
EU	European Union 欧盟
FAO	Food and Agriculture Organization of the United Nations 联合国粮食和农业组织
GFAR	Global Forum for Agricultural Research 农业研究全球论坛
GFU	Global Facilitation Unit for Underutilized Species 全球未充分利用物种促进会
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH 德国国际合作机构
GM	Genetically modified 转基因
GMO	Genetically modified organism 转基因生物
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH 德国技术合作公司
HT	Herbicide tolerance 除草剂耐受性
HYV	High yielding varieties 高产品种
IARC	International Agricultural Research Centre 国际农业研究中心
IAS	Invasive alien species 外来入侵物种
ICARDA	International Center for Agricultural Research in the Dry Areas 干旱地区农业研究国际中心
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics 半干旱地区农业研究国际中心
IDRC	International Development Research Centre, Canada 加拿大国际发展研究中心

IPPC	International Plant Protection Convention 《国际植物保护公约》
IPGRI	International Plant Genetic Resources Institute 国际植物遗传资源研究所
IPM	Integrated pest management 病虫害生物综合防治
IPR	Intellectual property rights 知识产权
ITPGRFA	International Treaty on Plant Genetic Resources for Food and Agriculture 《粮食和农业植物遗传资源国际条约》
MAS	Marker assisted selection 标记辅助选择
MDGs	UN Millennium Development Goals 联合国千年发展目标
MoA	Ministry of Agriculture 农业部
MTA	Material Transfer Agreement 材料转让标准协议
n.p.	Not published 未出版
NFR	EU Novel Foods Regulation 欧盟新食品法
NGO	Non-governmental organization 非政府组织
OIE	World Organization for Animal Health 世界动物卫生组织
PDO	Protected Designation of Origin 原产地名称保护
PEA	Participatory extension approach 参与式推广方式
PGI	Protected Geographical Indication 地理标志保护
PIC	Prior Informed Consent 取得事先知情同意
PPB	Participatory Plant Breeding 参与式植物育种
PPP	Public Private Partnership 公私合作伙伴关系
PVS	Participatory Varietal Selection 参与式品种选育
SBSTTA	Subsidiary Body on Scientific, Technical and Technological Advice of the Convention on Biological Diversity 《生物多样性公约》的科学、技术和工艺咨询附属机构
SEAGA	Socio-economic and Gender Analysis Programme of the FAO 联合国粮农组织的社会经济和性别
SEARICE	South East Asia Regional Initiatives for Community Empowerment 东南亚区域赋予社区权力计划
SPS	Sanitary and Phytosanitary Agreement of the World Trade Organization 世贸组织的《实施动植物卫生检疫措施的协议》
SSSP	Small Scale Seed Production by Self-help Groups 小规模种子自助生产组
TRIPS	Trade-Related Aspects of Intellectual Property Rights 《与贸易有关的知识产权协定》
TSG	Traditional Speciality Guaranteed 传统特色保证
UN	United Nations 联合国
UNCTAD	United Nations Conference on Trade and Development 联合国贸易和发展会议
UNDP	United Nations Development Programme 联合国开发计划署
UNFCCC	United Nations Framework Convention on Climate Change 联合国气候变化框架公约
UPOV	Union Internationale pour la Protection des Obtentions Végétales (International Union for the Protection of New Varieties of Plants) 《国际植物新品种保护公约》
WHO	World Health Organization 世界卫生组织
WIPO	World Intellectual Property Organization 世界知识产权组织
WSSD	World Summit on Sustainable Development 世界可持续发展首脑会议
WTO	World Trade Organization 世界贸易组织

Preface

The United Nations declared 2010 as the International Year of Biodiversity. Worldwide, numerous activities are underway to raise awareness of the importance of biological diversity. These spotlight the unabated decline of biodiversity and explore causes and consequences. They also showcase the importance and future potential of the sustainable use of biodiversity.

Agricultural biological diversity – as part of biodiversity – plays an important role in biodiversity as a whole, especially in regards to food security in the wake of a changing climate.

Agrobiodiversity is not a new theme to the People's Republic of China, or to Germany. In both countries, a number of relevant institutions have been engaged in the field of ex situ crop variety conservation for decades.

A joint Sino-German project designed to promote the sustainable use of agrobiodiversity in the People's Republic of China was agreed upon in 2003. Initially launched in Hunan and Hainan in 2005, it was extended to the provinces of Anhui and Hubei and Chongqing municipality in 2007, with additional funding from the EU.

One of the project's priorities is to advance human capacity development and knowledge management in the field of agrobiodiversity. This has led to the production of a series of papers, supported by the German Ministry for Economic Development and Cooperation (BMZ), exploring the manifold issues encompassing agrobiodiversity and points of leverage to maintain it. Can agrobiodiversity contribute and adapt to a changing climate? How do intellectual property rights impact on agrobiodiversity? What contribution does agrobiodiversity make to food security? These are just some of the many questions addressed by the papers.

To compliment the international agrobiodiversity conference convened by the Chinese Ministry of Agriculture and the United Nations Development Programme in September 2010 in cooperation with the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, we have compiled the papers most relevant for China in one volume, in Chinese and in English. This sourcebook is intended to assist technical and research institutions, schools and consultants by providing background information, interesting case studies and specific recommendations for action relating to agrobiodiversity.

We hope that the book encourages you take up agrobiodiversity and related issues in your work and hope that you may profit from the experience gained in the past by different institutions, including those of the German Development Cooperation. GIZ was formed on 1 January 2011. It brings together the long-standing expertise of DED, GTZ and InWEnt. For further information, go to www.giz.de.

Eschborn and Beijing



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Senior Adviser Agrobiodiversity
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Dr. Christine Martins
GIZ Project Director
Sustainable Management of Agrobiodiversity in the
Provinces of Hainan and Hunan, P.R. China

Foreword

The Sourcebook on Sustainable Agrobiodiversity Management, jointly compiled and published by the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH and the School of Economics and Management of Hainan University, as well as the Institute of Low-Carbon Economy Policy and Industrial Technology of Hainan University. It is an important contribution to the sustainable management of agricultural biodiversity in China. International cases are collected to assist teachers and scientific researchers in carrying out training programs and to disseminate knowledge on biodiversity. In addition, this sourcebook is a tool for enhancing the awareness of relevant institutions and individuals, e.g. government officials, scientists, private business owners, local communities, non-governmental institutions and farmers, regarding sustainable management on agricultural biodiversity. This work thus contributes to improving biodiversity management, and ensuring sustainable agricultural development in China.

In terms of field work and capacity building, Hainan University and GTZ have built a solid cooperative relationship in the area of sustainable agrobiodiversity management. In 2005, GTZ – acting on behalf of BMZ – and China's Ministry of Agriculture jointly launched the Sino-German Project of Sustainable Management of Agro-biodiversity, with Hunan and Hainan as the first pilot provinces. Mr. Li Qingsong, lecturer from the School of Economics and Management, Hainan University, participated in project design and planning, along with project monitoring and evaluation, as a technical advisor.

Hainan University undertook several surveys of the project in the province, whose findings were essential to the project's implementation. First, Prof. Yang Xiaobo conducted the resource survey in 2007. Next, Prof. Fu Guohua and Prof. Jin Shan performed surveys on the socio-economy and then on traditional knowledge respectively in 2008. A number of young faculty members and postgraduates were also involved in conducting these three surveys.

Additionally, the university and the project office jointly held the “Exhibition on China's Agricultural Biodiversity” on the campus in Haidian and Danzhou (Hainan), attracting thousands of teachers and students. Luis Waldmüller, the German Project Director at that time, gave a lecture entitled, “Agro-biodiversity and *in situ* Conservation”, which broadened and enhanced teachers' and students' awareness of biodiversity. Selected teachers participated in the training programs and seminars organized by the project.

The Institute of Low-Carbon Economy Policy and Industrial Technology was founded in March 2010 at Hainan University. It will carry out research on policies for developing a low-carbon economy in Hainan and provide essential technologies. The institute aspires to become a leading think-tank and reliable source of policy analysis for the Provincial Party Committee and the Provincial People's Government, as well as an indispensable technical platform for enterprises. Commissioned by the local government, the Institute is now developing the Strategic Planning for the Development of a Low-carbon Economy in Baoting County and Sanya, which involves the sustainable management of biodiversity.

Hainan University hopes to further its cooperation with GTZ in the area of sustainable management of biodiversity, the development of a low-carbon economy as well as other fields in the future, with the aim of making a greater contribution to biodiversity conservation and the development of a low-carbon economy in Hainan and the country as a whole.

Prof. Dr. Fu Guohua
Vice President of Hainan University, P.R. China

Abbreviations

ABS	Access and Benefit Sharing
BCH	Biosafety Clearing-House mechanism
BESH	Bäuerliche Erzeugergemeinschaft Schwäbisch Hall (farmer producer cooperative in Schwäbisch Hall, Germany)
BMELV	Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz (German Federal Ministry of Food, Agriculture and Consumer Protection)
BMZ	Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung (German Federal Ministry for Economic Development and Cooperation)
Bt	<i>Bacillus thuringiensis</i>
BTFP	Biotrade Facilitation Programme
CBD	Convention on Biological Diversity
CBI	Centre for the Promotion of Imports from Developing Countries, The Netherlands
CGIAR	Consultative Group on International Agricultural Research
CIAT	International Centre for Tropical Agriculture
CIP	International Potato Center
CIPR	Commission on Intellectual Property Rights
COP	Conference of the Parties
CIMMYT	International Maize and Wheat Improvement Center
DNA	Desoxyribonucleic acid
DUS	Distinctiveness, uniformity and stability
EED	Evangelischer Entwicklungsdienst (Church Development Service – An Association of the Protestant Churches in Germany)
EFSA	European Food Safety Authority
EGE	European Group on Ethics in Science and New Technologies of the European Commission
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GFAR	Global Forum for Agricultural Research
GFU	Global Facilitation Unit for Underutilized Species
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
GM	Genetically modified
GMO	Genetically modified organism
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH
HT	Herbicide tolerance
HYV	High yielding varieties
IARC	International Agricultural Research Centre
IAS	Invasive alien species
ICARDA	International Center for Agricultural Research in the Dry Areas
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IDRC	International Development Research Centre, Canada
IPPC	International Plant Protection Convention
IPGRI	International Plant Genetic Resources Institute

IPM	Integrated pest management
IPR	Intellectual property rights
IP	Intellectual property
ITPGRFA	International Treaty on Plant Genetic Resources for Food and Agriculture
MAS	Marker assisted selection
MDGs	UN Millennium Development Goals
MoA	Ministry of Agriculture
MTA	Material Transfer Agreement
n.p.	Not published
NFR	EU Novel Foods Regulation
NGO	Non-governmental organization
OIE	World Organization for Animal Health
PDO	Protected Designation of Origin
PEA	Participatory extension approach
PGI	Protected Geographical Indication
PIC	Prior Informed Consent
PPB	Participatory Plant Breeding
PPP	Public Private Partnership
PVS	Participatory Varietal Selection
SBSTTA	Subsidiary Body on Scientific, Technical and Technological Advice of the Convention on Biological Diversity
SEAGA	Socio-economic and Gender Analysis Programme of the FAO
SEARICE	South East Asia Regional Initiatives for Community Empowerment
SPS	Sanitary and Phytosanitary Agreement of the World Trade Organization
SSSP	Small Scale Seed Production by Self-help Groups
TRIPS	Agreement on Trade-Related Aspects of Intellectual Property Rights
TSG	Traditional Speciality Guaranteed
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UPOV	Union Internationale pour la Protection des Obtentions Végétales (International Union for the Protection of New Varieties of Plants)
WHO	World Health Organization
WIPO	World Intellectual Property Organization
WSSD	World Summit on Sustainable Development
WTO	World Trade Organization

Cataloguing in Publication Data

Sourcebook on Sustainable Agrobiodiversity Management

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ISBN 978-7-5097-2036-3

Published by Social Sciences Academic Press (P.R. China)

Address: 13f/15f, A/B Tower of HuaLong Plaza, Bldg 3, Jia No. 29, Beisanhuan Zhonglu,
Xicheng District, Beijing, P.R. China

Postcode: 100029

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Citation:

Lossau, Annette von, and Qingsong Li (Eds., 2011): Sourcebook on Sustainable Agrobiodiversity Management, Social Sciences Academic Press (P.R. China)

目 录

序 言	iii
前 言	v
缩略词汇表	vii
1. 农业生物多样性基础理论	1
1.1 农业生物多样性——粮食安全之本	3
1.2 女人、男人和农业生物多样性	7
1.3 与生物多样性保护和可持续利用相关的传统知识	11
1.4 农民作为育种者——参与式育种	13
1.5 农民作为种子的保管者——社区种子库	17
1.6 促进农业生物多样性管理的本地创新	20
1.7 家庭菜园——多样性的宝库	24
1.8 “未充分利用”的物种——大量潜在资源被浪费	27
1.9 本土品种——为防止动物传染病并肩而战	31
1.10 不受欢迎的来客——外来入侵物种	35
1.11 农业生物多样性和气候变化之间复杂的关系	39
1.12 生物多样性与农业集约化——农家品种如何发挥作用	42
1.13 农业基因工程：对生物多样性有何影响？	46
1.14 有关共存之思考——农田里的转基因作物	50
2. 农业生物多样性创造经济价值	53
2.1 公私合作伙伴关系与农业生物多样性	55
2.2 市场回潮——多样性展示和种子集市	58
2.3 旅游业——保持和促进农业多样性	61
2.4 价值链与生物多样性保护	65
2.5 受保护名称创造价值与生物多样性保护	69
2.6 营销促进生物多样性——施瓦本地区本土猪种实例分析	73
2.7 营销促进生物多样性——厄瓜多尔纯味可可豆实例分析	77
2.8 何人得益于生物多样性利用：瓜拉尼族人和甜菊实例分析	81
3. 农业生物多样性的管理	85
3.1 采取激励措施保护农业生物多样性	87
3.2 粮食和农业植物遗传资源国际条约	91
3.3 知识产权在农业领域的作用	95
3.4 农民的权利和农业生物多样性	99
3.5 遗传资源——获取与公平惠益分享	103
3.6 生物安全——《卡塔赫纳生物安全议定书》的执行	105
3.7 欧盟新食品法对发展中国家生物多样性产品贸易的影响	107

Table of contents

Preface	iii
Foreword	v
Abbreviations.....	vii
1. Basics of agrobiodiversity.....	1
1.1 Agrobiodiversity – the key to food security.....	3
1.2 Women, men and agrobiodiversity	7
1.3 Traditional knowledge relating to the conservation and sustainable use of biodiversity	11
1.4 Farmers as breeders – Participatory Plant Breeding.....	14
1.5 Farmers as bankers – community seed banks	18
1.6 Promoting local innovation in managing agricultural biodiversity	22
1.7 Home gardens – treasure troves of diversity.....	26
1.8 “Underutilized” species – rich potential is being wasted.....	30
1.9 Landraces – allies in the fight against animal epidemics	34
1.10 Unwelcome guests – invasive alien species (IAS)	38
1.11 Agrobiodiversity and climate change – a complex relationship	43
1.12 Biodiversity and agricultural intensification – how farmers’ varieties can contribute.....	47
1.13 Genetic engineering in agriculture: how does it impact on biodiversity?.....	51
1.14 A question of coexistence – genetically engineered crop plants in farmers’ fields	56
2. Adding economic value to agrobiodiversity.....	61
2.1 Partnerships for agrobiodiversity.....	63
2.2 Markets make a come-back – diversity displays and seed fairs	67
2.3 Maintaining and promoting agricultural diversity through tourism	71
2.4 Value chains and the conservation of biodiversity	75
2.5 Creating value from products with protected designations to conserve agricultural diversity	79
2.6 Utilising biodiversity through marketing – the case of the Schwäbisch Hällisches pig	84
2.7 Utilising biodiversity through marketing – the case of fine flavour cocoa from Ecuador.....	89
2.8 Utilising biodiversity – who benefits? The case of Stevia, the sweetener of the Guaraní people	93
3. Governance of agrobiodiversity.....	97
3.1 Incentive measures for the conservation of agrobiodiversity.....	99
3.2 International Treaty on Plant Genetic Resources for Food and Agriculture.....	103
3.3 The role of intellectual property rights in agriculture	107
3.4 Farmers’ Rights and agrobiodiversity.....	111
3.5 Genetic resources – access and equitable benefit sharing	115
3.6 Biosafety – the implementation of the Cartagena Protocol	118
3.7 The EU Novel Foods Regulation – its impact on trade in biodiversity products from developing countries	121
Index	125

1. 农业生物多样性基础理论

1.1 农业生物多样性

——粮食安全之本

作者: Anja Christinck, 2006



饮食多样化有益健康

图片: K-U. Klinker

据估算,全世界至少有 8.52 亿人遭受饥饿和营养不良;其中 4/5 的人生活在农村地区(资料来源:联合国粮农组织,2005)。解决饥饿问题已成为许多年来国际合作的核心问题之一。根除极端贫穷和饥饿问题排在联合国 2000 年宣布的 8 个千年发展目标(MDGs)之首。

这些目标宣布了 5 年之后,来自 25 个国家的专家申明:对作物和家畜的多样性保护和可持续利用是实现首个千年发展目标(MDG)的关键[国际植物遗传资源机构(IPGRI),全球未充分利用物种促进联合会(GFU),斯瓦米纳坦研究基金会(MSSRF)2005]。正是生物多样性,使人类能在地球各地居住,在最严酷的条件下也能生存。目前其潜力尚有待开发,尤其是对于那些在边远农村地区、依赖农业为生的人来说,这将是一笔巨大的财富。

粮食安全的基础

1996年在罗马召开的世界粮食峰会对粮食安全做了如下定义:

“粮食安全[.....]指在任何时候,所有人均能以物物交换或购买的方式获得足够的、安全的和有营养的粮食满足他们的日常饮食需要及偏好,过着积极、健康的生活”。

(www.fao.org/index_en.htm)

粮食安全包含三个要素:

- 供应,在需要的时间和地点,有足够的粮食供应。
- 获取,指需求方,尤其是指尽管有粮食足够供应却无力购买的人们。
- 利用,包括粮食的正确储存、加工和搭配利用。

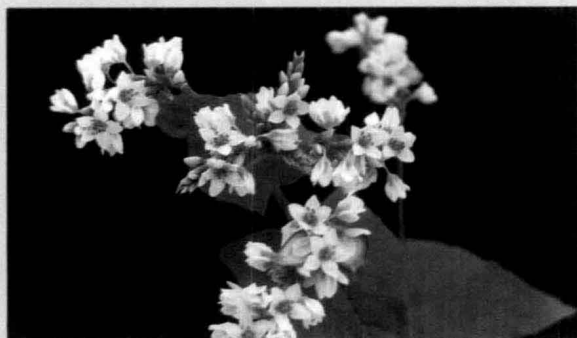
贫困人口通常粮食安全没有保障,季节性的粮食短缺、价格上涨或者粮食供应基础设施的突然破坏就会导致暂时粮食危机。

(德国经济合作与发展部BMZ, 2003;

www.fantaproject.org/focus/foodsecurity.shtml)

优化资源利用 以生产更多的粮食

评论家们承认,通过“绿色革命”主要粮食作物的产量提高了,许多国家的粮食安全状况得到改



荞麦不仅为以小规模农业为生的家庭保证营养,还可能成为市场上营养价值较高的保健品

图片: W. Arnold

荞麦

荞麦是中国部分地区和喜马拉雅山区传统种植的农作物,尤其适合山区贫瘠退化的土质。其生长周期短,因此能够帮助缓解因季节性粮食短缺或粮食歉收所带来的其他问题。此外,和其他谷类及块茎类作物不同,荞麦含有优质蛋白。因此,荞麦不仅有助于确保农民的营养,还具备包装成高级“健康食品”的潜力。