Consortium for the improvement of agriculture-based livelihoods in Central Africa

Musa Sub-Sector Strategic Plan for Burundi: 2006–2011

"Addressing the challenges of integrating bananas into the market economy"

April 2007

IPGRI and INIBAP now operate under the name "Bioversity International

TABLE OF CONTENTS

FOREWORD

This strategic plan for the *Musa* sub-sector was developed for the Consortium for the Improvement of Agriculture-based Livelihoods in Central Africa. CIALCA brings together national, regional and international partners to focus their resources on improving the livelihoods of people recovering from decades of civil conflicts. CIALCA is implemented by the National Agricultural Research Systems (NARS) of Rwanda, Burundi and the Democratic Republic of Congo, in collaboration with three Consultative Group for International Agricultural Research (CGIAR) centres (Bioversity International, the International Institute of Tropical Agriculture-IITA and the *Centro Internacional de Agricultura Tropical*-CIAT).

CIALCA also draws in the Association for Strengthening Agricultural Research in East and Central Africa (ASARECA) in the framework of the Banana Research for Eastern and Southern Africa (BARNESA) and mirrors the Institut de Recherche Agronomique et Zootechnique (IRAZ), which brings together the NARS of the three Central Africa countries. With the recent revival of the Economic Community of the Great Lakes Countries, IRAZ's role in coordinating sub-regional efforts to address agricultural productivity will be enhanced. Moreover a number of NGOs and private sector organization are operating across the borders of the countries of the sub–region. Such a large number of partners working within the agriculture sector of the sub-region would benefit from a regional strategic plan to facilitate their collaboration, share information and technologies and exploit synergies and institutional comparative advantages within and between them.

It is against this background that the sub-regional players were brought together to analyse and prioritize the contraints on banana productivity at the sub-region level, before identifying and prioritizing them at the country level. The approach also reflects the understanding that the majority, and sometimes the most important constraints, such as banana Xanthomonas wilt (BXW), Banana Bunchy Top Virus (BBTV), fusarium wilt, weevils and nematodes, as well as a host of socioeconomic problems, cut across borders. In addition it was also realized that there was a lot of similarity in terms of demographics, farming systems and socio economic fabric with potential for cross-border synergies that need to be exploited to address any agreed research for development priorities effectively. It was also perceived that identifying, prioritizing and addressing sub-regional constrains in a coordinated way would add value to the national level efforts to address the same.

As the sub-regional level, a number of challenges need to be addressed by research and development:

- Improving transfer of appropriate banana technologies;
- Adding value and improving post-harvest handling;
- Broadening the genetic base of bananas;
- Addressing the major pests and diseases;

Furthermore, another set of very important constraints were rated as medium priority because of the perceived probability of success in the face of the limited resources.These include:

- Improving soil fertility and water management.

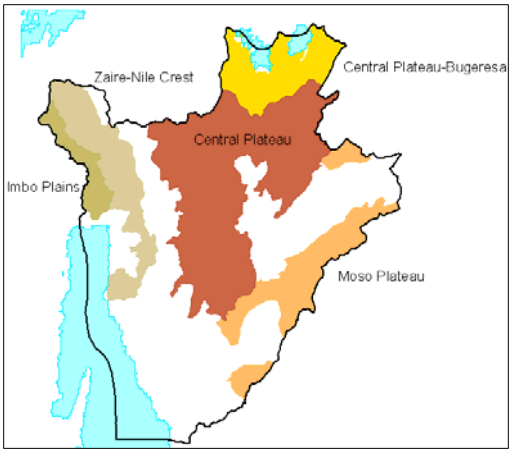
- Enhancing the nutritional quality of bananas for income and food security.
- Intensification of the existing production systems.
- Promoting transboundary banana/plantain trade between Uganda, Rwanda, Burundi and DR Congo.

The country priorities mirror the sub-regional priorities, further supporting the need for looking at the larger picture at the sub-regional level, where resources can be aggregated to create greater impact at national levels.

The sub-regional priorities will serve as a guide for resource allocation and sharing of responsibilities between countries and will form a basis for the development other associated policies aimed at improving the livelihoods of the people of the sub region. The document will facilitate discussions at national, sub-regional and international levels where partners may need guidance on resource investment and potential impacts. It will also guide the development of cooperation and collaborations mechanisms with respect to comparative advantages and roles in the collaboration. The priorities however must be construed as dynamic and requiring constant analysis to ensure synergies are exploited, lessons are learnt and critical and timely changes are made to maximize investment by all the interest groups from grassroot organizations to policy makers. To this end CIALCA (along with IRAZ and other sub-regional platforms) will play important roles in strengthening the sub-regional cooperation on agricultural research for development, while enhancing the linkages for information and technology access/exchange between the sub-region and the wider global fora with interests in the region.

INTRODUCTION

In Burundi, bananas, especially the cooking types) are a very important staple food. With the beer and dessert bananas and some plantains, they represent 40% of the total agriculture production and provide an important source of income. The main banana-growing regions are the Nile crest, the Imbo plains, the Central plateau and the Moso plateau. A few plantains can be found in the Imbo plains. Banana program research is handled by IRAZ, which closely collaborates with the other research institutes (ISABU, FACAGRO), the extension services, NGO's and other farmers organisations.



Over the years, the main achievements registered in Burundi are:

- The constitution of the first and significant reference collection of high altitude bananas. By the breath of its diversity, this collection is one of most significant in Africa and has germplasm not found anywhere else in the world. The collection currently has 300 accessions;
- Identification and diffusion of 16 cultivars of banana with good agronomic characteristics;
- Identification and diffusion of clones resistant and or tolerant to the various diseases in the area, in particular fusarium wilt and black leaf streak disease;
- Trials conducted by IRAZ at Mashitsi research centre has led to the determination of the densities of plantation, the periods of planting the banana trees, the optimal amounts of the manure, etc;
- The establishment of a tissue culture laboratory able to carry out micropropagation of planting material. It is an essential facility for research and access to clean and improved planting material for the farmers.

PRIORITY SETTING FOR THE *MUSA* SUB-SECTOR

The process of developing a strategic plan started by identifying the constraints and priority research interventions in order to make decisions on the allocation of investments.

The Project Strategic Planning Workshop followed the seven-step priority setting process recommended by the International Service for National Agricultural Research (ISNAR) and the International Food Policy Research Institute (IFPRI) and adopted by the Association for Strengthening Agricultural research in East and Central Africa (ASARECA). A Network Committee comprising the Bioversity-ESA Regional Coordinator, the Director of the Monitoring and Evaluation and Planning Unit of NARO, and an Associate Scientist at Bioversity-ESA was established (Step 1) to review the banana sub-sector or research domain (Step 2), evaluate

existing results (Step 3). For the fourth step, a second committee, a Workshop Process Management Committee (Annex 1), comprising the head of the National Banana Research Programme, eminent scientists and the Network Committee was established to develop/analyse the individual constraints (Step 4) into a set of research alternatives and consolidated into research for development sub-themes (Step 5). Subsequently, a priority setting workshop (Step 6) involving stakeholders was held during the first three days of the Workshop.

Steps 1 to 5 were conveyed to participants by way of presentations and discussions during the workshops. Work in groups and plenary discussions were also used. Presentations were delivered in both French and English, when necessary. Templates and background material were presented in French and English.

Step 6 involved the priority setting workshop itself. The process can be summarized into four key stages:

1. Presentation of the results obtained by the Network Coordination Committee and the Workshop Process Committee were delivered to participants through presentations. The regional sub-thematic areas for the Great Lakes Region were delivered by the Head of the National Banana Programme to the stakeholder representatives.
2. Group work exercises (and plenary discussions) were utilized to:
    a. verify the key constraints and research areas proposed by the Process Management Committee,
    b. agree on the criteria at country level and determine their relative weight,
    c. score the research areas.
3. The Workshop Process Management Committee synthesized and classified the results into high, medium or low priority research areas.
4. Stakeholder approval of the final results.

IDENTIFICATION OF CRITERIA

The priority-setting process used the weighted scoring method. The method ensures that adjustments can be made as priorities and circumstances change. Application of the weighted scoring method included identifying relevant criteria representative of national goals and research for development thematic areas. The team modified the BARNESA criteria (Annex 2) as indicated in Table 1. The total had to add up to 100.

Table 1. Weight given by the stakeholders to the criteria used to identify the priorities.

Criteria	Weight
Increasing household income	
Creating employment	9
Adding value to banana products	7
Increasing banana products on the market	7
Introducing new and profitable technologies along the chain	7
Improving product quality	5

Criteria	Weight
Increasing household food security	
Increasing banana yields and products	10
Reducing losses at all levels along the chain	4
Introducing demand-driven technologies	7
Improving nutritional value of banana and banana products	4
Maintaining the sustainability of the natural resource base	
Reducing use of chemical additives	3
Reducing soil fertility loss	9
Improving air and water quality	3
Conserving banana-based biodiversity	5
Strengthening institutional capacity	
Improving linkages and partnerships	1
Improving the skills of stakeholders	3
Strengthening financial resource base	2
Improving infra-structure	2
Improving the policy environment	
Strengthening advocacy at the grassroots	2
Generating policy data/information	2
Improving linkages between policy organizations	2
Facilitating information exchange and utilization	
Increasing information generation	2
Increasing information dissemination	2
Increasing information utilization	2

IDENTIFICATION OF CONSTRAINTS

The banana cropping system and the marketing of banana are much constrained by many factors such as biotic and abiotic factors leading to low productivity and institutional weaknesses (Table 2).

Table 2. Constraints on the *Musa* sub-sector.

Constraints
Production constraints
Low and/or declining fertility
Diseases and pests: Fusarium wilt, BBW, bunchy top; nematodes, weevils;
Poor accessibility to production inputs: fertilizers, improved varieties, clean planting material; improved agronomic practices
Genetic diversity poorly exploited because of lack of characterization and evaluation
Market and Post-harvest constraints
Lack of marketing information
Lack of marketing skills
Poor marketing
Lack of knowledge about technologies that can add value;
Traditional technologies not adapted to preserving and improving products
High packaging costs
Institutional constraints
Insufficient funding for research
Low involvement of the private sector
Limited access to credit
Low human resource capacity
Poor coordination at extension level

IDENTIFICATION OF RESEARCH AREAS

The following research areas were identified:

- Improving soil fertility, water management and soil conservation in banana cropping systems;
- Strengthening the application of integrated pest management strategies, establishing the distribution of diseases and pests, identifying banana cultivars resistant to current disease, establishing a quarantine system;
- Facilitating access to improved varieties and planting material (complete collecting, characterize and evaluate germplasm, enhance capacity in multiplication of clean planting material);
- Facilitating transfer of appropriate post-harvest technologies;
- Improving marketing and market information (diversification of banana products, development of competitive banana products, collect and dissemination of information);
- Developing human resources (researchers, farmers, private sector) and infrastructure;

- Developing partnerships (scientists, public sector, extension services, NGOs, private sector)

PRIORITY RESEARCH AREAS

The participants discussed the contribution of the research areas to meeting the identified criteria. Each research area was scored according to its estimated impact on a given criterion, from -5 for a very significant negative effect (if, for example, it had a negative impact on the environment, gender equity or employment) to +5 for an extremely positive effect. A score of 0 implied that the research area would contribute nothing to that criterion. The scores given by the participants were averaged and multiplied by the weight given to each criterion. The standard deviation was used to separate the research areas into three groups: high, medium and low priority.

This exercise is to help managers decide to which projects allocate resources. All high being equal, the high priority projects will be allocated more resources than the ones ranked medium and low. The results of the priority exercise are presented in Table 3. Participants were given the opportunity to review the results of their scoring so as to identify outlier scores.

Table 3. Priority given to each research area in Burundi.

Research areas	Priority
Facilitating access to improved varieties and planting material Strengthening the application of integrated pest management strategies	High
Improving soil fertility, water management and soil conservation in banana cropping systems Improving marketing and market information Developing human resources Facilitating transfer of appropriate post-harvest technologies	Medium
Developing partnerships Infrastructure /Physical Development	Low

THE STRATEGIC PLAN FOR THE *MUSA* SUB-SECTOR

Agricultural researchers in Burundi recognise the fact that bananas are a very important commodity in the livelihoods of the people and that the production-to-consumption chain does not effectively meet the stakeholders' expectations. The need to improve production and productivity of bananas has become so apparent that research has to be conducted in a different way. The overriding goal here is to contribute to poverty eradication. To this effect the paradigm shift in banana research will be geared towards increasing household income, improving household food security, maintaining the sustainability of the natural resource base, strengthening institutional capacity, improving the policy environment and facilitating information exchange and utilisation.

VISION AND MISSION

The vision is to enhance rural livelihood by increasing banana products on the market whereas the mission is to generate and disseminate appropriate technologies that will result in improving the banana cropping system for increased contribution to the well-being of the population of Burundi.

CHALLENGES

The main challenges that the banana research programme needs to address are:

- Facilitating access to improved germplasm and planting material;
- Enhancing skills in integrated pest management;
- Improving soil fertility and availability of water resources;
- Improving marketing and market information for bananas;
- Improving transfer of appropriate post-harvest technologies;
- Improving human, financial resources and infrastructures;
- Enhancing linkages and partnership between stakeholders.

STRATEGIC OBJECTIVES AND OPPORTUNITIES

The strategic objectives that will be pursued are:

- Promoting access to improved banana germplasm and planting material;
- Strengthening the application of integrated pest management strategies;
- Improving management and conservation of soil fertility and water;
- Improving marketing and market information of bananas;
- Developing human resource and physical infrastructure;
- Facilitating the transfer of appropriate post-harvest technologies;
- Developing and implementing effective partnerships.

In addressing the strategic objectives, the main opportunities to take advantage of are:

Commitment to peace and return of donors: There is a great thirst for development by the people of Burundi. The willingness of donors to provide funds will accelerate development by investing in the different sectors of the economy. A good banana research proposal stands very high chances of being supported.

Presence of institutions that can address the strategic challenges: At the research level, there are NARIs IRAZ, and RCMRD. Extension services, NGOs, farmers organisation and the private sector are involved in seed production.

Efficient tools exist at different institutional level: Especially for molecular biology and tissue culture laboratories.

Natural resources for the restoration of fertility: Utilisation of animal manure, compost, mulch, cold ash and plants such as *Tithonia.*

Technologies to control pest and diseases available in the country and at regional level: Improved hybrids, clean tissue-culture planting materials, botanicals such as neem, traditional biological control techniques.

Potential markets: Bananas can be exported to COMESA countries and non-African countries. Flour, chips and wine can be produced.

Telecommunication facilities: The Eastern Africa Submarine Cable System will improve communications, reduce the on satellite communications and reduce costs. Some countries like Burundi, Rwanda, Tanzania and Uganda are linked by KBO telecommunications, which are cheap.

For each project the outputs and specific activities to be undertaken are shown in Annex 3.

SUCCESS FACTORS

In order to effectively implement the different strategies for achieving the strategic objectives, the critical factors that will define success are:

- Timely funding: the proposed research interventions will require a timely flow and release of funds if the action plan is to be implemented accordingly.
- Adherence to work plans: this is necessary to achieve the outputs of the agenda and a means of accountability to the partners.
- Community participation and ownership: the communities must be involved and own the process.
- Effective partnerships: the production to consumption chain requires the participation of different players each contributing at critical points. The processors, marketing, transport to mention but a few will need to work together with a common vision.
- Security: this affects all the spheres of the economy and research can be very vulnerable to the extent that no funds will flow into the system and researchers won't be able to work.
- Political will: the government and other policy makers should be committed to the cause of improving the banana sub-sector.

CORE VALUES

The following core values are recommended in the implementation of the strategic plan:

- Team spirit: valuing team spirit, creativity and respect for one another and recognising diversity in the workplace (gender, cultural and professional), building on them as strengths.
- Integrity: respecting and responding to the needs of our partners and the people we serve with a high degree of integrity.

- Transparency: believing in and supporting transparency in our activities, resource allocation and decision-making.
- Result oriented: valuing time management and a result-oriented work ethics.
- Non-bureaucratic: maintaining an informal working environment, valuing effective vertical and horizontal communication more than hierarchy (non- bureaucratic).

IMPACT AND PERFORMANCE ASSESSMENTS

Periodic assessment of performance and impact is a key element to measure the contribution of banana research to rural development, as well as to identify its strengths and weaknesses. In future, the Banana Research Programme will ensure that performance indicators are identified. Such indicators will be simple and clearly defined to allow appropriate participatory methodologies to be used in performance and impact assessments.

The Banana Research Programme will also assess the processes and methods. Accuracy and dependability of results not only depend on clearly defined monitorable indicators and the availability of reliable data and information, but also on the wider participation of stakeholders in the assessment process. A management information system is a useful tool for capturing, updating and creating data, and monitoring provides a feedback mechanism. Integrating the two greatly facilitates performance assessment. The programme will seek to develop and implement such a system and to monitor and evaluate processes and methods by:

- Establishing a set of key quantitative and qualitative monitorable indicators to asses the project outputs and results;
- Documenting results to evaluate their effectiveness and impact on increasing production, incomes as well as their environmental impacts;
- Creating a database to ensure the timely and reliable assessment results.

The assessment process will involve partners and clients in operational areas. In order to integrate monitoring and evaluation processes with the performance assessment process, the focus will be on developing milestones and outputs for performance evaluation. Comprehensive baseline surveys will be conducted to set benchmarks against which future improvements will be gauged.

ANNEX 1: THE WORKSHOP PROCESS MANAGEMENT COMMITTEE

Melchior Nahimana, Director General, IRAZ, P.O. Box 91, Gitega, Burundi. Tel: (+257) 403020 or 934459, Fax: (+257) 402364, Email: iraz@cbinf.com

Pascal Ndayiragije, Scientific Director , Insitut des sciences Agronomiques du Burundi, BP 795, Bujumbura, Burundi. Tel: (+257) 227352 or 939917, Fax: (+257) 225798, Email: ndayipascalisabu@yahoo.fr

Gordien Niyongabo, Head of the Viral Cleaning Laboratory, University of Burundi, Faculty of Agriculture, BP. 2940, Bujumbura, Burundi. Tel: (+257) 849189, Fax: (+257) 247530, Email: nilaborentin@yahoo.fr

Theodomir Rishirumuhirwa, Director Agrobiotec, B.P.5667, Bujumbura, Burundi. Tel: (+257) 241972 or 824580, Email: agrobiotec2002@yahoo.fr

Eldad Karamura, Senior Scientist/Bioversity Regional Coordinator, Katalima Rd Plot 106, Naguru, P.O. Box 24384, Kampala, Uganda. Tel: (+256) 41286213 or 071286 948, Fax: (+256) 41286949, Email: E.Karamura@cgiar.org

Moses Osiru, Associate Scientist, Bioversity/BARNESA, P.O. Box 24384, Kampala, Uganda. Tel: (+256) 041286213, Mob (+256) 077595228, Fax: (+256) 041286949, Email: m.osiru@inibap.co.ug

Guy Blomme, Assistant Regional Coordinator, Bioversity, P.O. Box 24384 Kampala, Uganda. Tel: (+256) 41286213, Fax: (+256) 41286949, Email: g.blomme@cgiar.org

Siifa B. Lwasa, Programme Assistant, Bioversity, P.O. Box 24384, Kampala, Uganda. Tel: (+256) 41286213 or 077458181, Fax: (+256) 41286949, Email: l.siifa@inibap.co.ug

Herbert Mbuga, Accounting Assistant, Bioversity, P.O. Box 24384, Kampala, Uganda. Tel: (+256) 41286213 or 071270988, Fax: (+256) 41286949, Email: H.Mbuga@cgiar.org

Sylvester Dickson Baguma, Facilitator and Director Planning, Monitoring and Evaluation Unit of the National Agricultural Research Organization (NARO), P.O. Box 295, Entebbe, Uganda. Tel: (+256) 077504827, Fax: (+256) 041321070, Email: sdbaguma@naro.go.ug

ANNEX 2: ORIGINAL CRITERIA AND SUB-CRITERIA

INCREASING HOUSEHOLD INCOME
Creates employment
Adds value to banana products
Increases banana products on the market
Introduces new technologies along the chain
Improves product quality
IMPROVING HOUSEHOLD FOOD SECURITY
Increases yields of banana and products
Reduces losses at all levels along the chain
Introduces demand-driven technologies
MAINTAINING THE SUSTAINABILITY OF THE NATURAL RESOURCE BASE
Reduces use of chemical additives
Reduces loss of soil fertility
Improves the quality of air and water
Conserves banana-based biodiversity
STRENGTHENING INSTITUTIONAL CAPACITY
Improves linkages and partnerships
Improves the skills of stakeholders
Strengthens Financial Resource Base
Improves infra-structure
IMPROVING THE POLICY ENVIRONMENT
Strengthens advocacy at the grass-roots
Generates policy data/information
Improves linkages between policy organisations
FACILITATING INFORMATION EXCHANGE AND UTILISATION
Increases information generation
Increases information dissemination
Increases information utilization

ANNEX 3: RESEARCH OUTPUTS AND ACTIVITIES

Outputs	Activities	On-going and expected activities	Partners
Output 1: Enrichment of existing IRAZ collection	1.1. Complete collect of banana germplasm 1.2. Introduce exotic germplasm 1.3. Install new accessions collected and introduced ex situ	1.1.IRAZ/ISABU (EAPGREN) 1.2.IRAZ (KUL) 1.3. DGDC/CIALCA	1.1. ISABU 1.2. IRAZ
Output 2: Knowledge of the accessions in the collection is increased	2.1. Complete characterization of the accessions in the IRAZ collection 2.2. Evaluate the accessions	2.1.IRAZ/ISABU (EAPGREN) 2.2.IRAZ/ISABU (EAPGREN)	2.1. IRAZ DGDC/CIALC 2.2. IRAZ, ISABU and FACAGRO
Output 3: Availability of improved, clean and demand-driven material	3.1. Reinforce tissue culture facilities 3.2. Reinforce human resources 3.3. Clean and conserve the collected and introduced material in vitro 3.4. Multiply rapidly the promising varieties 3.5. Disseminate the cleaned promising varieties	3.1.DGDC/CIALCA 3.2.DGDC/CIALCA 3.3.DGDC/CIALCA 3.4. DGDC/CIALCA 3.5.DGDC/CIALCA	3.1.IRAZ, FACAGRO, AGROBIOTEC 3.2. FACAGRO, ISABU, IRAZ 3.3. IRAZ, FACAGRO, 3.4. Private labs, IRAZ 3.5. ISABU, NGOs, Extension services and private sector and farmers
Output 4: Existing technologies evaluated and new ones generated (IPM/Soil fertility)	4.1.Establish a pest and disease distribution map 4.2. Evaluate disease/pests impact 4.3. Develop and implement IPM techniques / components 4.4. Develop and implement soil fertility and water management techniques/ components 4.5. Train extension agents	4.1. DGDC/CIALCA 4.2. DGDC/CIALCA 4.3. DGDC/CIALCA 4.4.DGDC/CIALCA 4.5.DGDC/CIALCA	4.1.IRAZ, FACAGRO, ISABU 4.2.RAZ, FACAGRO, ISABU 4.3.RAZ, FACAGRO, ISABU 4.4.IRAZ, FACAGRO, ISABU 4.5.IRAZ,FACAGRO, ISABU

Outputs	Activities	On-going and expected activities	Partners
Output 5: Post harvest technologies transfer enhanced	5.1. Collect existing information on available technologies (diversification) 5.2. Identify market-oriented technologies 5.3. Training on the identified technologies 5.4. Dissemination of approved technologies	5.1. DGDC/CIALCA 5.2.DGDC/CIALCA 5.3.DGDC/CIALCA 5.4.DGDC/CIALCA	5.1. CNTA, ISABU, FACAGRO 5.2. CNTA, ISABU, FACAGRO 5.3. CNTA, ISABU, FACAGRO 5.4. NGOs, extension services, private sector, farmers and farmer associations, Young and women organisations
Output 6: Availability of marketable banana products ensured	6.1. Collect information and carry out socio-economic studies on banana market opportunities 6.2. Promote the available banana products	6.1. DGDC/CIALCA 6.2. Processors, marketers	6.1. ISABU, FACAGRO, processors, marketers, consumers 6.2. Processors, marketers

ANNEX 4: ACRONYMS

ASARECA	Association for Strengthening Agricultural Research in East and Central Africa
BARNESA	Banana Research Network for East and Southern Africa
BIOVERSITY	Bioversity International
BXW	Banana *Xanthomonas* Wilt (or Banana Bacterial Wilt)
CIALCA	Consortium for the Improvement of Agriculture-based Livelihoods in Central Africa
CIAT	Centro International de Agriculture Tropical
CNTA	Centre National de Technologie Alimentaire
DGDC	Directorate General for Development Cooperation, Belgium
EAPGREN	Eastern African Plant Genetic Resources Network
IITA	International Institute of Tropical Agriculture
IFPRI	International Food Policy Research Institute
INERA	Institute National des Etudes et de la Researches Agricole
IPM	Integrated Pest Management
IRAZ	Institut de Recherche Agronomique et Zootechnique
ISABU	Institut des Sciences Agonomiques du Burundi
ISNAR	International Service for National Agricultural Research
MEPU	Monitoring, Evaluation and Planning Unit, NARO
NARO	National Agricultural Research Organisation, Uganda
NARS	National Agricultural Research System
NGO	Non-Governmental Organisation
TSBF	CIAT's Tropical Soil and Biology Fertility Institute

Consortium for the improvement of agriculture-based livelihoods in Central Africa

Following a call for proposals of the Directorate General for Development Cooperation (DGDC – Belgium) in April 2004, three proposals were approved:

• 'Sustainable and Profitable Banana-based Systems for the African Great Lakes Region', led by the International Institute of Tropical Agriculture (IITA), Kampala, Uganda.

• '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 the Tropical Soil Biology and Fertility Institute of the International Center for Tropical Agriculture (TSBF-CIAT), Nairobi, Kenya.

• 'Building Impact Pathways for Improving Livelihoods in *Musa*-based Systems in Central Africa', led by Bioversity International, Kampala, Uganda.

As the above projects proposed to operate largely in the same parts of Rwanda, Burundi, and the Democratic Republic of Congo (DR Congo), with similar national partner institutes, and due to the complimentary nature of the activities proposed, above institutes agreed to operate as a Consortium to ensure cooperation and complimentarity and avoid technical and financial duplication at the national level. The Consortium for Improving Agriculture-based Livelihoods in Central Africa (CIALCA) is a Consortium of the International Agricultural Research Centers (IARCs) and their national research and development partners that aims at close technical and administrative collaboration and planning in areas of common interest, thereby enhancing returns to the investments made by DGDC and accelerating impact at the farm level.

Institut de Recherche Agronomique et Zootechnique (IRAZ), Burundi

Institut des Sciences Agronomiques du Burundi (ISABU), Burundi

Université du Burundi (UNB), Burundi

Institut des Sciences Agronomiques du Rwanda (ISAR), Rwanda

Université National de Rwanda (NUR), Rwanda

Institut National des Etudes et de la Recherche Agricole (INERA), DR-Congo

Plateforme DIOBASS, DR-Congo

Université de Kinshasa (UNIKIN), DR Congo

Université Catholique de Bukavu (UCB), DR Congo

Université Catholique du Graben (UCG), DR Congo

Faculté Universitaire des Sciences Agronomiques de Gembloux, Belgium

Katholieke Universiteit Leuven (K U Leuven),
Universite Catholique de Louvain-la-Neuve (UCL), Belgium

Supported by the Directorate General for Development Cooperation, Belgium