

The **Comminutor**

Newsletter of the TSBF Institute of CIAT



Prepared at TSBF Headquarters, PO Box 30677, Nairobi, Kenya June 2006 Volume 10 No.1



Editors:

Andre Bationo,
Nteranya Sanginga,
Boaz Waswa,
Job Kihara and
Juliet Ogola



AfNet Scientists during DSSAT training workshop in Accra, Ghana



Maize response to nutrient input in Western Kenya

Publisher:

Tropical Soil Biology and Fertility Institute of CIAT (TSBF-CIAT)

Design & Layout:

Ecomedia Ltd, Tel. +254 20 7224280
Email: ecomedia@cgiar.org

Editors:

Andre Bationo, Nteranya Sanginga, Boaz Waswa, Job Kihara and Juliet Ogola

TSBF-CIAT is a research programme whose main aim is to contribute to human welfare and environmental conservation in the tropics by developing adoptable and suitable soil management practices that integrate the biological, chemical and socioeconomic processes that regulate soil fertility and optimize the use of organic and inorganic resources to the land users.

TSBF-CIAT
United Nations Avenue, Gigiri
P.O. Box 30677, Nairobi, Kenya
Tel: +254 20 7224755
Fax: +254 20 7224763
Email: tsbfinfo@cgiar.org

Contents

Preface	2
TSBF-CIAT Centre Commissioned External Review (CCER-2006)	3
Success Stories	4
The Consortium for Improving Agriculture-based Livelihoods in Central Africa (CIALCA).	6
Oasis: A New Global R4D Partnership against Desertification	8
CIAT/FARA Sign Memorandum of Understanding on AfNet	10
New Projects	11
Training Workshops	12
New Staff	17
Announcements	21
TSBF Publications	22

Preface

The Tropical Soil Biology and Fertility institute of the International Center for Tropical Agriculture (TSBF CIAT) continues to be an excellent research centre in soil fertility in the tropics. TSBF-CIAT research focus primarily on strategic research, but it is ready to conducts research for development with partners via regional networks and global projects. Research for development activities are conducted in close collaboration with a range of partners including NARES, ARIs, Universities, NGOs and farmer groups/communities throughout Sub-Saharan Africa, Central America (Honduras, Nicaragua) and South America (Colombia, Brazil, Ecuador, Peru, Bolivia). In recent years this research has focused on a paradigm of Integrated Soil Fertility Management (ISFM). Various success stories emanating from the TSBF research in the region can be identified. Over the years TSBF, through the African Network for Soil Biology and Fertility (AfNet) and the Below Ground Biodiversity Program have successfully contributed to the capacity building of African scientists by organizing various courses in participatory research and scaling up, gender analysis modeling, carbon sequestration and below ground biodiversity. This issue of the *The Comminutor* is dedicated to highlighting past key research issues of TSBF.

TSBF-CIAT Centre Commissioned External Review (CCER-2006)

Integrated Soil Fertility Management in the Tropics: Achievements and Reflections (2002-2005)

Executive summary

The Tropical Soils Biology and Fertility Institute of CIAT (TSBF-CIAT) undertook a Centre Commissioned External Review (CCER 2006) with the aim of evaluating its achievements and reflections for the period 2002-2005. The review complemented and updated the TSBF-CIAT Strategy Document “Integrated soil fertility management in the Tropics: From Knowledge to Implementation”.

Since its creation in 1984, TSBF has conducted foundational research on the role of biological and organic resources in tropical soil fertility, in order to provide farmers with improved soil management practices for sustainable increase in agricultural productivity. In 1997, the International Center for Tropical Agriculture (“CIAT” or Centro Internacional de Agricultura Tropical) created a soils team (PE-2 Project) in Latin America to focus on identification of strategic principles, concepts and methods for protecting and improving soil quality through the efficient and sustainable use of soil, water and nutrient resources in crop-pasture-fallow systems in tropical savannas and hillsides agroecosystems. CIAT Project PE-2 evolved from CIAT’s Savannas (1992-1993) and Tropical Lowlands (1994-1995) Programs with the realization that soil was an increasingly important but neglected natural resource. In December 2001, an agreement between CIAT and the TSBF Programme led to the latter’s becoming an institute of CIAT (TSBF-CIAT).

TSBF-CIAT is addressing the CGIAR System Priority Area 4: Promoting poverty alleviation and sustainable management of water, land, and forest resources. Majority of the efforts are dedicated to System Priority Area 4A: Promoting integrated land, water and forest management at landscape level. Considerable efforts are also dedicated to System Priority Area 4D: Promoting sustainable agro-ecological intensification in low- and high-

potential areas. TSBF is housed in one of the three researches for development challenges (RDCs) of CIAT, “Improving management of agroecosystems in the Tropics”. The project also works in close collaboration with the other two RDCs (Agrobiodiversity; Rural Innovation) of CIAT.

The comparative advantage of TSBF-CIAT is in conducting international public goods (IPG) research on Integrated Soil Fertility Management (ISFM). ISFM is a holistic approach to soil fertility research that embraces the full range of driving factors and consequences of soil degradation — biological, physical, chemical, social, economic and political. However, while TSBF-CIAT will focus primarily on strategic research, it is also ready to conduct research for development with partners via regional networks and global projects. TSBF-CIAT will continue research on below-ground biodiversity as a means of beneficially managing soil biology, through the GEF-UNEP funded global project on below-ground biodiversity (BGBD) which has successfully completed its Phase I and is about to start its Phase II activities. Much of the applied research and dissemination of findings, as well as NARSs capacity building, is conducted via the Institute’s regional partner networks/consortia — the African Network for Soil Biology and Fertility (AfNet), the Latin American Consortium on Integrated Soil Management (known by its Spanish acronym, MIS), and the Consortium for Sustainable Development of the Andean Region (CONDESAN). TSBF-CIAT also collaborates with the South Asian Regional Network (SARNet) on soil fertility research in that region.

Research for development activities are conducted in close collaboration with a range of partners including NARES, ARIs, Universities, NGOs and farmer groups/communities throughout Sub-Saharan Africa, Central America and South America .

Success stories

Water harvesting and interactions with dry mixtures of PR and water-soluble P in West African Drylands

Following collaborative research of TSBF-CIAT and its West African partners (ICRISAT, INRAN, INERA) and the Financial Support of UNEP-GEF for the DMP project, sorghum production in the dry Sahelian zone increased by 300-800% following different technologies combining water harvesting and nutrient management. The water harvesting technologies include use of Zai, half moon or stone bounds and these could be accompanied by additions of small quantities of manure, mineral fertilizers or their combination. This research has also shown that nutrients are more important than water even in the dry areas. In 2005, use of Zai alone in Tougouri, Burkina Faso for example, performed better than the use of either Nitrogen or phosphorus fertilizer. Combinations of water harvesting and nutrient application highly increased yields due to better utilization of inorganic fertilizers. Even when both Zai and halfmoon were tested with combinations of water soluble P and phosphate rock in farmers' fields, similar yield increases were observed. From the studies, combining $\frac{1}{4}$ of water soluble P and $\frac{3}{4}$ of natural PR lead to the same yield as treatment where water soluble P was 100%. Water harvesting through Zai, half moon, use of tied ridges and stone bounds combined with nutrient such as manure, inorganic N and P and phosphate rock are some of the soil improvement technologies being scaled up in DMP West African countries by AfNet-TSBF, ICRISAT and other partners. This outcome has resulted from output 2 on "Sustainable soil, water, and nutrient management practices developed and tested by applying and integrating knowledge of biophysical and socio-cultural and economic processes" of TSBF-CIATs' 2005-2008 Strategic Programme Focus.

Addressing P deficiency in West African farming systems through Hill Placement and PR efficiency

Work done by TSBF-CIAT and its partners for several years with funding from Rockefeller Foundation focusing on phosphorus (P) availability has resulted in technologies that are now being taken up by farmers. The focus on P was because it is the most limiting nutrient to crop productivity in West Africa and about 80% of the African soils have inadequate supply. The technologies include hill placement of small quantities of P rather than broadcasting and combining PR with some water-soluble P. The work has shown that leguminous crops and cover crops in natural and managed fallows can take full advantage of biological nitrogen fixation in the presence of adequate P levels in the soils. It focused on utilizing PR deposits that are plenty in Africa by increasing their activity and suitability for direct application through use of PR together with water-soluble P. For several years, we have observed that the efficiency of Phosphate Rocks (PRK and PRT) can be increased above that of soluble P when a little amount of the soluble P is combined with the PR. Combining PR with 25% water-soluble P in has not shown any differences from its combination with 50%, 75% or 100% water soluble P. This clearly shows that placement of small quantities of water-soluble P fertilizers can improve the effectiveness of phosphate rock. To increase Impact of this outcome, Governments in West African Countries will require investing more in bringing PR closer to the people or by facilitating this process to be carried out by entrepreneurs. This outcome has resulted from the output 2 on "Sustainable soil, water, and nutrient management practices developed and tested by applying and integrating knowledge of biophysical and socio-cultural and economic processes" of TSBF-CIATs' 2005-2008 Strategic Programme Focus.

Adoption of new soil conservation technologies in the Llanos of Colombia: Arable layer building technology

As a result of CIAT's collaborative research activities with regional partners (Corpoica, Pronatta and Unillanos) and with the financial support from the Ministry of Agriculture and Rural Development (MADR) and Colombian Science Foundation (COLCIENCIAS), a series of soil improvement and conservation practices have been developed. These practices focus on arable layer building technologies - part of the soil profile that can be modified through a combination of biological and physical management in soils of the well-drained savannas of the Llanos of Colombia. These practices include use of proper crop and pasture rotations in agropastoral systems. Practices for arable layer building include a vertical corrective tillage using rigid chisels, correction of nutrient deficiencies in soil and sowing of acid soil adapted tropical forages with vigorous root systems and field crops with greater yield potential. The output on "Strategies developed to protect and improve

soil quality" listed in CIAT Medium-Term Plan of 1999-2001 resulted into this outcome. Farmers in the Llanos region of Colombia are the main users of this outcome. Farmers in the past attempted to establish crops without adequate soils management and used non-adapted pasture and crop germplasm, and consequently experienced large economical failures. In contrast to their previous experiences, utilization of soil conservation methodologies together with the use of improved germplasm have shown significant advantages in productivity and in economic returns to the investments made. Recent impact studies conducted by CIAT and its partners indicated that the productivity gains constitute the principal benefit for those who apply soil conservation practices in the Llanos. Research publications, technical bulletins, extension brochures and progress reports in both English and Spanish documented the development of technologies. It is considered that for achieving wider impacts of arable layer soil management technologies, investment by the Colombian government in improving road infrastructure is critical.

The Consortium for Improving Agriculture-based Livelihoods in Central Africa (CIALCA): CGIAR, NARS, NGO and private sector partners join forces in the Great Lakes region.

During 2005, the Directorate General for Development Cooperation (DGDC - Belgium) approved three proposals led by IITA, TSBF-CIAT and IPGRI-INIBAP:

- Sustainable and Profitable Banana-based Systems for the African Great Lakes Region (led by IITA).
- Enhancing the resilience of agro-ecosystems in Central Africa: a strategy to revitalize agriculture through the integration of natural resource management coupled to resilient germplasm and marketing approaches (led by TSBF-CIAT).
- Building Impact Pathways for Improving Livelihoods in Musa-based Systems in Central Africa (led by IPGRI-INIBAP).

The three projects operate largely in the same parts of Rwanda, Burundi, and DR Congo and with the same national partner institutes. In order to exploit these similarities in project objectives, structure and sites, the three CGIAR institutes and their NARS partners proposed to operate as a consortium. Using the different capacities of the participating institutes, the consortium aims to enhance research synergies, while avoiding needless duplication of research activities. This will maximize output with the available funding.

The setup of the 'Consortium for Improved Agriculture-based Livelihoods in Central Africa (CIALCA)' was endorsed by the Director-Generals of INERA, ISAR, ISABU, IRAZ in Kigali, on 15-16 September 2005. An operational model was developed, which included the recruitment of a CIALCA coordinator for Eastern DR Congo and Rwanda and the establishment of CIALCA offices in Bukavu and Kigali, respectively. In Burundi, CIALCA will operate through IRAZ, Gitega.

Following the meeting with the NARS DGs, individual project planning meetings were held in Bukavu, eastern DR Congo, 19-23 September 2005, for the TSBF-CIAT-led project, in Rubona, Rwanda, 2-7 October, for the IITA-led project and in Butare, Rwanda, 28 November-2 December 2005, for the IPGRI-INIBAP-led project. Subsequently, a CIALCA planning meeting for the banana work was held in Bujumbura, Burundi from 27 February till 3 March 2006. CD-Rom's containing presentations and outputs of these planning meetings were handed out to the participants and can be obtained through the CIALCA contact persons in Kigali, Bukavu or Gitega, or through the CGIAR centre contact persons (for contact details see below).

Meetings to discuss start off PRA and baseline survey activities, logistics and time frames are on schedule. Between 1 and 4 November 2005, a first such meeting was held in Bukavu around the PRA activities with representatives of all three projects and all national partner institutes present. PRA and baseline survey activities will be running from February to August 2006, while most project field activities/trials will take off during the second half of 2006.

The INIBAP and the IITA project focus on banana-based systems, while the TSBF-CIAT project is legume-oriented. Project purpose, partners and areas of intervention are as follows:

INIBAP-led proposal:

Project description:

The purpose of the project led by INIBAP is to strengthen national and regional mechanisms to plan and orient investments, projects and research-and-development (R&D) synergies for increasing the contribution of Musa to rural well-being. In addition, the project will strengthen national frameworks for conserving local Musa germplasm, introducing and evaluating new

cultivars and multiplying and disseminating clean planting material of superior cultivars. The project further aims to identify, with scientists, extension agencies, NGOs and farmers, market opportunities for bananas and banana products, to validate options for integrated pest and soil fertility management, and to develop improved Musa production systems. The project emphasizes strong partnerships and capacity building with NARS, Universities, NGO's, CBO's, and the private sector.

Partners: Catholic University of Leuven (Belgium), TSBF-CIAT, ISAR (Rwanda), IRAZ (Burundi), ISABU (Burundi), INERA (DR Congo), local universities, NGO's CBO's and private sector partners.

Areas of intervention: Burundi (Gitega, Kirundo, Cibitoke, Moso), Rwanda (Gishenyi, Cyangugu, Kibungo), eastern DR Congo (Kivu Provinces).

IITA-led proposal:

Project description:

The purpose of the project led by IITA is to develop and disseminate in partnerships with all stakeholders technologies that improve the sustainability and profitability of banana-based cropping systems. Emphasis is put on identifying and exploring markets as a driving force for changing banana-based farming systems. Technologies promoted include amongst others locally adapted NRM options (including integration of legumes), integrated pest management options, the introduction of new banana hybrids, and improved post-harvest technologies. The project emphasizes strong partnerships and capacity building with NARS, Universities, NGO's, CBO's, and private sector. The project will also put emphasis on strategic research on sustainable use of the natural resource base.

Partners: UCL (Belgium), ISAR (Rwanda), IRAZ (Burundi), ISABU (Burundi), INERA (DR Congo), local universities, NGO's CBO's and private sector partners.

Areas of intervention: Burundi (Gitega, Kirundo, Cibitoke), Rwanda (Kibungo, Kibuye, Gitarama), eastern DR Congo (Kivu provinces), Uganda (upstream research activities)

TSBF-CIAT-led proposal

Project description: The purpose of the project led by TSBF-CIAT is to develop and disseminate in partnerships with all stakeholders resilient agroecosystems through integration of stress-tolerant and bio-fortified germplasm, inclusion of locally adapted NRM options, market-led diversification and intensification, and revitalisation of research for development capacity of all stakeholders. The strategy of the project is embedded in a vision of national and peaceful reconstruction and built on (i) a range of improved legume-based technology options that will make the difference in people lives, (ii) revival of capacity for research for development, (iii) facilitate access to markets, (iv) improvement of nutrition and health of vulnerable groups, and (v) strategic alliances and partnerships.

Partners: Catholic University of Leuven (Belgium), INERA (DR Congo), CRSN (DR Congo), ECABREN (platform of NARES), DIOBASS (DR Congo), ISAR (Rwanda), World Vision (Rwanda)

Areas of intervention: DR Congo (Bas-Congo, Bandundu, and Sud-Kivu Provinces), Rwanda (Umutara, Bugesera, Kibungo), Western Kenya (upstream research activities).

Contact details:

TSBF-CIAT: Bernard Vanlauwe, Soil Fertility Specialist, Tropical Soil Biology and Fertility Institute of the International Centre for Tropical Agriculture (TSBF-CIAT), PO Box 30677, Nairobi, Kenya, Tel: +254-20-7224755; Fax: +254-20-7224763; Email: b.vanlauwe@cgiar.org

IITA: Piet van Asten, Banana Systems Agronomist, International Institute of Tropical Agriculture (IITA-Uganda), PO Box 7878, Kampala, Uganda, Tel: +256-752-787812, Fax: +256-41-285079, Email: p.vanasten@cgiar.org

INIBAP: Guy Blomme (INIBAP Assistant Regional Coordinator) and Eldad Karamura (INIBAP Regional Coordinator), International Network for the Improvement of Banana and Plantain – East and Southern Africa office (INIBAP-ESA), P.O.Box 24384, Kampala, Uganda, Tel: +256 41286213, Fax: +256 41286949. Email: g.blomme@cgiar.org and e.karamura@inibap.co.ug

CIALCA country representative for **Burundi:** Mr. Sylvestre Hakizimana, Banana Researcher, IRAZ, P.O. Box 91, Gitega, Burundi, Tel: +257 403020/21, Mobile: +257 903315, Email: iraz@cbinf.com or hakizisyl@yahoo.fr

CIALCA country office Kigali, **Rwanda**
Mrs. Kantengwa Speciose, Coordinator,
Tel: (+250) 55104708 or 08518471, Email: skantengwa03@yahoo.fr

CIALCA office **Bukavu**, eastern DR Congo: Mr. Dieudonné Katunga Musale, Coordinator, Tel: (+243) 98669793, Email: katungamusale@yahoo.fr
CIALCA office **Kinshasa**, western DR Congo: Dr. Jean Paul Lodi Lama, Tel: +243-815136746, Email: lodilama_jeanpaul@yahoo.fr

Oasis: A New Global R4D Partnership against Desertification

Oasis' is a new Global R4D Partnership against Desertification. It brings together the research-for-development efforts of the Future Harvest Centers of the Consultative Group on International Agricultural Research (CGIAR) in support of the United Nations Convention to Combat Desertification (UNCCD). Oasis was approved as a new Systemwide Program in April 2006 by the Alliance of Future Harvest Centers. The United Nations has declared 2006 as the International Year of Deserts and Desertification, and the launching of Oasis is a tangible sign of the CGIAR's commitment to the cause.

Desertification and the CGIAR

The UNCCD estimates that about 70% of the earth's agricultural drylands have been affected by desertification, defined by the Convention as "land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climate variation and human activities". Desertification is like a skin disease on the earth's

surface, erupting in patches that grow and merge over time if it is not treated.

The poor are hurt most, because they depend on the land for a living. When soils and vegetation are impoverished by desertification, they lose their livelihoods. The UNCCD estimates that some 250 million people in more than 110 countries have been affected so far, with economic losses in the range of US\$42 billion per annum.

The CGIAR has long recognized the importance of research to improve the sustainability of dryland agriculture, and even created two international centers entirely focused on these zones: ICRISAT and ICARDA for the tropical and non-tropical latitudes, respectively. Other Centers also invest a significant portion of their effort on the desertification-prone drylands. Initial partners in Oasis are CIAT, ICARDA, ICRAF, ICRISAT, IFPRI, ILRI, and WARDA, and more are expected to join.

UNCCD, CGIAR and Oasis

The CGIAR, represented by ICRISAT and ICARDA has contributed to the UNCCD process since its inception, participating in the initial meetings in 1993 that helped translate Convention ideals into actions, and in the many plenary and specialized UNCCD sessions since. Oasis is thus a strengthening of partnerships that have a long history. Oasis is an expansion of the Desert Margins Program and Desertification, Drought, Poverty and Agriculture Consortium (DDPA) into a global Systemwide Program. ICARDA and ICRISAT will jointly convene the Oasis partnership.

Why work together?

Desertification results from a host of interacting factors, including social, economic, policy, agricultural, ecological, climatic and other drivers. By combining forces, Centers and their partners will be able to combat desertification in a more holistic, integrated way that reflects the complexity of the issue. They will also increase the critical mass of scientists, facilities and resources that are brought to bear on the problem. This will also raise the global visibility of the CGIAR's work, providing more compelling investment opportunities for a world that wants to help.

Oasis partnerships go beyond the Centers, too. Oasis weaves together the web of extensive partnerships (national, regional, international, public, nongovernmental, and private-sector) that Centers have already established in their projects and programs that combat desertification.

Why the name 'Oasis'?

Suffering and hunger plague the drylands, aggravated by repeated droughts. While disasters attract media attention, quiet progress often goes unnoticed. The name 'Oasis' evokes the better future that the partners see as entirely possible for the drylands. Blessed by ample sunshine, fewer pests and diseases, and through the judicious use

of scarce water resources, research by CGIAR Centers has identified ways to create more secure, sustainable and prosperous livelihoods in the drylands. Oasis will carry that positive vision forward.

Oasis priorities

As a new initiative, the strategy, priorities and workplan of Oasis will be discussed by the partners and evolve rapidly in the coming months and years. Based on previous discussions, though the following six areas are likely to draw attention:

1. Understanding and arresting land degradation
2. Mitigating drought
3. Restoring and stabilizing dryland ecosystems
4. Policy and institutional options to encourage sustainable land use and greater investments in drylands
5. Diversifying agricultural systems and livelihoods
6. Sharing knowledge and technology

Getting started

Through dialogue and information exchange among the partners, Oasis will begin by creating an inventory of current Center activities geared at combating desertification. This will enable them to identify gaps, overlaps and potential synergies. The third step will be to develop those synergies through joint projects and proposals for additional funding.

We are pleased to inform you that Dr. Andre Bationo was nominated to be the CIAT representative to this initiative. For more information please contact the Oasis Facilitator, Dr. Mark Winslow at m.winslow@cgiar.org. The Oasis website (soon to be developed) will be at www.oasisglobal.net

CIAT/FARA Sign Memorandum of Understanding on AfNet

A Memorandum of Understanding (MOU) was signed between the Forum for Agricultural Research in Africa (FARA) and The Centro Internacional de Agricultura Tropical (CIAT) for hosting the African Network for Soil Biology and Fertility (AfNet) of the Tropical Soil Biology and Fertility (TSBF) Institute of CIAT under the umbrella of FARA. This MOU recognizes that that AfNet is an official pan-African network and that the comparative advantage of both FARA and AfNet will be harnessed through this partnership agreement in order to.

1. Improve understanding of the role of biological and inorganic resources in soil fertility and their management by African farmers to improve the sustainability of land-use systems.
2. Enhance the research and training capacity on national institutions in Africa in the fields of soil biology and management of ecosystems.
3. Facilitate provision of methods for soil management, which improve agricultural productivity and conserve the soil resource.
4. AfNet can carry key research themes of continental importance identified with partners and develop experimental methods and protocols for cross- site learning relevant to FARA.
5. Assist FARA in the implementation of its programs on Building African Scientific and Institutional Capacity (BASIC), Dissemination of New Agricultural Technologies in Africa (DONATA), Multi-country Agricultural Productivity Program (MAPP), Regional Agricultural Information System (RAIS) and the Sub-Saharan African Challenge Program (SSACP)
6. AfNet can organize training courses of cross-regional importance relevant to FARA
7. AfNet to facilitate the exchange of information between the three SROs who will be implementing SSA-CP and also enhance cross-cutting capacity in the areas of soil fertility management and information dissemination
8. Develop joint project proposals for securing funding, and in carry out the resulting projects

The signing of the above memorandum is a great milestone for AfNet and this will go a long way in promoting the pan African role of the network in capacity building and promoting research in the continent. AfNet is proud to be associated with FARA.

New Projects

Promoting Innovative Research to Enhance Sustainable Agricultural Development in Africa: Linking Participatory Monitoring and Evaluation and Capacity Building for Profitable Land Management, supported by IDRC

Objectives:

- (i) To develop and strengthen partnerships and build effective multidisciplinary teams for innovative research and sustainable agricultural development,
- (ii) To build skills for effective interdisciplinary research and development in order to enhance agricultural productivity and sustainability,
- (iii) To use participatory monitoring and evaluation systems to integrate local and scientific knowledge and strengthen institutional learning for monitoring and evaluating, and
- (iv) To scale up/out profitable land management technologies and marketing options using participatory approaches and policy dialogue/advocacy.

Submitted by:

The African Network for Soil Biology and Fertility (AfNet) of Tropical Soil Biology and Fertility (TSBF) Institute of CIAT & Rural Innovation (RI) Institute of CIAT.

Conservation and Sustainable Management of Below-ground Biodiversity (CSM-BGBD) Project: Phase II

The second phase of the Conservation and Sustainable Management of Below-ground Biodiversity (CSM-BGBD) Project was approved from the Global Environment Facility (GEF) on 8th February 2006. The project documents were co-signed by UNEP and TSBF on 28th April 2006 by Mr. David Hastie, the Chief Budget and Financial management Officer, UNEP and Dr. Nteranya Sanginga the TSBF Director. We take this opportunity to congratulate the BGBD team on this tremendous achievement.

Training Workshops

Advanced DSSAT4 Training Workshop: Assessing Crop Production, Nutrient Management, Climatic Risk and Environmental Sustainability with Simulation Models

Introduction

Today issues such as climate change, climate variability, soil carbon sequestration and the long-term impact on food security and environmental sustainability are gaining more attention especially in agricultural production. Many weather, soil, genetic and management factors affect the way a crop will respond to irrigation, fertilizer and other management practices. Determining appropriate crop management strategies under these uncertainties has major economic and environmental implications. The new windows-based Decision Support System for Agrotechnology Transfer (DSSAT) suite of simulation models of the soil/plant/atmosphere system can make a valuable contribution to the understanding of the processes that determine crop responses and also predict crop performance, resource use and environmental impacts for different environments and

management scenarios. The models can also be used to determine the potential impact of climate change on crop production and long-term soil carbon sequestration, and provide management scenarios for adapting to climate variability.

In 2004, a training workshop on DSSAT V4 was administered to a team of 30 core scientists in Arusha, Tanzania. The overall goal was to familiarize participants with DSSAT, a comprehensive computer model for the simulation of crop growth and yield, soil and plant water, nutrient and carbon dynamics and their application to real world problems. The specific focus of the program was the operation of the new windows-based DSSAT Version 4 software; description of the new DSSAT-Cropping System Model, CSM and its modules, such as CROPGRO, and CERES, and the science embedded in the models; minimum data requirements and experimental data collection for systems





simulation; integration of crop simulation models with data base management and; application of the new DSSAT-CSM model to improve management of cropping systems.

Workshop Goal and Objectives

The Advanced DSSAT4 Training Workshop was held at M Plaza Hotel, Accra, Ghana, October 21st to 29th 2005. The main aim of this follow-up workshop was to advance the target scientists' knowledge of the full capabilities of DSSAT through own data simulations and interpretations.

- 1) The main workshop advanced participants knowledge on the use of DSSAT. The workshop started with the participants who had own datasets presenting their protocols to the whole group to inform both the participants and the trainers the kind of data the individuals were to work with. All the protocols had though been emailed earlier to the trainers prior to the workshop.

The program made extensive use of the DSSAT-Cropping System Model (CSM), a new, general cropping system model for simulating crop growth and development and soil and plant

water, nitrogen and carbon dynamics. CSM is comprised of the CROPGRO module for soybean, peanut, common bean, chickpea, faba bean, cowpea, and other grain legumes, the CERES module for maize, sorghum and millet, the CERES-Rice module for rice, the SUBSTOR module for potato, the CROPSIM-CERES module for wheat and barley, and the CROPGRO module for tomato, bahia and brachiaria. The CENTURY model for the simulation of soil carbon and nitrogen is also included in CSM.

Attendance

The workshop brought together 29 participants from 10 different countries namely; Niger, Senegal, Burkina Faso, Kenya, Uganda, Togo, Ghana, Japan, France and Mozambique, 11 of whom attended the training for the first time. There were six trainers namely Professor James W. Jones from University of Florida (USA), Professor Gerrit Hoogenboom from University of Georgia (USA), Dr Paul Wilkens from IFDC-Alabama (USA), Dr Ken Boote, Professor from University of Florida (USA), Pierre C. Sibiry Traore from ICRISAT-Mali and Dr Jetse Stoorvogel from Wageningen, the Netherlands.

Acknowledgement

We would like to acknowledge the financial contribution of Project 5 of the Challenge Program on Water for Food (ICRISAT), the African Soil Biology and Fertility Network (TSBF-CIAT), and the Desert Margins Program (CGIAR). We would also want to acknowledge and thank the all trainers for their time and effort in ensuring that the training became a success.

Participatory Approaches to Research and Scaling Up (PRSU) Training Workshop, Nairobi, Kenya

Summary

Introduction

Achieving transition to a competitive, high-value and ecologically sound agriculture typically requires bringing together many elements that farmers manage as decision-makers. These elements typically include: better understanding of farmers' options for soil management; access to high yielding germplasm; identification of market opportunities and the entrepreneurial skills to exploit them. Participatory approaches are best suited to promoting high rates of adoption of new agricultural technologies, the development of small agro-enterprises and achieving significant improvements in management of natural resources. This originates from evidence that user participation can be critical in the preadaptive

stages of certain types of research. In contrast to earlier approaches to on-farm research, preadaptive participatory research brings users into the early stages of technology development. Users help set priorities, define criteria for success, and determine when an innovation is "ready" for release.

AfNet successfully organized the Participatory Approaches to Research and Scaling Up (PRSU) Training Workshop, Nairobi, Kenya between 19th - 30th September 2005. This was the second training of combined AfNet/DMP scientists in farmer participatory research (FPR) methods and scaling up (SU).



Workshop goal

The goal of the workshop was to develop the capacity of the African Network for Soil Biology and fertility (AfNet) member scientists as far as their knowledge and skill level of Farmer Participatory Research (FPR) and Scaling Up (SU) approaches are concerned and to enhance their ability to apply the FPR and SU approaches in their research and development work.

The training covered key concepts and tools for applying farmer participatory methods and approaches to natural resource management research. The participants applied the learning of participatory approaches directly with farmers during the mid-training field visit in the Meru District of Kenya.

Attendance

The forty participants in the two week training were AfNet Natural Resource Management scientists from West Africa (Nigeria, Burkina-Faso, Ghana, Niger and Senegal), Central (DRC) East Africa (Kenya, Uganda and Tanzania) and Southern Africa (Malawi, Botswana Zimbabwe, South Africa) as well as Madagascar. There were 15 women scientists and 24 men scientists, both first language Anglophones as well as Franco-phones, and the individual disciplines included rangeland ecologists, soil scientists, anthropologists, agro-foresters, sociologists, and one economist.

The workshop was opened by the AfNet Program Coordinator, Andre Bationo, who also gave presentations on behalf of R Tabo Deputy Director

– Western and Central Africa ICRISAT and Nteranya Sanginga Director, TSBF-CIAT. The workshop was organized and facilitated by Ritu Verma, a social scientist and anthropologist at TSBF-CIAT. Other facilitators were Sue Canney Davison, Pipal Ltd Nairobi and Twalib Ebrahim and Ezekiel Nguyo from the Depot (an NGO based in Nairobi). Other invited presenters were Michael Misiko- an anthropologist at TSBF-CIAT, Sandra J. Velarde - Programme Officer, Alternative-to-Slash and Burn, Regina Karega - Kenyatta University, Elly Kaganzi - Regional Agroenterprise Specialist, CIAT, Jonas Chianu - Economist, TSBF-CIAT and Pascal Sanginga - Sociologist, ERI-CIAT.

Acknowledgements

AfNet is grateful to the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and Centre d'Etude Régional pour l'Amélioration de l'Adaptation à la Sécheresse (CERAAS) for organizing the workshop. The workshop was sponsored by the Technical Centre For Agricultural And Rural Cooperation (CTA), West and Central African Council for Agricultural Research and Development (WECARD), African Development Bank (ADB), United Nations Environmental Program/ Global Environmental Facility (UNEP/GEF), Desert Margins Program (DMP), Challenge Program on Water and Food (CPWF) and the CG System wide Programme on Participatory Research and Gender Analysis (PRGA).

Mainstreaming Gender in Research and Development (Gender Training Workshop), Nazaret, Ethiopia

Introduction

Modern agriculture technologies have significantly increased productivity but have been largely inaccessible to resource-poor farmers in marginal environments. Farmers' low adoption rates of technologies developed by research institutions and promoted by extension staff in government and NGOs show the need for a client-based orientation in research and development. At the same time, there is a growing recognition of farmers' indigenous technical knowledge, capacity for innovations, as well as the heterogeneity and the diverse needs of male and female farmers. In this context, gender-conscious research organizations that undertake gender sensitive participatory-research is crucial. Engendering research and development programmes ensures institutionalized application of environmental and socio-economic methodologies that involve male and female farmers in the definition of an agenda, the conduct of research, monitoring, evaluation and the dissemination of results. Gender analysis or the identification of socially-constructed roles and relations among men and women strengthens the participatory research methodology by recognizing the differences among farmers access to and use of agricultural resources.

The International Institute for Rural Reconstruction (IIRR) Africa and AfNet/TSBF, have both given high priority to assisting development and research organizations in Africa to be more responsive to the needs of resource-poor farmers, particularly in Africa. To this end IIRR Africa and AfNet/TSBF organized a training workshop on Mainstreaming Gender in Research and Development between 20th and 31st March 2006 at the Rift Valley Hotel- Nazaret, Ethiopia

General Objective

The workshop was designed to enhance the knowledge, skills, and awareness of agricultural research and extension program leaders, so that they can engage in community driven research by including a gender "lens" to their work and use of

participatory approaches in planning, monitoring, and evaluation of research and extension work.

Specific Objectives

- Understand terms and concepts in gender mainstreaming and community driven research and development.
- Stress the importance of male and female farmer participation in agricultural research, livelihoods and extension work.
- Illustrate the use of PRA and gender analysis tools as applied to agricultural research and livelihoods development in planning, monitoring, and evaluation.
- Introduce the gender audit methodology and institutionalization of the same as a means to increase organizational sensitivity to gender.
- Analyze issues and problems related to improving gender-conscious farmer-driven participation in research and development institutions.
- Develop a series of team actions to overcome major constraints.
- Develop individual action plans to implement the team plan.

Participants/Target Groups

The training workshop was attended by 16 participants - 8 women and 8 men- drawn from 7 countries (Ethiopia, Ghana, Kenya, Nigeria, Tanzania, Uganda and Zambia). The workshop was facilitated by professionals from Ethiopia and Kenya.

Acknowledgements

AfNet is grateful to CTA for the financial support towards this workshop. The Network also appreciates the role played by IIRR in co-organizing and hosting the workshop in Ethiopia.

New Staff



Dr Omo Ohiokpehai joined TSBF in September 2005 as a Food Processing and Nutrition Scientist. Omo's training background is in food and nutrition science. She is a graduate of Food Biochemistry and Nutrition, and holds an MSc in Agricultural Science from Friendship University, Moscow, Russia (1972); MSc in Nutrition, University of Guelph, Guelph, Ontario, Canada (1977); and PhD in Food Science, University of Surrey, Guildford, UK (1982). Omo will be coordinating activities for a Rockefeller-funded collaborative project with Moi University's Academic Model for the Prevention and Treatment of HIV/AIDS (AMPATH) entitled "Soybean processing and utilization for improving the health and nutrition of rural households in HIV/AIDS affected areas of Kenya". Her main activities will include the testing of the model for improving food security, nutrition, health and incomes of populations, particularly those affected by HIV/AIDS, through the incorporation of soybeans and soymilk into the diets of adults, children and infants.



Addah Obiero joined TSBF on 1st April, 2006 as the Administrator in the UNEP-GEF Below-Ground Biodiversity (BGBD) Project. Although Addah's core responsibilities will be in the BGBD Project, her expertise is expected to strengthen financial management, especially budget monitoring and control, in the TSBF global office. She holds a Bachelor of Commerce (Finance option) degree from the University of Nairobi, Diploma in Business Management (Kenya Institute of Management), and Diploma in Public Relations (Kenya Polytechnic), beside a host of other supplementary in-house trainings in financial management and project administration. She also brings to TSBF a wealth of experience from the international NGO and private sector organizations; having worked with Bellerive Foundation, ITDG, African Union and, lately, UNDP-Sudan office. In all her previous employments covering a span of 9 years, she has been involved in Project management, planning and administration, financial management, logistics and liaison, as well as human resource management, in increasingly responsible levels. Addah speaks basic French and is highly computer literate.

Ms. Brenda Kingolla joined TSBF in January 2006 as a Field Assistant-Food and Nutrition, within the Rockefeller-funded collaborative project with Moi University's Academic Model for the Prevention and Treatment of HIV/AIDS (AMPATH) entitled "Soybean processing and utilization for improving the health and nutrition of rural households in HIV/AIDS affected areas of Kenya". She holds a Bachelor of Science Degree in Food Nutrition & Dietetics with a Minor in Sociology from Kenyatta University. While at TSBF, Brenda will assist in the training of farmers in food processing and nutrition; assist to bring nutrition perspective to the project at grassroot level; assist in procurement of processing materials; maintain documents and materials related to the project.



Rosemary N. Meyo has been working in the administration unit at TSBF-CIAT, Nairobi on temporary basis but has moved to TSBF-CIAT Maseno research station on a permanent basis as an Administrative Assistant. In her new station, Rosemary will provide first-line administrative support service necessary to facilitate the research operational activities of Maseno station. She moved in November 2005.



Ms. Doreen K. Mugadi joined TSBF in April 2006 as Technician specialized in Soil Microbiology. She holds a Bachelor of Science Degree in Biomedical Sciences and Technology from Egerton University. While at TSBF she will be conducting technical analysis in the ongoing Microbial Ecology Research Project, participating in the technical aspects of training of MSc and PhD students.

Ms. Jacqueline A. Odongo joined TSBF in April 2006 and will working as a Data Entry Clerk. Jacqueline holds a Diploma in Secretarial and diploma in Business Management from Kenya Institute of Management. Her responsibilities will include data entry and verification as well as documentation within the Soybean Project.



Ms. Margaret Mita Sambo joined TSBF as an Administrative Assistant in April 2006. She holds a Diploma in Business Management from University of Nairobi. Mita will be providing administrative support within TSBF.

Ms. Mary W. Nderitu joined TSBF as a Finance Assistant in April 2006. Mary holds Certificates in Accounting and is currently pursuing CPA VI from Strathmore University. While at TSBF, Mary will be providing support in the Finance Unit. PABRA/ECABREN technical and financial supports.



Ms. Elizabeth Murua joined TSBF in March 2006 as a Research Assistant. Elizabeth holds a Bachelor of Science Degree in Botany with a Minor in Zoology from Jomo Kenyatta University. Here responsibilities while at TSBF will involve assisting in processing and analyzing samples from different research sites, data entry, literature search and editing reports.

Oscar Wakhungu Mutende joined TSBF as an Accounts Clerk. Oscar has a Higher Diploma from The Institute for the Management of Information Systems (IMIS) attained at the Kenya College of Accountancy (KCA). He has also trained as a Certified Public Accountant (CPA) at the Star College of Management Studies and has wide experience in Computer Systems management. His responsibilities while at TSBF are to verify invoices and other payment demand documents, preparing payment vouchers, posting and preparing various financial summaries from the cash and ledger books.



Sanginga Matabaro Jeanmarie joined TSBF CIAT in September 2005 as a Research Assistant (Agronomist) under the DGDC project in Southern Kivu Eastern DRC. Jeanmarie was born in DRC in 1960. He completed his undergraduate studies as an Agronomist at Kisangani DRC where he qualified as a Technical Agronomist Engineer in 1985. He has worked as an Agronomist for different organizations in DRC. Prior to joining TSBF he was employed by the Food for the Hungry International/ DRC (FHI), an American NGO financed by USAID/OFDA under the food security program in Eastern DRC.



Valéry Kasereka joined TSBF legume Project in 2005. He got his Masters Degree in Land-Use and Regional Development at Laval University, Quebec, Canada in 1998. He was awarded a degree in Rural Development Studies (Regional Planning) at the Institute of Rural Development (ISDR) in Bukavu, DR Congo. From 1987 to 1990 Kasereka worked in a World Bank project, Ituri Office for Agriculture development in the Northeast of former Zaire, as agricultural advisor to more than 100 agricultural producers' cooperatives. From 1991 to 2001, he served as a Chief Warden at the Congolese Institute of Natural Resource Conservation (ICCN). He is a co-founder of Vision Verte, an NGO very active in natural resource conservation in Kivu Province, DR Congo. Before joining the TSBF legume project, he was an independent consultant in conception and evaluation of rural development projects and in field studies for local and international organisations: German Agro-action (AAA), Bureau d'Etudes Scientifique et Technique (BEST), Conseil Intermarais du Bushi (supported by ICCO/ Hollande) and United Nations Development programme (UNDP). Valéry Kasereka is married to Venantie Bisimwa Nabintu and they have 3 children.

Lodi Lama Jean-Paul joined TSBF-CIAT on October 1st 2005 as an Agronomist in west DRC based in Kinshasa. Jean-Paul will be working within the "Enhancing the resilience of agro-ecosystems in Central Africa: a strategy to revitalize agriculture through the integration of natural resource management coupled to resilient germoplasm and marketing approaches" project. Prior to this new appointment, Jean-Paul has been head of The National Legume Program at M'vuazi Research Center in Bas-Congo. He has also worked as a junior legume breeder for the Outreach USAID Project RAV (Applied Research and Extension) at Gandajika Research Center (1986-1987) in Kasai Province and at M'vuazi Research Center (1987-1991) in Bas-Congo. Since 1987, he has also been a CIAT collaborator conducting collaborative research activities with CIAT/PABRA/ECABREN.



Julie Lunzehirwa N'namanvu joined TSBF-CIAT in October 2005 as a Research Assistant (Socio economist) within the Belgian supported project; "Enhancing The Resilience of Agro-Ecosystem in Central Africa: A Strategy to Revitalize Agriculture through the Integration of Natural Resource Management Coupled to Resilient Germplasm and Marketing Approaches" project. Julie has a BSc in Economics and development from the Catholic University of Kinshasa in 2004. She is currently a graduate student at the Catholic University of Kinshasa working on her master degree program.



Mrs Kantengwa Marie Speciose,

joined TSBF in March 2006, as a Coordinator of CIALCA activities in Rwanda. Mrs Speciose is Rwandese and has a Diploma in Agriculture and a BSc in Sociology. She has worked the Rwanda National Seed Service for 12 years as a seed production supervisor, before joining the World Vision, where she was in charge of the Rwanda Emergency Agriculture Recovery Program, a large relief project funded by USAID to recover the seed system in Rwanda after the 1994 war and genocide. She joined the Agriculture Technology Development and Transfer Project (ATDT) in 2000-a joint project between ISAR and IITA first (1998 to 2001) and then after with CIAT (from 2001)-as a research and extension liaison officer to liaise different project partners and ISAR scientists in the process of technology transfer. In her new position, Mrs Speciose will be to make this consortium an effective and efficient linkage between research institutions, extension agencies and farming communities in Rwanda. Her main duties will be technical supervision of the 3 project activities (implementation, data collection, data reporting, etc), linking with partner organizations, and fostering integration of activities between the three projects. Other administrative duties will include accounting for funds received, organize travel and visas, manage documentation centres, organize project planning meetings, annual reporting to the consortium coordination and represent the consortium at different fora

Mr. Katunga Musale joined CIAT as the Coordinator of CIALCA. in the Democratic Republic of Congo. Mr. Katunga has a Masters in Fodder Crops from the Faculty of Agriculture Gembloux, Belgium. He also trained in veterinary medicine. Mr.

Katunga is the Head of Livestock program in D.R. Congo and member of Steering committee of ASARECA - Animal Agriculture Research Network. He has also been a lecturer in various universities in Eastern D.R. Congo. He once served as Academic Secretary General of the Institut Supérieur des Études Agronomiques et Vétérinaires, ISEAV Mushweshwe



Announcements

The Workshop on Payment of Environmental Services (PES) Approaches To Contribute to Equitable And Sustainable Management of Soil and Water in Upper Catchments from 27th to 29th June 2006 at ICRAF Headquarters in Nairobi, Kenya. The workshop was hosted by the Challenge Programme on Water and Food (CPWF) and the African Network for Soil Biology and Fertility (AfNet). The objectives of the workshop were to:

- i. Expose participants to the state of the art in the theory and practice of PES,
- ii. Identify key research issues in soil and water management related to PES,
- iii. Develop a draft workplan for a multi-year, collaborative research and development project to assess the potential for PES in soil and water to promote sustainable and equitable resource management in tropical watersheds
- iv. Reach agreement among partners about the scope and balance of the activities conducted within the PES initiative

The workshop was attended by about 25 participants drawn from Africa, Asia and Latin America. For more details about the workshop contact Nancy Johnson, Leader, Water and People in Catchment of the CGIAR Challenge Program on Water and Food on email (n.johnson@cgiar.org) and Dr. Andre Bationo, the AfNet Co-ordinator, P.O. Box 30677-00100, Nairobi, Kenya; Email: a.bationo@cgiar.org

The 23rd Annual Conference of the Soil Science Society of East Africa (SSSEA)

The 23rd Annual Conference of the Soil Science Society of East Africa (SSSEA) will be held between 20th and 24th November 2006, Hotel Brovad, Masaka, Uganda. The theme of the Conference will be Strengthening Stakeholders Participation in Natural Resource Management: A Key Towards Improved Livelihoods. The papers will be presented under the following disciplines:

- a. Land Resources Inventory and Land Use Planning

- b. Management of Natural Resources
- c. Management of Organic and Inorganic
- d. Resources for Maintenance of Soil Fertility
- e. Socio-economics and Gender aspects in relation to Land Husbandry
- f. Environmental Quality and Soil health
- g. Policy Issues on Land Use and
- h. Management

For more information about the conference, contact the organizers on the following address:

The Organizing Committee SSSEA; C/O Dr. Drake N. Mubiru; Secretary General, SSSEA; Kawanda Agricultural Research Institute; P.O. Box 7065; Kampala, Uganda; SSSEA@kari.go.ug or dnmubiru@kari.go.ug

The 4th International Conference of the African Soil Science Society (ASSS)

The African Soil Science Society 4th International Conference will be held between 7th and 13th January 2007, in GIMPA (Accra, Ghana). The theme of the conference will be: **Impacts of climate change, global trade, urbanization and biotechnology on land use in Africa**. The aim of the Conference is to bring together African soil scientists, interested stakeholders, and policy makers to provide a fertile and enabling platform for sound discussions on the themes outlined. Emphasis will be on strategies and policies for better preparedness to global issues, advise on norms and standards, risks assessment in the domain of land use and sustainable land management for better livelihoods and food security in Africa.

Specific objectives

- a. Facilitate sharing of information and experiences regarding emerging issues related to land use in Africa;
- b. Identify policies and research activities that could support/facilitate adoption of appropriate technologies, norms and standards and enhance the capacity of key players and stakeholders;

- c. Reactivate the structures and functioning of ASSS and its sub-regional bodies;
- d. Strengthen the relationship with IUSS;
- e. Recognize the valuable contribution of soil scientists to soil knowledge generation and dissemination for sustainable land use within the continent.

The conference will be organized under the following sub-themes:

Sub-theme 1: Assessing the dynamics of land use in Africa

Sub-theme 2: Impact of regional and global trade on land use changes

Sub-theme 3: Impact of land use evolution on climate change

Sub-theme 4: Impact of biotechnologies on farm biodiversity and land use

Sub-theme 5: Impact of urbanization on land use in the urban-rural continuum

Upcoming Training Courses

In line with its objectives, AfNet has successfully organized various capacity building workshops for its members. We are pleased once more to inform our members that the Network will be organizing follow-up courses on Decision Support Systems for Agro-technology Transfer (DSSAT) and Participatory Research and Scaling up this year. More details about the courses will be circulated to all the network members by mail.

AfNet Symposium

AfNet is in the process of organizing an International Symposium to be held in the course of the year. The theme of the Symposium will be '*Soil Fertility Replenishment as key to Africa's Green Revolution: Exploring the Scientific Facts*'. The theme of the symposium will be a follow-up to the Abuja Declaration of the African Head of States Fertilizer Summit held between 9th and 13th June 2006, in Abuja Nigeria.

TSBF Publications

1. Barrios E., Cobo J.G., Rao I.M., Thomas R.J., Amézquita E. and Jiménez J.J. 2005. Fallow management for soil fertility recovery in tropical Andean agroecosystems in Colombia. *Agriculture, Ecosystems and Environment* 110: 29-42.
2. Begum H.H., Osaki M., Nanamori M., Watanabe T., Shinano T. and Rao I.M. 2006. Role of phosphoenolpyruvate carboxylase in the adaptation of a tropical forage grass, *Brachiaria* hybrid, to low phosphorus acid soils. *Journal of Plant Nutrition* 29: 35-57.
3. Chen W.M., de Faria S.M., Straliotto R., Pitard R.M., Simoes-Araujo J.L., Chou J.H., Chou Y.J., Barrios E., Prescott A.R., Elliot G.N., Sprent J.J., Young J.P.W. and James E.K. 2005. Proof that *Burkholderia* strains form effective symbioses with legumes: a study of novel *Mimosa*-nodulating strains from South America. *Applied and Environmental Microbiology* 71: 7461-7471.
4. Chianu J. and Hiroshi T. 2005. Integrated nutrient management in the farming systems of the savannas of Northern Nigeria: what future? *Outlook on Agriculture* 34(3): 197-202.
5. Diouf D., Duponnois R., Ba A.T., Neyra M. and Lesueur D. 2005. Influence of rhizobial and mycorrhizal symbioses on growth and mineral nutrition of *Acacia auriculiformis* and *Acacia mangium* under salt stress conditions. *Functional Plant Biology* 32: 1143-1152.
6. Esilaba A.O., Byalebeka G., Delve R.J., Okalebo J.R., Ssenyange D., Balule M. and Ssali H. 2005. On-farm testing of integrated nutrient management strategies in Eastern Uganda. *Agricultural Systems* 86: 144-165.
7. Esilaba A.O., Nyende P., Nalukenge G., Byalebeka J., Delve R.J. and Ssali H. 2005. Resource flows and nutrient balances in smallholder farming systems in Mayuge District, Eastern Uganda. *Agriculture, Ecosystems and Environment* 109(3-4): 192-201.
8. Fatondji D., Martius C., Biielders C.L., Vlek P.L.G., Bationo A. and Gerard B. 2005. Effect of planting technique and amendment type on pearl millet yield, nutrient uptake, and water use on degraded land in Niger. *Nutrient Cycling in Agroecosystems*

Journal (Accepted)

9. Lesueur D. and Duponnois R. 2005. Relations between rhizobial nodulation and root colonization of *Acacia crassiparpa* provenances by an arbuscular mycorrhizal fungus, *Glomus intraradices* Schenk and Smith or an ectomycorrhizal fungus, *Pisolithus tinctorius* Coker & Couch. *Annals of Forest Sciences* 62: 467-474.
10. Mando A., Ouattara B., Sédogo M., Stroosnijder L., Ouattara K., Brussaard L. and Vanlauwe B. 2005. Long-term effect of tillage and manure application on soil organic fractions and crop performance under Sudano-Sahelian conditions. *Soil and Tillage Research* 80: 95-101.
11. Probert M.E., Delve R.J., Kimani S.K. and Dimes J.P. 2005. Modelling nitrogen mineralization from organic sources: representing quality aspects by varying C:N ratios of sub-pools. *Soil Biology and Biochemistry* 37(2): 279-287.
12. Ramisch J.J. 2005. Inequality, agro-pastoral exchanges, and soil fertility gradients in Southern Mali. *Agriculture, Ecosystems and Environment* 105(1-2): 353-372.
13. Rangel A.F., Mobin M., Rao I.M. and Horst W.J. 2005. Proton toxicity interferes with the screening of common bean (*Phaseolus vulgaris* L.) for aluminum resistance in nutrient solution. *J. Plant Nutr. Soil Sci.* 168: 607-616.
14. Sarr A., Diop B., Peltier R., Neyra M. and Lesueur D. 2005. Effect of rhizobial inoculation methodologies and host plant provenances on nodulation and growth of *Acacia senegal* and *Acacia nilotica*. *New Forests* 29: 75-87.
15. Sarr A., Neyra M., Oihabi A., Houeibib M.A., Ndoye I. and Lesueur D. 2005. Characterization of native rhizobial populations presents in soils from natural forests of *Acacia senegal* and *Acacia nilotica* in Trarza and Gorgol regions from Mauritania. *Microbial Ecology* 50: 152-162.
16. Tabo R., Bationo A., Gerard B., Ndjeunga J., Marchal D., Amadou B., Annou M.G., Sogodogo D., Taonda J-B.S., Hassane O., Diallo M.K. and Koala S. 2005. Improving cereal productivity and farmers' income using a strategic application of fertilizers in West Africa In: Bationo A., Waswa B.S., Kihara J. and Kimetu J. (Eds) *Advances in integrated soil fertility management in sub-Saharan Africa: Challenges and Opportunities*. Springer NL (In Press)
17. Thierfelder C., Amézquita E. and Stahr K. 2005. Effects of intensifying organic manuring and tillage practices on penetration resistance and infiltration rate. *Soil and Tillage Research* 82: 211-226.
18. Tittonell P., Vanlauwe B., Leffelaar P.A., Rowe E. and Giller K.E. 2005. Exploring diversity in soil fertility management of smallholder farms in Western Kenya. I. Heterogeneity at region and farm scale. *Agriculture, Ecosystems and Environment* 110: 149-165.
19. Tittonell P., Vanlauwe B., Leffelaar P.A., Shepherd K.D. and Giller K.E. 2005. Exploring diversity in soil fertility management of smallholder farms in Western Kenya. II. Within farm variability in resource allocation, nutrient flows and soil fertility status. *Agriculture, Ecosystems and Environment* 110: 166-184.
20. Tscherning K., Barrios E., Peters M., Lascano C. and Schultze-Kraft R. 2005. Effects of post harvest treatment on aerobic decomposition and anaerobic in-vitro digestion of tropical legumes with contrasting quality. *Plant and Soil* 269: 159-170.
21. Tscherning K., Lascano C.E., Barrios E., Schultze-Kraft R., Peters M. (2006) The effect of mixing prunings of two tropical shrub legumes (*Calliandra houstoniana* and *Indigofera zollingeriana*) with contrasting quality on N release in the soil and apparent N degradation in the rumen. *Plant and Soil* 280(1/2): 357-368.
22. Vanlauwe B., Aihou K., Tossah B.K., Diels J., Sanginga N. and Merckx R. 2005. *Senna siamea* trees recycle Ca from a Ca-rich subsoil and increase the topsoil pH in agroforestry systems in the West African derived savanna zone. *Plant and Soil* 269: 285-296.
23. Vanlauwe B., Diels J., Sanginga N. and Merckx R. 2005. Long-term integrated soil fertility management in South-Western Nigeria: crop performance and impact on the soil fertility status. *Plant and Soil* 273: 337-354.
24. Vanlauwe B., Gachengo C., Shepherd K., Barrios E., Cadisch G. and Palm C.A. 2005. Laboratory validation of a resource quality-based conceptual framework for organic matter management. *Soil Science Society of America Journal* 69: 1135-1145.
25. Velásquez E., Lavelle P., Barrios E., Joffre R. and Reversat F. 2005. Evaluating soil quality in tropical agroecosystems of Colombia using NIRS. *Soil Biology and Biochemistry* 37: 889-898.
26. Wagatsuma T., Khan M.S.H., Rao I.M., Wenzl P., Tawaraya K., Yamamoto T., Kawamura T.,

Hosogoe K. and Ishikawa S. 2005. Methylene blue stainability of root-tip protoplasts can serve as an indicator of aluminum tolerance in a wide range of plant species, cultivars and lines. *Soil Science and Plant Nutrition* 51: 991-998.

27. Wenzl P., Arango A., Chaves A.L., Buitrago M.E., Patiño G.M., Miles J. and Rao I.M. 2006. A greenhouse method to screen brachiariagrass genotypes for aluminum resistance and root vigor. *Crop Sci.* 46: 968-973.
28. Zhiping Q., Rao I.M., Ricaurte J., Amézquita E., Sanz, J.I. and Kerridge P. 2004. Root distribution and nutrient uptake in crop-forage systems on Andean hillsides. *Journal of Sustainable Agriculture* 23(4): 39-50.

Books Edited

29. Bationo A., Waswa B.S., Kihara J. and Kimetu J. (Eds) 2006. *Advances in integrated soil fertility management in sub-Saharan Africa: Challenges and Opportunities*. Springer NL (In Press)
30. German, L., Ramisch, J.J., Verma, R. (Editors), Forthcoming, *Beyond the Biophysical: Knowledge, Culture, and Politics in Natural Resource Management*.
31. Quintero M., Estrada R.D. and García J. 2005. *Model of optimization for ex-ante evaluation of land use alternatives and measurement of environmental externalities (ECOSAUT) (in press)*.
32. Verma, R., 2006, *Inside the Development Machine: Culture, Power and Disconnect in the Central Highlands of Madagascar*, London: SOAS. (Forthcoming)

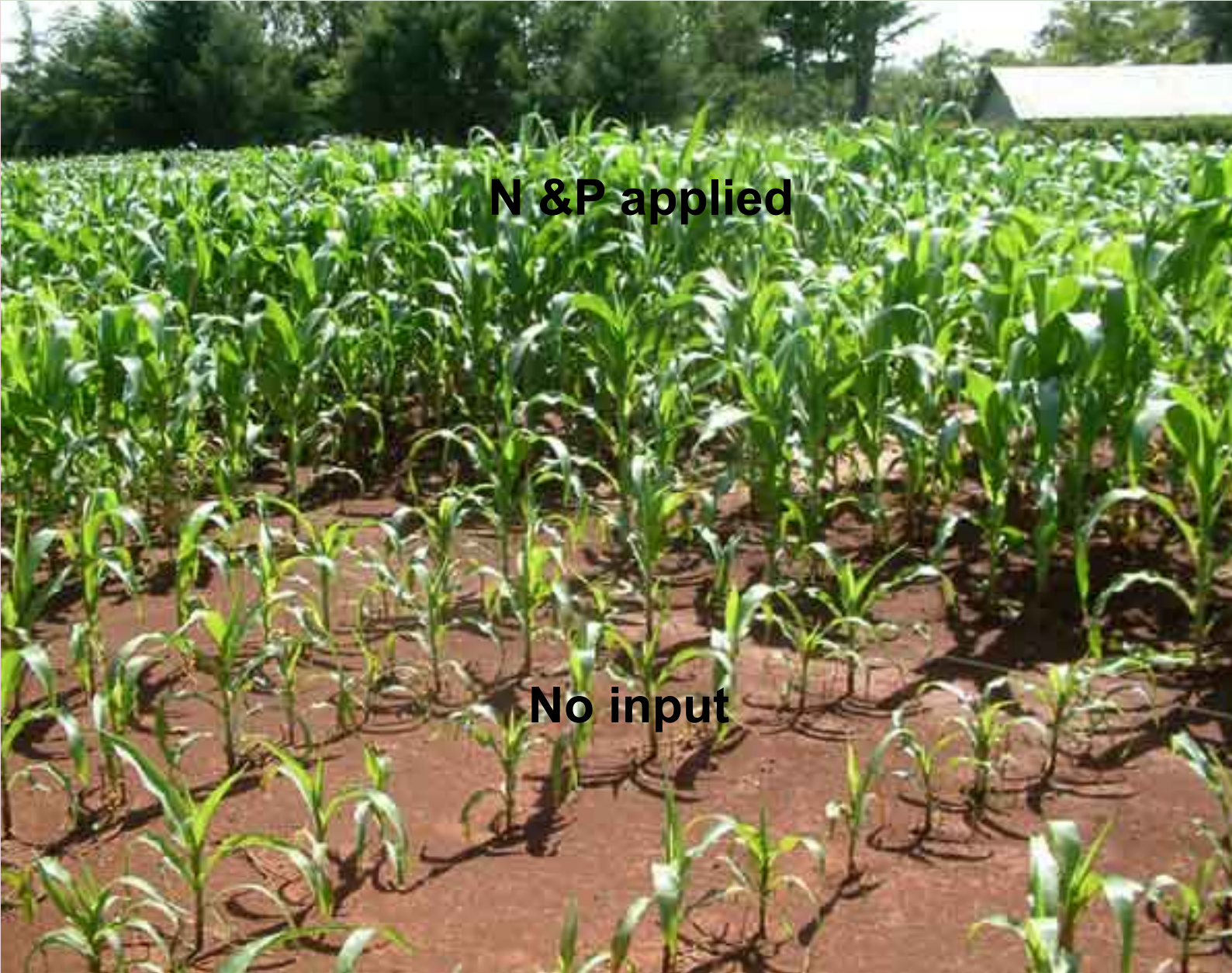
Refereed Book Chapters

33. Amede T. and Taboge E. 2005. Optimizing soil fertility gradients in the Enset (*Ensete ventricosum*) systems of the Ethiopian Highlands: Trade-offs and local innovations. *In: Bationo et al. (Forthcoming)*, from the Yaoundé Conference.
34. Barrios E. 2005. Soil Biodiversity, Ecosystem Services and Land Productivity. *In: Zoebisch M. (ed.) Applied Natural Resources Management. Volume I – Agrodiversity and Land Productivity: Options for Development*. World Association of Soil and Water Conservation (WASWC) and German Institute of Tropical and Subtropical Agriculture (DITSL). Science Publishers, New Hampshire, USA. (in press).
35. Bationo A., Kihara J., Vanlauwe B., Kimetu J.,

Waswa B.S. and Sahrawat K.L. 2006. Integrated Nutrient Management – concepts and experience from sub-Saharan Africa. In Aukland M.S. and Grant C.A. (eds) *Integrated Nutrient Management*. The Hartworth Press Inc. NY (In Press)

36. Cerri C., Feller C., Jr. C. and Rondon M. 2005. Potential of soil carbon sequestration in Amazonian tropical rainforest. In: Potential to sequester carbon in soils from latinoamerica. (Lal R., Kimble J., eds). In press by The Harworth Press Inc.
37. Giller K., Bignell D., Lavelle P., Swift M., Barrios E., Moreira F., van Noordwijk M., Barois I., Karanja N. and Huising J. 2005. Soil diversity in rapidly changing tropical landscapes: scaling down and scaling up. *In: Bardgett E., Usher M. and Hopkins D. (eds.) Biological Diversity and Function of Soils*. Cambridge University Press. 448 p.
38. Nandwa S.M., Bationo A., Obanyi S.N., Rao I.M., Sanginga N. and Vanlauwe B. 2006. Inter and intra-specific variation of legumes and mechanisms to access and adapt to less available soil phosphorus and rock phosphate. *In: Bationo A. (ed.) Fighting Poverty in Sub-Saharan Africa: The Multiple Roles of Legumes in Integrated Soil Fertility Management*, Springer-Verlag, New York (in press).
39. Oberson A., Bunemann E.K., Friesen D.K., Rao I.M., Smithson P.C., Turner B.L. and Frossard E. 2006. Improving phosphorus fertility through biological interventions. *In: Uphoff N. (ed.) Biological Approaches to Improving the Fertility and Sustainability of Soil Systems*. Marcel Dekker, New York, USA. (in press).
40. Ramisch J.J., Misiko M.T., Mairura F.S. and Otworld N.T. 2006. Whose land degradation counts? Contentious understandings of soil fertility management in Western Kenya, invited Chapter in Indigenous knowledge: Contentions and Transformations. *In: Dei G. and Wane N.N. (eds.) University of Toronto Press (in press)*.
41. Rao I.M. 2006. Minerals: Function. *In: Raghavendra A.S. (ed.) Crop Physiology*. The Haworth Press, Inc., Binghamton, USA. (In review).
42. Rondón M.A., Acevedo D., Hernández R.M., Rubiano Y., Rivera M., Amézquita E., Romero M., Sarmiento L., Ayarza M.A., Barrios E. and Rao I.M. 2006. Carbon sequestration potential of the neotropical savannas (Llanos) of Colombia and Venezuela. *In: Lal R. and Kimble J. (eds.) Carbon*

- sequestration potential of the main biomes of Latin America. The Haworth Press, Inc., Binghampton, USA. (*In press*).
43. Rychter A.M. and Rao I.M. 2005. Role of phosphorus in photosynthetic carbon metabolism. *In: Pessaraki M. (ed.). Handbook of Photosynthesis. 2nd Edition, CRC Press, Taylor & Francis, New York. pp. 123-148.*
44. Singh B.P., Rao I.M. and Beebe S. 2005. Prospects of improving drought tolerance in common bean. Proceedings of the International Conference on Sustainable Crop Production in Stress Environments: Management and Genetic Options. Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur (M.P.), India.
45. Singh B.R., Rao I.M., Barrios E. and Amézquita E. 2005. Impact of tillage, agropastoral and planted fallow systems on soil-plant processes in low fertility tropical soils of Latin America. *In: R. Lal, Hobbs, Uphoff and Hansen (eds.). Sustainable Agriculture and the Rice-Wheat system. Marcel Dekker, Inc., New York (in press).*
46. Swift M.J., Stroud A., Shepherd K., Albrecht A., Bationo A., Mafongoya P., Place F., Tomich T.P., Vanlauwe B., Verchot L. and Walsh M. 2005. Confronting land degradation in Africa: Challenges for the next decade. ICRAF 25th Anniversary Proceedings, Nairobi, Kenya (*in press*).
47. Tabo R., Bationo A., Kandji S., Waswa B.S. and Kihara J. 2005. Global change and food systems in Africa (*In press*).
48. Vanlauwe B., Ramisch J. and Sanginga N. 2005. Integrated soil fertility management in Africa: from knowledge to implementation. *In: Uphoff N. et al (eds.). Biological Approaches to Sustainable Soil Systems. CRC Press, USA (in press).*26. Wagatsuma T., Khan M.S.H., Rao I.M., Wenzl P., Tawaraya K., Yamamoto T., Kawamura T., Hosogoe K. and Ishikawa S. 2005. Methylene blue stainability of root-tip protoplasts can serve as an indicator of aluminum tolerance in a wide range of plant species, cultivars and lines. *Soil Science and Plant Nutrition* 51: 991-998.



N & P applied

No input