



A Training Guide for *In Situ* Conservation On-farm 农田原生境保护培训指南

第一版

D.I. Jarvis, L. Myer, H. Klemick, L. Guarino, M. Smale,
A.H.D. Brown, M. Sadiki, B. Sthapit and T. Hodgkin

翻译 杨庆文
审校 张宗文



Netherlands Ministry
of Foreign Affairs
Development
Cooperation



IPGRI is a
FUTURE
HARVEST
Centre

A Training Guide for *In Situ* Conservation On-farm 农田原生境保护培训指南

第一版

**D.I. Jarvis, L. Myer, H. Klemick, L. Guarino, M. Smale,
A.H.D. Brown, M. Sadiki, B. Sthapit and T. Hodgkin**

翻译 杨庆文

审校 张宗文

参与本书编写的合作者

S. Achtar	P. Eyzaguirre	T. Quinones-Vega
A. Amri	D. Fanissi	K. R'hrib
L. Arias-Reyes	M. Fernandez	R. Rana
Z. Asfaw	E. Friis-Hansen	V. Ramanatha Rao
G. Ayad	D. Gauchan	D. Rijal
J. Bajracharya	N.P. Ha	K. Riley
R. Balaghi	N.N. Hue	J. Rodriguez
D. Balma	M. Ibnou-Ali	R. Salazar
B. Baniya	K. Joshi	E. Sauri-Duch
M.O. Belem	O. Kabore	M. Sawasogo
A. Birouk	S. Khatiwada	R. Sevilla-Panizo
A. Bouizgaren	A. King	K.K. Sherchand
P. Bramel-Cox	D. Lope-Alzina	A. Subedi
S. Brush	M. Mahdi	M. Taghouti
L. Burgos-May	I. Mar	A. Tan
J. Canul-Ku	F. Marquez-Sanchez	A. Teshome
F. Castillo-Gonzalez	P.N. Mathur	I. Thorman
S. Ceccarelli	H. Mellas	H.Q. Tin
P. Chaudhary	N.K. Motiramani	P. Tiwari
J.-L. Chavez-Servia	C. Morales-Valderrama	L.N. Trinh
V. Cob-Vicab	A. Mudwari	R. Tripp
P.H. Cuong	F. Nassif	M. Upadhyay
N.N. De	J. Ndung'u-Skilton	R. Valdivia-F.
A. Demessie	R. Ortega-Paczka	D. Williams
B. Dossou	Y. Pandey	R. Zangre
N. Dudnik	C. Paudel	J.-D. Zongo
T. Duch-Carballo	J.-L. Pham	
E. Ellis	P. Quek	

国际植物遗传资源研究所 (IPGRI) 是国际农业研究磋商小组 (CGIAR) 所属的一个独立自主的国际农业科学研究组织。IPGRI 的宗旨是为了人类的现在和未来促进遗传多样性的保存和利用。IPGRI 的总部设在位于意大利罗马附近的 Maccarese, 在世界范围内设有 19 个办事处。本研究所执行三个项目计划: 1) 植物遗传资源项目; 2) CGIAR 遗传资源支持项目; 3) 国际香蕉和大蕉改良协作网 (INIBAP)。

IPGRI 的国际法人地位是由其“成立协议”确定的, 截至 2000 年 1 月下列国家已经签署了该协议: 阿尔及利亚、澳大利亚、比利时、贝宁、玻利维亚、巴西、布基纳法索、喀麦隆、智利、中国、刚果、哥达斯黎加、象牙海岸、塞浦路斯、捷克、丹麦、厄瓜多尔、埃及、希腊、几内亚、匈牙利、印度、印度尼西亚、伊朗、以色列、意大利、约旦、肯尼亚、马来西亚、毛利塔尼亚、摩洛哥、挪威、巴基斯坦、巴拿马、秘鲁、波兰、葡萄牙、罗马尼亚、俄罗斯、塞内加尔、斯洛伐克、苏丹、瑞士、叙利亚、突尼斯、土耳其、乌干达和乌克兰。

IPGRI 的研究经费由下列国家政府和国际组织提供: 澳大利亚、奥地利、比利时、巴西、保加利亚、加拿大、中国、克罗地亚、塞浦路斯、捷克、丹麦、爱沙尼亚、南斯拉夫、芬兰、法国、德国、希腊、匈牙利、冰岛、印度、爱尔兰、以色列、意大利、日本、韩国、拉脱维亚、立陶宛、卢森堡、马其顿、马耳他、墨西哥、荷兰、挪威、秘鲁、菲律宾、波兰、葡萄牙、罗马尼亚、斯洛伐克、斯洛文尼亚、南非、西班牙、瑞典、瑞士、泰国、土耳其、乌干达、英国和美国, 以及亚洲开发银行 (ADB)、商品公共基金会、农业和农村合作技术中心 (CTA)、欧洲环境署 (EEA)、欧洲联盟、联合国粮农组织 (FAO)、加拿大国际发展研究中心 (IDRC)、国际农业发展基金会 (IFAD)、美洲开发银行、自然资源研究所 (NRI)、法国国际农业经济和发展研究中心 (CIRAD)、北欧基因库、洛克菲勒基金会、联合国计划开发署 (UNDP)、联合国环境署 (UNEP)、台湾香蕉研究所 (TBRI) 和世界银行。

本出版物采用和出现的地理名称不意味 IPGRI 或 CGIAR 对任何国家的合法地位、领土、城市或地区或它的主权、或有关的边境线的界定表示了任何意见。同样、书中所表达的观点属于作者, 不代表这些组织的观点。

引用:

Jarvis, D.I., L. Myer, H. Klemick, L. Guarino, M. Smale, A.H.D. Brown, M. Sadiki, B. Sthapit and T. Hodgkin. 2000. 农田原生境保护培训指南第一版, 国际植物遗传资源研究所东亚办事处, 北京

ISBN 92-9043-549-2

北京中关村南大街 12 号
中国农科院内
IPGRI 东亚办事处

©国际植物遗传资源研究所, 2002

前言

编写本教材的目的

本教材是为各个国家开展农业生物多样性原生境保护项目而编写的,通过对与作物遗传多样性原生境保护项目设计和执行中有关因素进行综合分析,为各界人士包括农业与环境行政管理部门、大专院校、研究和推广单位、非政府组织(NGOs)以及社区基层单位提供科学的参考依据。

农田原生境保护是一个广泛而复杂的课题,任何培训教材都不可能包含所有与之相关理论的具体细节。因此,本教材将连续为各国进行的农田保护项目提供能力建设及项目执行中所涉及的基本技术和方法。讨论农田保护项目实施所必需的信息和实践步骤,并且介绍实施这些项目的重要性。通过阅读该培训教材提供的基本信息,读者应该能够在其所从事的领域鉴别和获得需要的具体信息。

教材使用对象

本教材适用于那些从事下列工作的人员:

- 主张进行非原生境保护外的其它植物遗传资源(PGR)保护项目
- 将农民纳入资源保护和育种实践
- 设计整个农业生态系统保护项目
- 通过利用地方作物资源改善农民生活
- 确定国家作物遗传多样性丰富中心
- 利用地方作物遗传多样性提高农作物产量

所有这些人员可能来自从事植物遗传资源、可持续农业和农村发展工作的国家农业研究和育种机构、大专院校、研究中心、推广服务单位、非政府机构和其它组织。

可以预料,利用本教材的人们将是长期进行国家植物遗传资源非原生境保护项目中的一部分或与这些工作密切相关,因为这些人希望通过原生境保护扩大作物遗传资源的保护范围。由于原生境保护包括众多相关的学科,其中有些学科在以前进行的植物遗传资源典型的非原生境保护项目中未曾涉及过,因此,我们希望该教材能够帮助任何一个国家开展包括农田保护在内的国家保护项目,当然也包括那些地区或国际机构的合作者。

本教材的结构安排

第一章介绍了农田原生境保护,详细地阐述了农田原生境保护的重要意义及其与非原生境保护策略的不同之处。接下来五章描述了农田保护项目设计中必需的信息类别。第二章讨论了作物遗传资源管理中人的因素,如社会、文化和经济对农民决定的影响。第三章涵盖了农业生态系统的各种因素和它们在改变作物遗传资源多样性方面的作用。第四章着重强调了农民在多种作物栽培中对农艺性状选择的重要性以及通过田间或实验室进行性状测量的重要性。第五章论述了作物群体遗传学和育种系统在农田保护中的作

用。第六章讨论了包括种子供应和贮藏在内的种子系统。接下来的四章则主要探讨农田保护的实际设计和执行过程中的问题。第七章讨论了国家机构和决策部门在农田保护中进行立项的必要性,同时也强调了个人和机构之间的合作关系。第八章和第九章详细论述了多学科在进行研究和保护中的综合利用过程,以及管理人员、决策者和社区如何利用这些研究结果。第十章主要探讨了从事保护的农场系统可能采取的策略问题。

本教材所涉及的学科包括从遗传学到生态学再到人类学的各个学科,还包括取样、数据分析和参与性保护所涉及的各个方面以及科学、管理与发展的关系等等。该教材只是在最大限度内提供最基本和最必需的概念,文中解释这些概念所列举的例子都是从各个国家在参与 IPGRI“全球农业生物多样性原生境保护”项目或其它世界范围内进行的植物遗传资源研究和保护项目中总结出来的。书中推荐的读物主要是指导读者直接获取这些读物并扩大在各个领域的知识面。

在课堂上,我们期望所有参加人员能够将他们自己的知识融入进来,以逐渐丰富我们的教材内容。我们还希望读者将他们实际工作中的事例与本教材提供的相关内容结合起来,并将所获得的结果反馈给在 IPGRI 工作的作者。

致谢

本教材的编写得到了瑞士政府（瑞士发展与合作局）、荷兰政府（DGIS-国际合作理事会）、德国政府（BMZ/GTZ-Bundesministerium für Wirtschaftliche Zusammenarbeit/Deutsche Gesellschaft Für Technische Zusammenarbeit）、加拿大政府（IDRC-国际发展研究中心）和联合国粮农组织提供的资金支持，作者在此表示诚挚的谢意！

我们特别感谢本教材编辑 Linda Sears，她不仅为本教材的及时出版付出了辛勤劳动，而且使本教材的设计非常具有吸引力。

最后我们要感谢所有参与本教材编写工作的人们，他们中有农民、发展商、教育工作者、研究人员，还有政府官员，他们通过参与“加强农业生物多样性原生境保护科学基础研究”项目而使得本教材能够顺利出版。

参与本书编写的合作者

Australia

Dr ADH Brown
Division of Plant Industry
CSIRO
GPO Box 1600
Canberra, A.C.T. 2601
Tel: +61 2 6246081
Fax: +61 2 62465000
Email: t.brown@pi.csiro.au

Burkina Faso

Dr Didier Balma
Institut de l'Environnement et Recherches
Agricoles (INERA)
01 BP 476 Ouagadougou 01
Tel: (226) 319202 or 336517
Fax: (226) 319206
Email: dbal@fasonet.bf

Dr Maïmounata Ouedraogo Belem
Institut de l'Environnement et Recherches
Agricoles (INERA)
01 BP 476 Ouagadougou 01
Email: belem@irbet.irbet.bf

Mr Madibaye Djimadoum
Agro-écologue
Fédération National des Groupement Naam
(FNGN)
BP 100 Ouahigouya
Tel: 226 550411
Fax: 226 550162
Email: fugn@fasonet.bf

Dr Omer Kabore
FUGN
c/o INERA
01 B.P. 476 Ouagadougou 01
Tel: (226) 319202 or 336517
Fax: (226) 319206

Mahamadou Sawasogo
Institut de l'Environnement et Recherches
Agricoles (INERA)
01 BP 476 Ouagadougou 01

Dr Roger G Zangre
Centre Nationale de Recherche, Scientifique et
Technologique
03 BP 7021 Ouagadougou 03
Ouagadougou
Tel: +226 365912
Fax: +226 315003; 319206

Dr Jean-Didier Zongo
Institut de Développement Rural
Université de Ouagadougou
Ouagadougou
Tel: (226) 307159; 381114 (home)
Fax: (226) 307242
Email: zongojd@fast.univ-ouaga.bf

Denmark

Dr Esbern Friis-Hansen
Herluf trolles
Gade 24
2TV 105 2K
Copenhagen
Email: efh@cDrdk

Ethiopia

Dr Zemedede Asfaw
The National Herbarium
Department of Biology
Addis Ababa University
PO Box 3434
Addis Ababa
Tel: (251) 1 114323
Fax: (251) 1 552350 or 552150
Email: biology.aau@telecom.net.et

Dr Abebe Demissie
A/General Manager
Biodiversity Conservation and Research
Institute
Box 30726 Addis Ababa
Email: biod-et@telecom.net.et

Hungary

Mr Istvan Mar
In situ Coordinator
Institute of Agrobotany
H - 2766 Tapioszele
Tel: (36) 53 380 070/071
Fax: (36) 53 380 072
Email: imar@agrobot.rcat.hu

India

Dr Narendra Motiramani
Scientist
Department of Plant Breeding and Genetics
Indira Gandhi Agricultural University
Krishak Nagar, Raipus (M.P.)
492012
Fax: 91-771-424532
Tel: 91-771-424481/424315/424666 (ext: 126)
Tel. (Res.): 91-771-429746

Dr Paula Bramel-Cox
ICRISAT
Patancheru 502 324
Andhra Pradesh
Tel: 91-40 596161
Fax: 91-40 241239
Email: P.Bramel-Cox@cgiar.org

Mexico

Mr Luis Manuel Arias Reyes
CINVESTAV - Unidad Merida
Carr. Antigua a Progreso Km. 6
P. 73 "Cordemex"
97310 Merida, Yucatan
Tel: 52 (99) 812960/ 812931
Fax: 52 (99) 812919
Email: lmarias@mda.cinvestave.mx

Luis Alberto Burgos
CINVESTAV - Unidad Merida
Carr. Antigua a Progreso Km. 6
P. 73 "Cordemex"
97310 Merida, Yucatan

Jaime Canul-Ku
CINVESTAV - Unidad Merida
Carr. Antigua a Progreso Km. 6
P. 73 "Cordemex"
97310 Merida, Yucatan

Dr Fernando Castillo-Gonzalez
Colegio de Postgraduados
Instituto de Recursos Geneticos y Productividad
Km 35,5 Carretera Mexico-Texcoco
56230 Montecillo, Texcoco
Tel: (91 595) 1 02 30
Fax: (91 595) 1 15 44
Email: fcastill@colpos.colpos.mx

Vidal Cob-Vicab
CINVESTAV - Unidad Merida
Carr. Antigua a Progreso Km. 6
P. 73 "Cordemex"
97310 Merida, Yucatan

Teresa Duch-Carballo
CINVESTAV - Unidad Merida
Carr. Antigua a Progreso Km. 6
P. 73 "Cordemex"
97310 Merida, Yucatan

Ms Diana Lope-Alzina
CINVESTAV - Unidad Merida
Carr. Antigua a Progreso Km. 6
P. 73 "Cordemex"
97310 Merida, Yucatan

Dr Fidel Marquez S.
Coordinator of the Maize Breeding Program
Universidad Autonoma Chapingo (UACH)
Manuel M. Dieguez 113
44680 Guadalajara, Jal.
Tel/Fax: (52-3) 5151729
Email: cruoc@cencar.udg.mx

Dr Carmen Morales-Valderrama
DEAS-INAH
Ex Convento del Carmen
Ave. Revolución esq. Monasterio San Angel
D.F. C.P. 01000
Tel: (52-5) 5508043/3917655
Fax: (52-5) 6162073
Email: CHOMAK63@INFOSEL.NET.MX

Dr Rafael Ortega-Paczka
UACH
Chapingo, Texcoco
CP 56190
Tel: (home) (52-595) 429-31
Tel and Fax: (Office) (52-595) 450-20
Email: paczka@taurus1.chapingo.mx

Teresa Quiñones Vega
CINVESTAV - Unidad Merida
Carr. Antigua a Progreso Km. 6
P. 73 "Cordemex"
97310 Merida, Yucatan

Mr Juan Rodriguez
Inst. Tecnológico Agropecuario No. 2
Km 16,3 Antigua Carretera Merida-Motul
Conkal, Yucatan
Tel: (991-2) 4135

Dr Enrique Sauri Duch
Instituto Tecnológico de Merida
Division de Estudios de Postgrado e
Investigacion
Laboratorio de Ciencia y Tecnologia de
Alimentos
Km. 5 carretera Merida-Progreso
Merida, Yucatan, C.P. 97118
Tel and Fax: (99) 44-84-79
Email: esauri@labna.itmerida.mx

Morocco

Dr Riad Balaghi
 Agroclimatology Laboratory
 Institut National de la Recherche
 Agronomique (INRA)
 BP 578, Meknes
 Tel: 212 5 - 30 02 43
 Fax: 212 5 - 30 02 44
 Email: r.balaghi@caramail.com
 Email: olea@ibnawam.inra.org.ma

Dr Ahmed Birouk
 Labo. Phytogénétique et Biotech. Végétale
 Hassan II Université
 BP 6202, Rabat
 Tel: (212 7) 776788
 Fax: (212 7) 778135/775838
 Email: birouk@fusion.net.ma

Mr Abdelaziz Bouizgaren
 INRA
 Centre Régional du Haouz et Présahara
 Marrakech
 Email: bouizgaren@hotmail.com

Dr Daoud Fanissi
 Coordonnateur de la Subdivision
 de l'ORMVA/TF
 BP 47, Rich
 Tel: 212-55-89130
 Email: d.fanissi@caramail.com

Meriem Ibnou Ali El Alaoui
 INRA Centre Régional de Saïs et Moyen Atlas
 BP 578 Meknes
 Email: meriem_206@yahoo.fr
 Mr Mohammed Mahdi
 Institut National de la Recherche
 Agronomique (INRA)
 BP 578 Meknes

Dr Hamdoun Mellas
 Department de Genetique Appliquée
 INRA
 BP 415, Bd. Annasr, Rabat
 Tel: 212-7-772608/770049
 Email: mellas@awamia.inra.org.ma

Dr Fattima Nassif
 INRA
 BP 589, Settât
 Tel: 212-3-403210/403210
 Email: nassif@settânet.net.ma

Keltoum Rh'Rib
 Germplasm Program
 INRA
 Rabat
 Email: Rh'Rib@awamia.inra.org.ma

Dr Mohammed Sadiki
 Laboratoire de génétijque des légumineuses
 (GLGB)
 Institut Agronomique et Vétérinaire Hassan II
 BP 6202, Rabat-Institut
 Rabat
 Email: sadiki@fusion.net.ma

Mouna Taghouti
 Tissue Culture
 INRA Rabat
 Email: Taghouti@awamia.inra.org.ma

Nepal

Mrs Jwala Bajracharya
 Senior scientist (TLCB)
 Agricultural Botany Division
 Nepal Agricultural Research Council
 Khumaltar, Lalitpur
 Email: Jwala@unlimit.com

Mr Bimal Baniya
 Chief, Division of Agricultural Botany
 Nepal Agricultural Research Council
 Khumaltar, Lalitpur
 Email: ISCC_nepal2@wlink.com.np

Mr Pasupati Chaudhary
 Site officer, Bara
 c/o LI-BIRD
 PO Box 324, Pokhara

Mr Devendra Gauchan
 Senior Social Scientist
 Division of Outreach research
 Nepal Agricultural Research Council
 Khumaltar, Lalitpur
 Email: ISCC_nepal2@wlink.com.np

Mr Krishna Joshi
 Plant breeder (TL-PPB)
 LI-BIRD
 PO Box 324
 Mahendrapul, Kaski, Pokhara
 Email: teebird@mos.com.np

Mr Shambu Khatiwada
Senior rice breeder and site coordinator, Bara
National Rice Research Programme
Hardinath, Dhanusha, Janakpur

Mr Ashok Mudwari
Senior breeder (PPB)
Agricultural Botany Division
Nepal Agricultural Research Council
Khumaltar, Lalitpur
Email: ISCC_nepal2@wlink.com.np

Mr Yam Pandey
Senior Horticulturist
Horticultural Research Farm
Malepatan, Pokhara

Mr Chabi Paudel
Senior agronomist and site co-ordinator, Jumla
Agricultural Research Station
Khalanga, Jumla, Karnali Zone

Mr Ram Rana
In situ team leader and social scientist
LI-BIRD
PO Box 324
Mahendrapul, Kaski, Pokhara
Email: rblibird@mos.com.np

Mr Deepak Rijal
Site Coordinator, Kaski (TL-CP)
LI-BIRD
PO Box 324
Mahendrapul, Kaski, Pokhara
Email: drlibird@mos.com.np

KK Sherchand
LI-BIRD
PO Box 324
Mahendrapul, Kaski, Pokhara
Email: kksherchand@mos.com.np

Mr Pratap Shrestha
Social scientist
LI-BIRD
PO Box 324
Mahendrapul, Kaski, Pokhara

Dr Anil Subedi
Executive Director
LI-BIRD
PO Box 324
Mahendrapul, Kaski, Pokhara
Email: aslibird@mos.com.np

Mr Puspa Tiwari
Site Officer, Jumla
c/o LI-BIRD
PO Box 324
Mahendrapul, Kaski, Pokhara
Email: prtivari@mos.com.np

Dr Madhusudham Upadhyay
National Project Coordinator
Agricultural Botany Division
Nepal Agricultural Research Council
Khumaltar, Lalitpur
Email: ISCC_nepal2@wlink.com.np

Mr Subhash Vaidya
Chief, Outreach Research Division
Nepal Agricultural Research Council
Khumaltar, Lalitpur

Peru

Dr Maria Fernandez
Profesora Visitante
Investigacion Participativa
Universidad Nacional Agraria
Casilla R18-067
Lima 18
Tel: +51 (1) 349 4057; 349 5647 an.213
Email: mefernandez@lamolina.edu.pe

Ing. Ricardo Sevilla P.
Director
Biodiversidad y Recursos Geneticos CODESU
Ramón Dagnino 369
Lima 11
Tel/ Fax: +51 (1) 4338837
Email: ariesco@codesu.org.pe
Codesu@terra.com.pe

Dr Roberto Valdivia-F
Presidente Directoria
Centro de Investigacion de Recursos Naturales
y medio Ambient
Apartado 388, Puno
Tel: +51 (54) 353575/ 352891/ 366029
Fax: +51 (54) 353182
Email: cirnma@unap.edu.pe;
rova@unap.edu.pe

Philippines

Mr Rene Salazar
CBDC-BUCAP
C/o SEARICE
Unit 332 Eagle Court Condominium
Diliman, Quezon
Tel: 63 2 9247544
Fax: 63 2 9215432
Email: reneslr@pacific.net.ph

Dr Jean-Louis Pham
Population Geneticist
Genetic Resources Center
International Rice Research Institute
MCPO Box 3127
1271 Makati City
Email: j.pham@cgiar.org
Email: jean-louis.pham@mpl.ird.fr

South Africa

Landon Myer
Senior Scientist
South African Medical Research Council
PO Box 198
Mtubatuba 3935
South Africa
Tel: +27 35 550 0158
Fax: +27 35 550 1674
Email: landon.myer@mrc.ac.za

Syria

Dr Salvatore Ceccarelli
ICARDA
PO Box 5466
Aleppo
Tel: +963 (21) 225112
Fax: +963 (21) 213490
Email: s.ceccarelli@cgiar.org

Dr Ahmed Amri
ICARDA
PO Box 5466
Aleppo, SYRIA
Email: a.amri@cgiar.org

Turkey

Dr Ayfer Tan
Department of Plant Genetic Resources
Aegean Agricultural Research Institute (AARI)
PO Box 9 Menemen, Izmir 35661
Tel: (90 232) 8461107
Fax: (90 232) 8461331
Email: AARI@service.raksnet.com.tr

Vietnam

Mr Pham Hung Cuong
Nihung SC
VASI
Thanh Tri-Hanoi
Tel: 8615 556/8615 487
Fax: 844 8613 937
Email: lntrinh@hn.vnn.vn

Mr Nguyen Ngoc De
Head, Rice Research Department
Mekong Delta Farming Systems
Research and Development Institute
Cantho University, Cantho
Tel:(84) 71 831251/830040/8
Email: ltduong@ctu.edu.vn

Mr Nguyen Phung Ha
Daback SC
VASI
Thanh Tri-Hanoi
Tel: 8615 556/8615 487
Fax: 844 8613 937
Email: lntrinh@hn.vnn.vn

Mrs Nguyen Ngoc Hue
Nho Quan Site Coordinator
Vietnam Agricultural Science Institute
Vandien, Thanhtri, Ha Noi
Tel: 8615 556/8615 487
Fax: 844 8613 937
Email: nghia@vasi.ac.vn

Mr Huynh Quang Tin
Deputy Head
Department of Biodiversity Development
and Conservation
Farming Systems Institute
Cantho University, Cantho City, Cantho
Tel: (84-71) 831012
Fax: (84-71) 831270
Email: ltduong@ctu.edu.vn

Dr Luu Ngoc Trinh
Vietnam Agricultural Science Institute
Vandien, Thanhtri, Ha Noi
Tel: (844) 614326 / (8434) 845320
Fax: (844) 8613937
Email: lntrinh@hn.vnn.vn

United Kingdom

Dr Robert Tripp
 Research Fellow
 Overseas Development Institute
 Portland House
 Stag Place
 London SW1E 5DP
 Tel: 44-0171-393-1600
 Fax: 44-0171-393-1699
 Email: r.tripp@odi.org.uk

United States of America

Dr Stephen B. Brush
 University of California, Davis
 CA 95616
 Tel: +1 (916) 752-4368
 Email: sbrush@ucdavis.edu

Dr Erle C. Ellis
 Department of Geography and Environmental
 Systems
 University of Maryland, Baltimore County
 1000 Hilltop Circle
 Baltimore, MD 21250
 Tel: 1-410-455-2002
 Fax: 1-410-455-1056
 Email: ece@umbc.edu

IPGRI Headquarters

Via delle Sette Chiese 142
 00145, Rome, ITALY
 Ms Nina Dudnik
 Former Intern, Molecular Genetics
 Genetic Resources Science and Technology
 Group (GRST)

Dr Pablo Eyzaguirre
 Senior Scientist, Anthropology and
 Socioeconomics
 Genetic Resources Science and Technology
 Group (GRST)
 Tel: (39-06) 51892267
 Fax: (39-06) 5750309
 p.eyzaguirre@cgiar.org

Dr Toby Hodgkin
 Principle Scientist, Genetic Diversity
 Genetic Resources Science and Technology
 Group (GRST)
 Tel: (39-06) 51892212
 Fax: (39-06) 5750309
 t.hodgkin@cgiar.org

Dr Devra I. Jarvis
 Senior Scientist, *In situ* Conservation
 Genetic Resources Science and Technology
 Group (GRST)
 Tel: (39-06) 51892414
 Fax: (39-06) 5750309
 Email: d.jarvis@cgiar.org

Ms Amanda King
 Former Intern, Ethnobotany
 Genetic Resources Science and Technology
 Group (GRST)

Ms Heather Klemick
 Intern, Agroecology and Agroecomics
 Genetic Resources Science and Technology
 Group (GRST)
 Tel: (39-06) 51892404
 Fax: (39-06) 5750309
 Email: h.klemick@cgiar.org

Dr Melinda Smale
 Economist
 Genetic Resources Science and Technology
 Email: m.smale@cgiar.org

Dr Awegechew Teshome
 Former Associate Scientist, *In Situ*
 Conservation
 Genetic Resources Science and Technology
 Group (GRST)

Ms Imke Thormann
 Consultant

IPGRI Americas (AME)

c/o CIAT
 Apartado Aereo 6713
 Cali, COLOMBIA

Dr Jose Luis Chavez-Servia
In Situ Conservation Specialist on Crop
 Genetic Resources for the Americas
 c/o CINEVESTAV-IPN
 Unidad Merida, MEXICO
 Tel: 52 (99) 812960/ 812931
 Fax: 52 (99) 812919
 Email: jchavez@kin.cieamer.conacyt.mx

Mr Luigi Guarino
 Senior Scientist, Genetic Diversity
 Tel: (57-2) 445-0029
 Fax: (57-2) 445-0073
 Email: l.guarino@cgiar.org

Dr David E. Williams
Senior Scientist, Genetic Diversity
Tel: (57-2) 445-0029
Fax: (57-2) 445-0073
Email: d.williams@cgiar.org

IPGRI Asia, Pacific and Oceania (APO)

PO Box 236
UPM Post Office
Serdang
43400 Selangor Darul Ehsan, MALAYSIA

Dr P.N. Mathur
Associate Scientist
South Asia Assistant Coordinator
c/o NBPGR, Pusa Campus
New Delhi 110 012, INDIA
Tel: (91-11) 578112
Fax: (91-11) 5731845
Email: IPGRI-DELHI@cgiar.org

Dr Paul Quek
Scientist, Documentation/Information
Specialist
Tel: (60-3) 9423891-4
Fax: (60-3) 9487655
Email: p.quek@cgiar.org

Dr V. Ramanatha Rao
Senior Scientist, Genetic Diversity/
Conservation
Tel: (60-3) 9423891-4
Fax: (60-3) 9487655
Email: vr.rao@cgiar.org

Dr Ken Riley
Former Regional Director, APO
Dr Bhuwon R. Sthapit
Scientist, *In Situ* Crop Conservation Specialist
3/202 Buddha Marg
Nadipur Patan, Kaski District
Pokhara-3, NEPAL
Tel: (977-61) 21108
Fax: 977-61) 22097
Email: B.Sthapit@cgiar.org
IPGRI-APO-INSITU@CGIAR.ORG

**IPGRI Central and West Asia and North
Africa (CWANA)**

c/o ICARDA
PO Box 5466
Aleppo, SYRIA

Ms Suha Achta
Former Associate Scientist, *In Situ*
Conservation
Dr George Ayad
Regional Director, CWANA
Tel: (963-21) 213433
Fax: (963-21) 225105 or 213490
Email: g.ayad@cgiar.org

IPGRI Sub-Saharan Africa (SSA)

c/o ICRAF
PO Box 30677
Nairobi, KENYA

Dr Bernadette Dossou
Associate Scientist, *In Situ* Conservation
IPGRI West and Central Africa (WCA)
c/o IITA/Benin Research Station
08 B.P. 0932
Cotonou, BENIN
Tel: (229) 350188/350553/360600
Fax: (229) 350556
Email: b.dossou@cgiar.org

Ms Julia Ndung'u-Skilton
Associate Scientist, *In Situ* Conservation
Tel: (254-2) 521514
Fax: (254-2) 521209
Email: j.ndungu-skilton@cgiar.org

文献索引

- Aguirre, J.A., M.R. Bellon and M. Smale. 2000. A regional analysis of maize biological diversity in Southeastern Guanajuato, Mexico. *Economic Botany* 54(1):60-72.
- Allard, R.W. 1988. Genetic Changes Associated with the Evolution of Adaptedness in Cultivated Plants and Their Wild Progenitors. The Wilhelmine E. Key 1987 Invitational Lecture.
- Allard, R.W. 1990. The Genetics of Host-Pathogen Coevolution: Implications for Genetic Resource Conservation. *Journal of Heredity* 81(1):1-6.
- Almekinders, C.J.M., N.P. Louwaars and G.H. de Bruijn. 1994. Local seed systems and their importance for an improved seed supply in developing countries. *Euphytica* 78:207-216.
- Alston, J., G.W. Norton and P.G. Pardey. 1995. *Science under Scarcity*. CAB International, Wallingford, Oxon, UK.
- Altieri, M.A. and L. Merrick. 1987. *In situ* conservation of crop genetic resources through maintenance of traditional farming systems. *Economic Botany* 1: 86-96.
- Anderson, E. and L. Hubricht. 1938. Hybridization in *Tradescantia* III. The evidence for introgressive hybridization. *American Journal of Botany* 25:396-402.
- Anikster, Y., M. Feldman and A. Horovitz. 1997. The Ammiad Experiment. Pp. 239-253 *in Plant Genetic Conservation* (B.V. Ford- Lloyd, J.G. Hawkes and N. Maxted, eds.). Chapman and Hall, London.
- Arias, L., J. Chávez, V. Cob, L. Burgos and J. Canul. 2000. Agromorphological characters and farmer perceptions: data collection and analysis. Mexico. Pp. 95-100 *in Conserving agricultural biodiversity in situ: A scientific basis for sustainable agriculture* (D. Jarvis, B. Sthapit and L. Sears, eds.). International Plant Genetic Resources Institute, Rome, Italy.
- Auricht, G.C., R. Redid and L. Guarino. 1995. Published information of the natural and human environment. Pp. 131-151 *in Collecting Plant Genetic Diversity: Technical Guidelines* (L. Guarino, V.R. Rao and R. Reid, eds.). CAB International, Oxon UK.
- Baldwin, J.F. 1981. Fuzzy logic and fuzzy reasoning. *In Fuzzy Reasoning and Its Applications* (E.H. Mamdani and B.R. Gaines, eds.). Academic Press, London.
- Balma, Didier. 1998. Establishing multidisciplinary groups and project preparation in Burkina Faso. *In Strengthening the scientific basis of in situ conservation of agricultural biodiversity onfarm. Options for data collecting and analysis. Proceedings of a workshop to develop tools and procedures for in situ conservation on-farm, 25-29 August 1997*. IPGRI, Rome.
- Baniya, B.K., A. Subedi, R.B. Rana, C.L. Paudel, S.P. Khatiwada, D.K. Rijal and B.R. Sthapit. 2000. Seed supply systems: data collection and analysis. Nepal. Pp. 159-164 *in Conserving agricultural biodiversity in situ: A scientific basis for sustainable agriculture* (D. Jarvis, B. Sthapit and L. Sears, eds.). International Plant Genetic Resources Institute, Rome, Italy.
- Barbier, E. 1988. *Sustainable Agriculture and the Resource Poor: Policy Issues and Options*. IIED, University College London, Environmental Economics Center.
- Barbour, M.G., J.H. Burk and W.D. Pitts. 1987. *Terrestrial Plant Ecology* (Second Edition). Benjamin Cummings Publishing, Wokingham, UK.
- Barrett, S.C.H. and J.R. Kohn. 1991. Genetic and Evolutionary Consequences of Small Population Size in Plants: Implications for Conservation. Pp. 3-30 *in Genetics and Conservation of Rare Plants* (D.A. Falk and K.E. Holsinger, eds.). Oxford University Press, Oxford.
- Belem, M.O. 2000. Socioeconomic data collection and analysis. Burkina Faso. Pp. 46-48 *in Conserving agricultural biodiversity in situ: A scientific basis for sustainable agriculture* (D. Jarvis, B. Sthapit and L. Sears, eds.). International Plant Genetic Resources Institute, Rome, Italy.
- Bellon, M.R. 1996. The dynamics of crop infraspecific diversity: A conceptual framework at the farmer level. *Economic Botany* 50:26-39.
- Bellon, M.R. and S.B. Brush. 1994. Keepers of the Maize in Chiapas, Mexico. *Economic Botany* 48:196-209.
- Bellon, M.R. and M. Smale. 1998. A conceptual framework for valuing on-farm genetic resources. CIMMYT Economics Programme Working Paper. CIMMYT, Mexico D.F.
- Bellon, M.R. and J.E. Taylor. 1993. 'Folk' soil taxonomy and the partial adoption of new seed varieties. *Economic Development and Cultural Change* 41 :763-786.

- Bellon, M.R., M. Smale, A. Aguirre, F. Aragón, S. Taba, J. Berthaud, J. Díaz and H. Castro. 1999. Farmer management of maize diversity in the central valleys of Oaxaca, Mexico: Methods proposed for impact assessment. *In Assessing the Impact of Participatory Research and Gender Analysis* (N. Lilja, J.A. Ashby and L. Sperling, eds.). CGIAR Programme on Participatory Research and Gender Analysis, Cali, Colombia.
- Bellon, M.R., J.-L. Pham, L.S. Sebastian, S.R. Francisco, G.C. Loresto, D. Erasga, P. Sanchez, M. Calibo, G. Abrigo and S. Quilloy. 1998. Farmers' perceptions of varietal diversity: implications for on-farm conservation of rice. *In Farmers, Gene Banks, and Crop Breeding: Economic Analyses of Diversity in Wheat, Maize, and Rice* (M. Smale, ed.). Kluwer Academic Publishers, The Netherlands/CIMMYT, Mexico.
- Bellon, M.R., J.-L. Pham and M.T. Jackson. 1997. Genetic conservation: a role for rice farmers. Pp. 261-289 *in Plant Genetic Conservation: The In Situ Approach* (N. Maxted, B.V. Ford-Lloyd and J.G. Hawkes, eds.). Chapman and Hall, London.
- Benz, B.F., L.R. Santana Miche and F.J. Sanchez-Velasquez. 1990. Ecology and Ethnobotany of *Zea diploperennis*: Preliminary investigations. *Maydica* 35:85-98.
- Berg, T. 1993. The science of plant breeding: Support or alternative to traditional practices? Pp. 72-77 *in Cultivating Knowledge: Genetic Diversity, Farmer Experimentation and Crop Research* (W. de Boef, K. Amanor and K. Wellard, eds.). Intermediate Technology Publications, London.
- Blum, A. and C.Y. Sullivan. 1986. The comparative drought resistance of landraces of sorghum and millet from dry and humid regions. *Annals of Botany* 57:835-846.
- Bommer, D.F.R. 1991. The historical development of international collaboration in plant genetic resources. Pp. 3-12 *in Searching for New Concepts for Collaborative Genetic Resources Management: Papers of the EUCARPIA/IBPGR Symposium, Wageningen, The Netherlands* (T.J.L. van Hintum, L. Frese and P.M. Perret, eds.). International Crop Network Series No. 4. IBPGR, Rome.
- Boster, J.S. 1985. Selection for perceptual distinctiveness: evidence from Aguaruna cultivars of *Manihot esculenta*. *Economic Botany* 39:310-325.
- Bowman, K.O., K. Hutcheson, E.P. Odum and L.R. Shenton. 1971. Comments on the distribution of indices of diversity. Pp. 315-366 *in Statistical Ecology, Vol. 3. Many Species Population, Ecosystems, and Systems Analysis* (G.P. Patil, E.C. Pielou and W.E. Waters, eds.). Pennsylvania State University Press, University Park.
- Bretting, P.K. and D.N. Duvick. 1997. Dynamic conservation of plant genetic resources. *Advances in Agronomy* 61:1-51.
- Briggs, D. and S.M. Walters. 1997. *Plant Variation and Evolution*. Cambridge University Press.
- Brockhaus, R. and A. Oetmann. 1996. Aspects of the documentation of *in situ* conservation measures of genetic resources. *Plant Genetic Resources Newsletter* 108:1-16.
- Brown, A.H.D. 2000. The genetic structure of crop landraces and the challenge to conserve them *in situ* on farms. Pp. 29-48 *in Genes in the Field: On-Farm Conservation of Crop Diversity* (S.B. Brush, ed.). Lewis Publishers, Boca Raton, FL, USA.
- Brown, A.H.D. and D.R. Marshall. 1996. A basic sampling strategy: theory and practice. Pp. 75-91 *in Collecting Plant Genetic Diversity: Technical Guidelines* (L. Guarino, V.R. Rao and R. Reid, eds.). CAB International, Oxon UK.
- Brush, S. 1995. *In situ* conservation of landraces in centres of crop diversity. *Crop Science* 35:346-54.
- Brush, S.B. 1991. A farmer-based approach to conserving crop germplasm. *Economic Botany* 45:153-65. Brush, S.B. and E. Meng. 1998. Farmers' valuation and conservation of crop genetic resources. *Genetic Resources and Crop Evolution* 45:139-150.
- Brush, S.B., J.E. Taylor and M. Bellon. 1992. Technology Adoption and Biological Diversity in Andean Potato Agriculture. *Journal of Development Economics* 39:365-387.
- Burdon, J.J., A.H.D. Jarosz and A.M. Brown 1990. The spatial scale of genetic interactions in host-pathogen coevolved systems. *In Pests, Pathogens and Plant Communities* (J.J. Burdon and S.R. Leather, eds.). Blackwell Scientific Publications, Oxford.
- Caballero, A. 1994. Developments in the prediction of effective population size. *Heredity* 73:657-79.

- Casas, A. and J. Caballero. 1996. Traditional management and morphological variation in *Leucaena esculenta* (Fabaceae: Mimosoideae) in the Mixtec Region of Guerrero, Mexico. *Economic Botany* 50(2):167-181.
- Casley, D.J. 1988. The collection, analysis, and use of monitoring and evaluation data. World Bank.
- Castillo G., F., L.M. Arias R., R. Ortega P. and F. Marquez S. 2000. PPB, Seed networks and grassroot strengthening. Mexico. Pp. 199-200 *in* Conserving agricultural biodiversity *in situ*: A scientific basis for sustainable agriculture (D. Jarvis, B. Sthapit and L. Sears, eds.). International Plant Genetic Resources Institute, Rome, Italy.
- Causton, David R. 1988. *An Introduction to Vegetation Analysis*. Unwin Hyman, London.
- Ceccarelli, S., S. Grando and R.H. Booth. 1995. Farmers and crop breeders as partners. Pp. 99-116 *in* Participatory Plant Breeding: Proceedings of a Workshop on Participatory Plant Breeding (P. Eyzaguirre and M. Iwanaga, eds.). IPGRI, Rome.
- Chambers, Robert. 1994. The Origins and Practice of Participatory Rural Appraisal. *World Development* 22(7):953-969.
- Chamber, R. and B. Childyal. 1985. Agricultural Research for Resource-Poor Farmers: the Farmers-First-and-Last Model. Discussion Paper No. 203. Institute of Development Studies, Brighton.
- CIMMYT. 1988. *From Agronomic Data to Farmer Recommendations: An Economics Training Manual*. Completely revised edition (English, Spanish, French). CIMMYT, Mexico, D.F./The World Bank, Washington, DC.
- Costanza, R., R. D'Arge, R. de Groot, S. Farber, M. Grasso, B. Hannon, K. Limburg, S. Naeem, R.V O'Neill, J. Paruelo, R.G. Raskin, P. Sutton and M. van den Belt. 1997. The value of the world's ecosystem services and natural capital. *Nature* 387: 253-260.
- Cromwell, E. 1996. The seed sector in perspective. Pp. 8-25 *in* Governments, Farmers and Seeds in a Changing Africa (E. Cromwell, ed.). CAB International, UK. Cromwell, E.A., E. Friis-Hansen and M. Turner. 1992. The seed sector in developing countries: a framework for performance analysis. ODI Working Paper No. 65. Overseas Development Institute, London.
- Crossa, J. 1989. Methodologies for estimating the sample size required for genetic conservation of outbreeding crops. *Theoretical and Applied Genetics* 77:153-161.
- Crossa, J. and R. Vencovsky. 1994. Implications of the variance effective population size on the genetic conservation of monoecious species. *Theoretical and Applied Genetics* 89:936-42.
- De, Nguyen Ngoc. 2000. Linking the National Genebank of Vietnam and farmers: Experiences from Mekong Delta in Vietnam. Chapter 7 *in* Participatory Approaches to the Conservation and Use of Plant Genetic Resources (E. Friis-Hansen and B. Sthapit, eds.). IPGRI, Rome. (in press)
- Dearing, J.A. and L. Guarino. 1995. Bibliographic databases for plant germplasm collectors. Pp. 229-254 *in* Collecting Plant Genetic Diversity: Technical Guidelines (L. Guarino, V. Ramanatha Rao and R. Reid, eds.). CAB International, Wallingford, UK.
- Demissie, A. and A. Bjornstad. 1997. Geographical, altitude and agroecological differentiation of isozyme and hordein genotypes of landrace barleys from Ethiopia: implications to germplasm conservation. *Genetic Resources and Crop Evolution* 44:43- 55.
- Demissie, A. and A. Bjornstad. 1996. Phenotypic diversity of Ethiopian barleys in relation to geographical regions, altitudinal range, and agroecological zones: as an aid to germplasm collection and conservation strategy. *Hereditas* 124:17-29.
- Dennis, J.V. 1987. *Farmer Management of Rice Variety Diversity in Northern Thailand*. PhD thesis. Cornell University, Ithaca, NY.
- Devlin, B. and N.C. Ellstrand. 1990. The development and application of a refined method for estimating gene flow from angiosperm paternity analysis. *American Journal of Botany* 79:1311-1319.
- Ehrlich, P.R. and P.H. Raven. 1969. Differentiation of populations. *Science* 165:1228-1232.
- Ellis, E.C. and S.M. Wang. 1997. Sustainable traditional agriculture in the Tai Lake Region of China. *Agriculture Ecosystems & Environment* 61:177-193.
- Ellis, E.C., R.G. Li, L.Z. Yang and X. Cheng. 2000. Long-term change in village-scale ecosystems in China using landscape and statistical methods. *Ecological Applications* 10(4):1057-1073.

- Ellstrand, N.C. and C.A. Hoffman. 1990. Hybridization as an avenue for escape for engineered genes. *BioScience* 40:438-442.
- Epperson, B.K. 1990. Spatial autocorrelation of genotypes under directional selection. *Genetics* 124:757-71.
- Eyzaguirre, P. and M. Iwanaga, editors. 1996. Participatory Plant Breeding: Proceedings of a Workshop on Participatory Plant Breeding. IPGRI, Rome. xix
- Eyzaguirre, P. and M. Iwanaga. 1995. Farmers' contribution to maintaining genetic diversity in crops, and its role within the total genetic resources system. Pp. 9-18 in *Participatory Plant Breeding: Proceedings of a Workshop on Participatory Plant Breeding* (P. Eyzaguirre and M. Iwanaga, eds.). IPGRI, Rome.
- FAO. 1989. Les Ressources Phytogenetiques: Leur Conservation *in situ* au service des besoins humains. FAO, Rome. FAO. 1990. Guidelines for soil profile description. 3rd Edition, Revised. FAO, Rome.
- FAO. 1997. Annex II: Guide for the conduct of constraints analysis component. Special Programme for Food Security, SPFS/DOC/18, Handbook Series, Volume II. FAO, Rome.
- FAO. 1998. Socioeconomic and Gender Analysis Programme Field Handbook (Principal Author, V.L. Wilde). FAO, Rome.
- Feldstein, Hilary Sims and Janice Jiggins. 1994. Tools for the Field: Methodologies Handbook for Gender Analysis. Kumarian Press Inc., West Hartford, CT, USA.
- Finckh, M. and M. Wolfe. 1997. The use of biodiversity to restrict plant diseases and some consequences for farmers and society. Pp. 203-237 in *Ecology in Agriculture* (Louise E. Jackson, ed.). Academic Press, London.
- Ford-Lloyd, V.B. 1986. Intraspecific variation in wild and cultivated beets and its effects upon infraspecific classification. In *Intraspecific Classification of Wild and Cultivated Plants* (B.T. Styles, ed.). Clarendon Press, Oxford.
- Ford-Lloyd, V.B. and J.T. Williams. 1975. A revision of *Beta* section *Vulgares* (Chenopodiaceae), with new light on the origin of cultivated beets. *Botanical Journal of the Linnean Society* 17:89-102.
- Frankel, O.H. 1974. Genetic conservation: our evolutionary responsibility. *Genetics* 78:53- 65.
- Frankel, O.H., A.H.D. Brown and J.J. Burdon. 1995. *The Conservation of Plant Biodiversity*. Cambridge University Press.
- Frankel, O.H. and J.G. Hawkes, eds. 1975. *Crop Genetic Resources for today and tomorrow*. International Biological Programme 2. Cambridge University Press, Cambridge.
- Frankfort-Nachmias, Chava and David Nachmias. 1996. *Research Methods in the Social Sciences*. St. Martin's Press, New York.
- Friis-Hansen, E. 1996. The role of local plant genetic resource management in participatory breeding. Pp. 66-76 in *Participatory Plant Breeding: Proceedings of a Workshop on Participatory Plant Breeding* (P. Eyzaguirre and M. Iwanaga, eds.). IPGRI, Rome.
- Friis-Hansen, E. 2000. Participatory approaches to a study of plant genetic resources management in Tanzania. Chapter 15 in *Participatory approaches to the conservation and use of plant genetic resources* (E. Friis- Hansen and B. Sthapit, eds.). International Plant Genetic Resources Institute, Rome, Italy.
- Friis-Hansen, E. 2000. Socioeconomic data collection and analysis. Tanzania. Pp. 60-62 in *Conserving agricultural biodiversity in situ: A scientific basis for sustainable agriculture* (D. Jarvis, B. Sthapit and L. Sears, eds.). International Plant Genetic Resources Institute, Rome, Italy
- Friis-Hansen, E. and B. Sthapit, eds. 2000. *Participatory approaches to the conservation and use of plant genetic resources*. International Plant Genetic Resources Institute, Rome, Italy.
- Gaifami, A. 1992. Developing local seed production in Mozambique. Pp. 97-105 in *Growing Diversity: Genetic Resources and Local food Security* (D. Cooper, R. Vellve and H. Hobbelenk, eds.). ITP, London.
- Gauch, Hugh G. Jr. 1982. *Multivariate Analysis in Community Ecology*. Cambridge University Press, Cambridge.
- Gauchan, D., A. Subedi, S.N. Vaidya, M.P. Upadhyay, B.K. Baniya, D.K. Rijal and P. Chaudhary. 2000. Policy changes, extension and formal education systems. Nepal. Pp. 221-225 in *Conserving agricultural biodiversity in situ: A scientific basis for sustainable agriculture* (D. Jarvis, B. Sthapit and L. Sears, eds.). International Plant Genetic Resources Institute, Rome, Italy