
PROJECT EVALUATION
**“SUPPORTING THE
DEVELOPMENT OF THE
COTTON SECTOR
IN THE C4 COUNTRIES”**
(BENIN, BURKINA FASO,
CHAD AND MALI)



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CONTENTS

EXECUTIVE SUMMARY	4
01/ CONTEXT	8
02/ PROJECT OVERVIEW	12
03/ PARTNER INSTITUTIONS	16
04/ METHODOLOGY	20
Analytical Framework	20
Research Techniques	24
05/ PLANNING AND MANAGEMENT	26
Analysis of the Logframe	26
Management	28
06/ RESULTS EVALUATION	32
Result 1	33
Result 2	35
Result 3	40
Result 4	43
Result 5	44
07/ APPLICATION OF THE PRINCIPLES OF SOUTH-SOUTH COOPERATION	46
Horizontality	48
Ownership	50
Mutual Benefits	52
08/ CROSS-SECTIONAL RESULTS ANALYSIS	56
09/ FINAL CONSIDERATIONS AND RECOMMENDATIONS	60
Appendix 1: List of Interviewees	70
Appendix 2: List of Indicators	78
Appendix 3: List of the Key Equipments Purchased for the Sotuba Station	88
Appendix 4: Photographs	94
Appendix 5: Important actors in partner countries' cotton sector	104

EXECUTIVE SUMMARY

The C4 Project, implemented between March 2009 and December 2013, is the first Brazilian technical cooperation project of this scale. Its general objective is to contribute to improving competitiveness in the cotton supply chain of the African partner countries. The project was coordinated by the Brazilian Cooperation Agency (ABC) with support from the United Nations Development Programme (UNDP), and executed by the Brazilian Agricultural Research Corporation (Embrapa), which shared knowledge in three main areas: Integrated Pest Management, genetic improvement and no-till farming. The partner institutions in Africa were the respective countries' public research institutions: *L'Institut d'Economie Rurale* (IER, Mali), *L'Institut pour l'Environnement et Recherches Agricoles* (INERA, Burkina Faso), *L'Institut Tchadien De Recherche Agronomique Pour Le Développement* (ITRAD, Chad) and *L'Institut National des Recherches Agricoles du Bénin* (INRAB, Benin).

This evaluation involved an initial literature review, reading and systematisation of documents related to the project. Subsequently, the evaluation team conducted 109 semistructured interviews, and participant observation in all the countries involved in the project. The evaluation team sought to analyse elements such as performance, effectiveness, efficiency and sustainability. In addition, the team assessed the application of the principles of South-South Cooperation in practice, considering the following dimensions: horizontality, ownership and mutual benefits.

The lengthy planning and negotiation process was considered important in ensuring that the project met the specific needs and interests of the partners. Management mechanisms - such as the Project Steering Committee, the appointment of a coordinator located in Bamako, and focal points in the partner institutions - were essential to ensuring the monitoring of the actions and ownership of the project. The importance of the role of the Brazilian embassies in the project was also mentioned. However, problems related to financial management and administrative processes had a negative impact on the execution of the scheduled activities. Embrapa's technicians were evaluated very positively by the partner institutions, but interviewees from Brazil pointed out that the organisation should provide incentives to encourage researchers to participate in cooperation projects.

With regard to expected result 1 (revitalization of the Sotuba Station in Mali), the construction of the C4 Cotton Centre was completed and the centre has been equipped with offices, a meeting room, and an entomology laboratory. In addition, the experimental area was revitalised, and the biotechnology and soil analysis laboratories were equipped and fully wired. Adequate

facilities for the development of the project's technical and administrative activities therefore exist.

The construction of the centre also had an important impact on the visibility of the project, and the centre is now a reference point within the Sotuba Station.

Furthermore, the whole experimental area has received constant visits and is used to promote the validation and dissemination of Brazilian farming techniques. However, the resources made available to the project are being partially underused and some items of equipment are beyond the needs of the project activities. There is a lack of qualified human resources needed to carry out the analyses in the biotechnology laboratory. With regard to the sustainability of the investments, the management of the C4 Centre has not yet been passed on to the local partner.

With regard to the second expected result (Embrapa knowledge introduced and validated), adaptive research has been carried out in the three main areas of the project aiming to validate techniques and adapt them to the local context.

The 10 Brazilian cotton-seed varieties transferred to the countries were used and adapted by the partner institutions. In Mali, two varieties are being produced for planting and being crossed with local varieties to improve fibre quality. In Burkina Faso, the decision was taken to improve local varieties by crossing them with a Brazilian variety, while in Benin Brazilian varieties were selected to improve the colour and shine of local varieties. Interviewees in Chad stated that Brazilian cotton is high quality, but they lack the human resources needed to progress with the genetic activities.

The results of technology transfer involving no-till farming into cover crops in experimental areas were evaluated very positively, showing that the use of this system increases the productivity of the crops involved. The fact that the system can be used with other crops was mentioned as a positive aspect. However, the no till-farming system requires a change in planting habits and therefore greater investment of time and resources to guarantee the success of its dissemination. Some adaptations have been suggested which take into account the local physical conditions and culture.

With respect to the main area Integrated Pest Management, the project proposed the installation of a laboratory in Bamako to produce the natural enemy (*Trichogramma*) of the main cotton pest (the cotton bollworm - *Helicoverpa armigera*) that attacks the fruits of the cotton plant. This activity is still in the experimental stage and researchers are having trouble identifying the species and finding it on cotton plants in the field.

The complexities of the analysis of infestations are often beyond the capacities of the farmers and the researchers see this as an obstacle. Another challenge is the high level of investment necessary to ensure the success of biological control.

Regarding expected result 3 (researchers, technicians and farmer leaders trained in new cotton production technology), the project held 22 courses in Brazil and the partner countries. The main beneficiaries of these activities were researchers from the partner institutions. The capacity building activities were evaluated very positively by the interviewees, both in terms of content and methodology. The partners value the knowledge and attitude of the Embrapa technicians. However, the high turnover of technicians between activities had a negative impact on the connection between the capacity building activities. Language was also cited as an obstacle to the flow of the capacity building activities. Despite these obstacles, the evaluation team found examples of replication and dissemination of learning to a wider public.

With respect to the fourth expected result (materials about new cotton production technology produced and disseminated), three manuals of best practices in farming, five technical bulletins and two publicity materials were produced with the participation of all the institutions involved in the project. A total of 4,540 copies of the manuals of good agricultural practices were sent to Bamako for distribution. However, the distribution of the manuals is awaiting a formal event to present the material to local actors. The material meets the needs of the African researchers but is not adapted to the needs of the extension agents and farmers.

With respect to the application of the principles of horizontality of South-South Cooperation, it was observed that there was a high level of participation and advocacy among partner institutions in all phases of the project. The Project Steering Committee played an essential role in this process. The level of satisfaction with communication is greater, the closer the interlocutor is to the C4 Cotton Centre in Sotuba.

With regard to ownership, the project was aligned with national strategies and the priorities of the partner institutions. However, there was little coordination between the project and other relevant actors and projects. The involvement of senior staff from the partner governments and Brazilian embassies showed that there was political support for the project. The motivation and commitment of the partners to the project was evident, for example through the pre-financing of activities. Finally, as mentioned previously in relation to results 2 and 3, Brazilian knowledge is being adapted to realities in partner countries.

However, the technical and financial management of the C4 Centre remains under the leadership of the Brazilians.

An analysis of the mutual benefits of the project shows that there was knowledge enhancement among the partners, which is an important factor for the consolidation of the relationships between the countries. The partners are interested in opening new opportunities of cooperation with Brazil. In addition to the transfers from Brazil to the partner countries, some technologies have been introduced in Brazil, such as the water recycling system from Chad. Also for Brazil, the project brought visibility within the World Trade Organisation (WTO) and lessons learnt in relation to the approaches to South-South Cooperation, contributing to, for example, the elaboration of the ABC Management Manual.

Project performance was deemed good. In terms of effectiveness, the project results are well matched to the needs of the beneficiaries, but show varying degrees of success due to different levels of adherence to agricultural techniques and practices depending on local realities. The approaches chosen to achieve the results were considered consistent. The evaluation took into consideration that adaptive research and capacity development are medium to long term processes. However, certain adjustments to the activities could enhance the impact of the project.

The main challenges and drawbacks of the project were analysed considering the innovative nature of the project. As a pilot project, its impact on cotton productivity in partner countries will depend on the ownership and sustainability of technology transfer. There are therefore a number of opportunities to create synergies, identify common interests and exchange learning experiences between the project and other relevant actors.

THE RECOMMENDATIONS FOR THE FUTURE PHASES ARE:

TO STRENGTHEN MANAGEMENT:

- Strengthen planning and financial management
- Improve the monitoring and evaluation system
- Guarantee incentives and support to encourage the participation of Embrapa technicians and researchers in cooperation projects

TO ENSURE TECHNOLOGY TRANSFER:

- Adapt the no-till farming system to the realities of local farmers
- Review the Integrated Pest Management main area
- Distribute the dissemination materials and rethink methods of dissemination to farmers
- Start up activities in the biotechnology laboratory
- Strengthen communication between the individuals involved in the project
- Create mechanisms to avoid discontinuity of the content of capacity building activities and make the post-course material more accessible
- Elaborate an investment plan and activity plan for the entomology laboratory in Sotuba

TO GUARANTEE SUSTAINABILITY AND OWNERSHIP:

- Guarantee project alignment with other actions in the cotton supply chain and partner institutions
- Widen the network of actors to include other research areas
- Strengthen the academic research component
- Guarantee the long term sustainability of interventions



CONTEXT

COTTON IS A MAJOR CASH CROP WITH IMPORTANT IMPLICATIONS FOR THE DEVELOPMENT OF AGRICULTURE AND POVERTY REDUCTION IN WEST AFRICA. IN BENIN, BURKINA FASO AND MALI, COTTON ACCOUNTS FOR 30, 80 AND 85, RESPECTIVELY, OF THE TOTAL VALUE OF AGRICULTURAL EXPORTS (FAOSTAT, 2013)¹, AND IT IS ESTIMATED THAT OVER 10 MILLION PEOPLE DEPEND DIRECTLY ON COTTON PRODUCTION IN WEST AND CENTRAL AFRICA.² APART FROM DIRECT BENEFITS, COTTON ALSO SUSTAINS OTHER ACTIVITIES LINKED TO FARMING SUCH AS TRANSPORT AND GINNING, CREATING JOBS IN RURAL AREAS AND CONTRIBUTING TO REGIONAL DEVELOPMENT (THERIAULT AND SERRA, 2013).³

¹ FAOSTAT (2013). Food and Agricultural Organization Statistical Databases. Available at: <http://faostat.fao.org>. (last accessed on 8 April 2013)

² World Trade Organization Committee on Agriculture. Poverty reduction: Sectoral Initiative in Favour of Cotton – Joint Proposal by Benin, Burkina Faso, Chad and Mali. TN/AG/GEN/4, 16 May 2013.

³ THERIAULT, V. and SERRA, R. Institutional Environment and Technical Efficiency: a Stochastic Frontier Analysis of Cotton Producers in West Africa. Journal of Agricultural Economics. 2013.

Cotton was introduced to West Africa as a crop at the beginning of the twentieth century. Cotton production in the region received a boost in the middle of the twentieth century with the creation of two institutions to carry out research into cotton production and textile manufacturing: *l'Institut de Recherches du Coton et des Textiles Exotiques* (IRCT) and *la Compagnie Française pour le Développement des Textiles* (CFDT).

Vertical integration in the cotton textiles industry, established by the CFDT, was strengthened in the postcolonial era, as these companies exerted a monopoly over the seed market and a near-monopoly over credit and input markets.

Mali, Benin, Burkina Faso and Chad have a common regulatory framework that does not allow for free competition in the purchase of cottonseed. Cotton is produced under contract farming, where a fixed price, seed purchase and credit to purchase inputs is guaranteed to farmers before planting. At the same time, cotton farmer cooperatives were created recently under a new legal framework to defend farmers' interests.

Average cottonseed production in Mali, Burkina Faso, Benin and Chad over the last five years was 360,000, 590,000, 77,000 and 36,000 tonnes respectively (Faostat, 2013). Central and West Africa are experiencing a cotton revival and the production figures from 2012/13 confirm a recovery from the crisis of 2011/12: total area planted, production and exportation grew by 33, 41 and 42, respectively. These improvements were aided by the favourable climate, a policy of high producer prices and subsidised inputs, together with improvements in production practices (AgriTrade, 2014).⁴

The vegetation of Benin, Mali, and Burkina Faso is characterised by savannah. Farms have an average size of three hectares and traditionally use manual labour. The farmers generally use animal traction for soil preparation, but may also use tractors. In Benin, the supply of inputs (seeds, fertilizer and pesticides), ginning, and commercialisation of cotton is undertaken by the state-linked company Sonapra, while in Burkina Faso the same activities are carried out by the private companies Faso Coton and Sofitex. In Mali, the state cotton company, *Compagnie Malienne pour le Développement du Textile* (CMDT)⁵, is responsible for the purchase and supply of inputs, while in Chad, the parastatal company, CotonTchad, exercises a monopoly over the purchase of raw cotton, processing and the sale of cotton plume.⁶

It is important to highlight that the C4 Project occurs within the larger context of international cooperation and various traditional donors, NGOs and the private sector are also implementing agricultural development projects in the C4 countries, particularly in the cotton sector. Furthermore, a number of policies and initiatives exist in Africa which aim to attract outside investment in this area, such as the Comprehensive Africa Agriculture Development Programme (CAADP)⁷ and Framework for African Productivity (FAAP).⁸

BOX 1 - SECURITY

The C4 countries face varying degrees of presence of Islamic fundamentalist groups that operate throughout North Africa. Mali has been in war against rebels in the region of Azawad in the north of the country since 2012, which resulted in the ousting of the former president Amadou Toumani Touré, while protests in October 2014 in Burkina Faso led to the resignation and flee for safety of the president Blaise Compaoré, who had been in power for over 27 years, and a transitional government.

Furthermore, the epicentre of the recent conflict with the group Boko Haram in the northeast of Nigeria is located only 150 kilometres from N'Djamena, capital of Chad, and these rebels entered Chadian territory for the first time in March 2015. This increased threat to regional security is therefore an additional challenge to the C4 Project during the current and subsequent phases.

⁴ AGRITRADE. 2014. Executive brief - cotton sector. Disponível em: <http://agritrade.cta.int/>. Acesso em: 03.03.2015.

⁵ PEREIRA, Geovando and MORELLO, Camilo. Report of the Technical Visit to the cotton-producing regions of Benin, Burkina Faso and Mali. Goiânia, 16/03/2006.

⁶ ABC. Supporting the Development of the Cotton Sector in the C4 Countries (Benin, Burkina Faso, Chad and Mali). 2009.

⁷ For further information access <http://www.caadp.net/>

⁸ FARA (2006) Framework for African Productivity. Forum for Agricultural Research in Africa, Ghana.

Historically, cotton production in Brazil was concentrated in the Northeast, Southeast and South Regions. In the middle of the 1990s, the Central-West Region of Brazil became the main cotton producer due to problems with pest control in the Northeast Region and the development of agriculture in the cerrado (Brazilian savannah). The presence of major agribusiness groups in the Central-West Region, together with investments in agricultural research drove the development of new technology, thus leading to an increase in cotton production. Therefore, Brazil's experience with more productive varieties of cotton, which offer high-quality fibre and greater disease resistance, has the potential to contribute towards the development of cotton production in the C4 countries.⁹

Current annual cotton production in Brazil is approximately 1.8 million tonnes. Average yield is 1.6 tonnes/hectare and the country exported over 247,000 tonnes of cotton between January and June 2015.¹⁰ Production occurs mainly on large farms using a mechanized and technical cropping system and genetically modified seeds. In some areas of the Northeast, however, cotton is still produced under a traditional cropping system.

Given the importance of the cotton sector in the C4 countries and Brazil and the challenges posed by the introduction of agricultural subsidies in developed countries, Brazil, Mali, Burkina Faso, Benin and Chad began a dialogue which led to the emergence of the Cotton 4 project. During the Fifth World Trade Organisation (WTO) Ministerial Conference held in Cancun in 2003, these countries proposed an end to subsidies. Instead of joining Brazil in a formal WTO dispute against subsidies provided by the United States to their cotton farmers, these African nations proposed an initiative within the WTO Agriculture Committee; hence the group became known as the Cotton 4.

This project is unique, since it is directly connected to the global trade processes that symbolize the struggles between the Global North and the Global South, and is therefore particularly significant in terms of its visibility and political importance.

Thus, the factors that drove the emergence of the C4 Project are perfectly matched with the guiding principles of the Brazilian international cooperation programme. South–South Cooperation (SSC) can be broadly defined as any kind of cooperative relationship involving government or non-government actors from two or more countries from the so-called “Global South”. This category encompasses developing countries in general (low and middle-income countries) which face similar development challenges.

Types of SSC include: varied geometry coalitions between countries from the Global South, such as the India-Brazil-South Africa Dialogue Forum (IBSA), the Group of Twenty (G20), and BRICS group of countries (Brazil, Russia, India, China and South Africa); South-South knowledge exchange, trade and investment; scientific and technical cooperation between developing countries; regional, sub-regional and inter-regional integration arrangements between countries from the Global South; and the so-called “South-South Development Cooperation”, which includes technical cooperation.

Despite the rapid growth in SSC over the past decade, and a growing consensus regarding its guiding principles, there is no internationally accepted conceptual and statistical definition. Furthermore, there is a lack of knowledge of SSC in practice and of monitoring and evaluation tools and systems. This situation hinders the rigorous analysis of the contribution that SSC makes towards development in partner countries. In this respect, the present evaluation seeks to make a contribution founded on evidence-based information.

⁹ Source: Brazilian Cooperation Agency. Strengthening technology and disseminating good agricultural practices for cotton in the Cotton 4 countries and Togo. 2014.

¹⁰ Source: the Brazilian Cotton Producers Association (ABRAPA), <http://www.abrapa.com.br/estatisticas/Paginas/exportacoes-brasileiras.aspx>

PROJECT OVERVIEW

THE PROJECT *SUPPORTING THE DEVELOPMENT OF THE COTTON SECTOR IN THE C4 COUNTRIES* IS THE FIRST REGIONAL INITIATIVE DEVELOPED BY THE BRAZILIAN COOPERATION AGENCY (ABC) IN PARTNERSHIP WITH THE STATE-OWNED BRAZILIAN AGRICULTURAL RESEARCH CORPORATION (EMBRAPA).



The first prospecting mission in Africa raised a number of critical issues related to the characteristics of the region, such as poor chemical and physical properties of the soil, irregular rainfall distribution, and excessively small plant population per hectare.¹¹ The technology transferred by Embrapa during the course of project therefore sought to address these issues by focussing on three main areas:

- Integrated Pest Management;
- Soils/Nutrition/No-till farming
- Genetic improvement

The duration of the project was 58 months (March 2009 to December 2013) and the overall project budget was US\$5.21 million, out of which nearly US\$ 1.35 million came from the WTO litigation while the remainder was funded through the Brazilian budget.¹² Table 1 shows the project's logical framework.

Apart from the results presented in table 1, an analytical framework was created during a Project Steering Committee meeting held in October 2013 with the support of the Brazilian National School of Public Administration (ENAP) to evaluate the project (hereafter called the 2013 Evaluation Framework) which added three new results:

- R6. Cooperation Network addressing the project theme strengthened
- R7. Relationships between the partner countries strengthened
- R8. Participative management and horizontality in project relationships promoted

¹¹ MORELLO, Camilo L., PEREIRA, Geovando V. Report of Technical Visit to cotton-growing regions of Benin, Burkina Faso and Mali. Goiânia: EMBRAPA; 2006.

¹² Source: Embrapa, Consolidated Monitoring and Evaluation Report of the C4 Project : Supporting the Development of the Cotton Sector in the C 4 Countries (Benin, Burkina Faso, Chad e Mali)

TABLE 1 – THE C4 PROJECT'S LOGICAL FRAMEWORK

GENERAL OBJECTIVE	To contribute to improving competitiveness in the cotton supply chain
SPECIFIC OBJECTIVES	<p>SO1. To revitalise the Sotuba Research station in Bamako to serve as a Pilot Unit</p> <p>SO2. To develop adaptive research into genetic improvement, Soils/Nutrition/No-till farming, and Integrated Pest Management</p> <p>SO3. To strengthen the capacity of researchers, technicians and farmer leaders to use new technology</p> <p>SO4. To prepare and distribute dissemination material about validated knowledge</p>
RESULTS	<p>R1. Sotuba Research station Revitalised</p> <p>R2. Adaptive research into genetic improvement, Soils/Nutrition/No-till farming, and Integrated Pest Management validated</p> <p>R3. Capacity of researchers, technicians and farmer leaders from the C4 countries to use new technology is strengthened</p> <p>R4. Dissemination material about new cotton production technology prepared and distributed to agricultural extension technicians and farmers</p> <p>R5. Project monitored and evaluated</p>
ACTIVITIES	<p>A1.1-A1.4. Select a specialist to oversee the implementation of the project at local level; contract companies to carry out the refurbishment of the pilot station; purchase equipment, vehicles and materials; carry out monitoring missions</p> <p>A2.1-A2.4. Introduce Brazilian cotton varieties; introduce no-till farming and soil and nutrient management methodology; introduce Integrated Pest Management methodology</p> <p>A3.1-A3.17.¹³ Capacity building targeting the project's three main areas of knowledge transfer in Brazil, Mali, Burkina Faso, Chad and Benin; implement a technology showcase to demonstrate good agricultural practices; organise field trips in all C4 countries; participation of the C4 specialists in 2 Brazilian Cotton Congresses held during the course of the project</p> <p>A4.1-A4.2. Elaborate manuals of good agricultural practices and distribute them to technicians and farmers; elaborate technical bulletins and distribute them to technicians and farmers</p> <p>A5.1-A5.3. Create a Project Steering Committee and ensure its effectiveness; evaluate project mid-term and end performance</p>
INPUTS	Budget and human resources to carry out activities

¹³ Changes were made to some of these activities during the course of the project.

PARTNER INSTITUTIONS

THE PROJECT WAS COORDINATED BY THE ABC AND EXECUTED BY THE RESPECTIVE MAIN PUBLIC RESEARCH INSTITUTIONS OF EACH COUNTRY: EMBRAPA (BRAZIL), IER (MALI), INERA (BURKINA FASO), INRAB (BENIN) AND ITRAD (CHAD).

BRAZILIAN COOPERATION AGENCY - ABC, BRAZIL

The ABC was created in 1987 as part of the Ministry of Foreign Affairs (MRE). Its role is to negotiate, coordinate, implement and monitor the technical cooperation projects and programs established by Brazil with other countries and international agencies. The ABC/MRE is linked to the Under-Secretary-General for Cooperation and Trade Promotion, which also belongs to the MRE.

ABC's operating structure comprises four coordinating departments: CGPD –General Coordination of Technical Cooperation between Developing Countries; CGCB - General Coordination of Bilateral Technical Cooperation; CGCM - General Coordination of Multilateral Technical Cooperation, and CGAO - General Coordination of the Administration and Overall Budget of the ABC.

The ABC was created during a time of major change in the flow of international development cooperation, and after its creation Brazil began to give a greater emphasis to South-South Technical Cooperation in its foreign policy. Currently, Brazil promotes this type of cooperation across all continents, either through bilateral projects and programmes, or via triangular partnerships with foreign governments and international agencies.¹⁴

BRAZILIAN AGRICULTURAL RESEARCH CORPORATION - EMBRAPA, BRAZIL

Embrapa was created in 1973 to develop a farming system adapted to the Brazilian context. It is linked to the Ministry of Agriculture and has 16 regional offices and 46 decentralised research centres that develop activities related to research, crop selection, technical publications, and the promotion of technology transfer to farmers. Its staff includes 2,400 researchers, 1,700 technicians, 2,500 analysts and 2,700 assistants.

Embrapa Cotton and Embrapa Rice and Beans were directly involved in the project. The focus of the National Cotton Research Centre (CNPA) in Campina Grande in the State of Pernambuco is the development of technology for the production of cotton, castor oil plant, sesame and sisal, developing cultivars, production systems, research into biological control, biotechnology, agricultural

mechanization, fibre and yarn quality, food technology and production of biodiesel biofuel from castor oil. It also provides consultancy, training and laboratory analysis services.¹⁵

In the international sphere, Embrapa is present across all continents, working in partnership with research institutions and networks around the world. International activities are overseen by Brazil's Department of Foreign Affairs, subordinated to the President of Embrapa. Technical cooperation projects fall under the Department of Technical Cooperation, which coordinates projects funded by the ABC and other international agencies.

L'INSTITUT D'ECONOMIE RURALE - IER, MALI

The IER is responsible for coordinating the country's agricultural research activities, developed through six research centres, each of which is dedicated to running one or more research programmes. The headquarters of the IER's Cotton Programme is the Sikasso Research Centre, located in the country's main cotton producing region.

The country's main research centre is the *Centre Regional de Recherche Agronomique* (CRRRA – Sotuba) in Bamako (appendix 4, photograph 1) on the banks of the River Niger. According to its director, the CRRRA-Sotuba has an area of 280 hectares and develops 17 lines of research, one of which is cotton. The centre has 310 staff (150 permanent staff paid by the government, and 160 staff paid through projects). The centre has a number of facilities including laboratories, administrative buildings, livestock barns and sheds, garage and experimental plots for each line of research. The centres are administrated from the CRRRA – Sotuba.

The government is responsible for paying the CRRRA-Sotuba's staff and electricity costs. Other costs are funded by private organisations and through specific projects and cooperation projects. According to the centre's director, 75% of costs are funded through external sources, of which half comes from foreign funders.

¹⁴ Source: <https://www.abc.gov.br/SobreABC/>. Accessed on 13th May 2015.

¹⁵ <https://www.embrapa.br/algodao/apresentacao>

Project funders include the African Development Bank, the Islamic Development Bank (IDB), the World Bank (WB), the World Agroforestry Centre (ICRAF), *Agence Française de Développement* (AFD), and the International Fertilizer Development Centre (IFDC). The centre also maintains close partnerships with national and international universities.

The majority of cotton research carried out at the Sikasso Research Centre is funded by the *Compagnie malienne pour le développement du textile* (CMDT). Part of the funding received by the CRRA – Sotuba comes from the CMDT, while agricultural input companies fund specific research related to their products.

L'INSTITUT POUR L'ENVIRONNEMENT ET RECHERCHES AGRICOLES - INERA, BURKINA FASO

INERA's research activities are divided into four main areas: plant production, animal production, forest production, and natural resource/production system management. These areas are divided into 16 research programmes according to the types of crop and animal husbandry, including cotton.

INERA has 370 staff, including 40 researchers and 50 technicians. The most important research station in Burkina Faso is the Farako-Ba Station in Bobo Dioulasso, which is home to INERA's national headquarters. The station covers an area of 475 hectares and has 250 staff, including researchers, technicians and administrative workers. And develops research in all of the four main areas outlined above. Three other smaller "satellite" stations are located in the west sub-region.

As in Mali, the government is responsible for paying staff and electricity costs. Other running costs are covered by partners, external funding and cooperation. The sale of certified seeds and provision of technical assistance are also important sources of income, while "cotton societies" finance 98% of the costs of INERA's *Recherche Coton* (Cotton Research) programme.

INSTITUT NATIONAL DES RECHERCHES AGRICOLES DU BÉNIN - INRAB, BENIN

INRAB's well-defined organisational structure comprises three divisions: the Science Division, Administration and Human Resources Division, and Financial Resources Division.

INRAB develops field research from seven *Centres de Recherches Agricoles* (CRAs), three of which are regional: the CRA-Sud, which focuses on maize, sorghum and cassava; the CRA-Nord, which carries out zootechnical and aquaculture research; and the CRA-Centre, that apart from food crops, conducts research in forestry. The CRA – Agonkanmey houses soil, plant protection, zootechnical, veterinary and fish laboratories. The CRA-PP (*Plantes Pérennes*) conducts nationwide research into perennial crops, such as Palm Oil and Cocoa, and vegetable crops. Research into cotton is conducted throughout the country by the CRA-CF (*Coton et Autres Fibres Textiles*), based in Cotonou, which has two "satellite" units: the "Antenne Nord" in Parakou, and the "Antenne Sud" in Bohicon.

The CRA-CF conducts research in three main areas: soil cultivation, phytosanitary protection, and genetic improvement. Research is also carried into sisal and other fibre crops. The CRA-CF does not have specifically designated research centres, but rather 14 permanent experimental centres located throughout the country. The centre has five permanent researchers, 57 researchers with temporary contracts, and field staff. Research is funded with support from organisations such as the *Association interprofessionnelle de Coton* (AIC) and *Centre de coopération internationale en recherche agronomique pour le développement* (CIRAD), and through individual projects.¹⁶

¹⁶ Source: <http://inrab.org/index.php/cra/cra-coton-et-fibres>, accessed on 20th April 2015

L'INSTITUT TCHADIEN DE RECHERCHE AGRONOMIQUE POUR LE DEVELOPPEMENT - ITRAD, CHAD

ITRAD is organised into regional centres and works in two main areas: research and seed production. It conducts research into cotton, rice, maize, millet, sorghum, and beans. In 2011, ITRAD had 72 full-time researchers, accounting for 60% of the country's agricultural researchers. The institute is mainly government-funded (Asti, 2014).¹⁷

The *Centre Régional de Recherche Agricole* (CRRA-Sotuba) produces cotton seed for distribution and to maintain varietal purity, through agreements made with CotonTchad. The centre produced 30 tonnes of seeds in 2011. The CRRA-Sotuba also produces seeds from other plants such as maize, rice, and sorghum.



¹⁷ IFPRI (2014) ASTI Agricultural R&D Indicators Factsheet: Chad. Available at <http://www.asti.cgiar.org/pdf/factsheets/Chad-Factsheet.pdf>

METHODOLOGY

THIS SECTION PRESENTS THE ANALYTICAL FRAMEWORK DEVELOPED BY THE EVALUATION TEAM AND THE STAGES OF THE EVALUATION PROCESS.

ANALYTICAL FRAMEWORK

The ABC's 2013 South-South Technical Cooperation Management Manual (hereafter called the ABC Management Manual), describes South-South Technical Cooperation as the horizontal exchange of knowledge and experiences between partner countries. The idea is to share lessons learnt and successful tried and tested practices from Brazil to tackle the challenges of social development and economic growth. Technical Cooperation is also seen as a particularly suitable means of consolidating relations between Brazil and other countries, emphasising political, economic and social integration.

The definition of this analytical framework drew on the ABC Management Manual and Appendices I and II of the Terms of Reference of this evaluation. The evaluation was conducted on two fronts: (1) an evaluation of the results and specific objectives contained in the original project document (R1 – R5) and the planning and management processes that influenced the attainment of these results; and (2) a reflection on the application of the principles of SSC, demonstrated by the results contained in the 2013 Evaluation Framework (R6 – R8).

The results were analysed (sections 6 and 8 of this report) considering three main elements: programme quality evaluation criteria, capacity strengthening, and technology transfer. The programme quality criteria are outlined in table 2.

TABLE 2 – PROGRAMME QUALITY EVALUATION CRITERIA

CRITERIA	EXPLANATION
PERFORMANCE	This measure compares the predetermined project goals with what was effectively achieved;
EFFECTIVENESS	This measure judges whether the results produced by the project met the beneficiaries' needs and whether the activities implemented by the project were a suitable match for the problems originally identified by the project
EFFICIENCY	This refers to the allocation of financial, material and human resources, taking into consideration possible losses or waste, as well as deadlines and costs
SUSTAINABILITY	This assesses whether the benefits generated by the project will be sustained after the end of the project and if it will have long term effects

The second element aims to understand the effect of this South-South cooperation project on capacity development at different levels: (1) Individual - relating to the knowledge and skills acquired and used in attaining the shared objectives; (2) Organisational - related to improving organisational processes and the capacity of organisations to deliver goods and services; (3) Inter-institutional - concerning the strengthening and structuring of sectors, systems and policies.

The results were also analysed through the lens of technology transfer, which involves not only the transfer of technology from its place of origin to its place of use, but also issues such as acceptance, adaptation and the utilisation of technology by the final user. In other words, technology is at the same time interwoven with, and formed by, the context within which it was developed. The success of technology transfer depends on the ability

of the receiving country to adapt the technology to its own context and maintain it after external support is withdrawn. Table 3 describes the different levels of assimilation in the technology transfer process.

TABLE 3 - LEVELS OF ASSIMILATION AND TECHNOLOGY TRANSFER

LEVELS OF ASSIMILATION	DESCRIPTION
OPERATIONAL (BASIC LEVEL)	Capacity to manage and operate production facilities designed and built by the external agent
DUPLICATIVE (INTERMEDIATE LEVEL)	Capacity to expand production without the help of the external agent
ADAPTIVE (TECHNOLOGICAL INDEPENDENCE)	Capacity to adapt product design and carry out production process reengineering
INNOVATIVE (ADVANCED PROJECT)	Capacity to develop a next-generation system
SOURCE: ADAPTED FROM STEWART (1990) APUD MENDES AND BUAINAIN (2013) <small>MENDES, C.I.C. and BUAINAIN, A.M. "Transferência de tecnologia agrícola: relato de algumas experiências da Empresa Brasileira de Pesquisa Agropecuária (Embrapa) com parceria público-privada." XV Congresso da Associação Latino-Iberoamericano de Gestão de Tecnologia. Porto: ALTEC, 2013.</small>	

The analysis of the application of SSC principles (section 7 of this report) was conducted considering three elements: (1) horizontality - related to shared management and the establishment of equal power relations; (2) ownership of technology - concerning the capacity to exchange knowledge and create endogenous and sustainable solutions; and (3) mutual benefits – benefits for all partner companies which lead to greater autonomy. Although these elements are crosscutting and overlapping, they are emphasised to provide a more specific analysis of the lessons learnt.

The definition of the above elements and dimensions also considered the principles adopted at conferences. These principles have helped to improve understanding

about SSC and thus provide guidance for evaluating the quality of South-South partnerships (see Table 4). It is important to note that many of these principles are interconnected and may be conceptualised or adopted differently.

Indicators were defined for each expected result based on these elements and dimensions (appendix 2). Since information relating to these indicators was not gathered before the project began, it was not possible to compare the situation before and after project implementation. However, these indicators did serve as a basis for the interview guides.

TABLE 4 – THE PRINCIPLES OF SOUTH-SOUTH COOPERATION

Conference	Agreed Principles
BANDUNG (1955) ¹⁸	Respect for human rights; respect for sovereignty; non-indifference; mutual interests and collaboration; international justice
NAIROBI (2009) ¹⁹	Multilateralism; environmental sustainability; mutual benefits; horizontality; capacity development; mutual learning; exchange of experiences; technology transfer; transparency and accountability; respect for national sovereignty; without conditionalities; equality; non-interference; inclusivity and participation; results, impact and quality
DELHI (2013) ²⁰	Demand-based; without conditionalities; respect for national sovereignty; self-sufficiency and self-help; mutual benefits; common but differentiated responsibilities; voluntary partnerships; solidarity; complementarity with North-South cooperation; diversity and heterogeneity; capacity development.

¹⁸ For further information see: http://franke.uchicago.edu/Final_Communique_Bandung_1955.pdf

¹⁹ For further information see: <http://ssc.undp.org/content/dam/ssc/documents/Key%20Policy%20Documents/Nairobi%20Outcome%20Document.pdf>

²⁰ For further information see: <http://www.un.org/en/ecosoc/newfunct/dcfdelhi.shtml>

RESEARCH TECHNIQUES

The first stage of the evaluation consisted of a literature review, reading and systematisation of documents related to the project. Participant observation and semi-structured interviews were conducted with the main actors in the C4 Project. The evaluation team that carried out the fieldwork was made up of an agronomist and a specialist in evaluation and sustainable development.

The questions asked during the interviews concerned technical issues relating to the activities developed in the following areas: genetic variation, entomology and soils, management, institutional relations, cooperation, monitoring and evaluation.

During participant observation, the team accompanied field activities, observing aspects such as buildings and facilities, investments and structuring of demonstration units, as well as more subtle issues such as the behaviour of the project actors and the relationship between them.

In Brazil, fieldwork was carried out in December 2014 and January 2015, in Brasilia, at Embrapa Rice and Beans in Goiania (State of Goias) and Embrapa Cotton in Campina Grande (State of Pernambuco). During this period, face-to-face and telephone interviews were conducted with a total of 24 people: seven representatives from the ABC, 16 representatives from Embrapa, and one from the UNDP (appendix 1).

With regard to the interviews in the C4 countries, we sought to talk to representatives from the maximum number of institutions involved in the project possible and reach the greatest possible variety of actors. It is important to highlight that we did not have access to all the lists of participants in capacity building activities and that the selection of interviewees was based on a contact

list received from the ABC, names mentioned in mission reports and suggestions of focus points in each country. As a result, the sample may not be not totally representative of the project universe.

Using the snowball sampling method, depending on the progress made in each interview, new people were identified and interviewed in each country adding new actors to the list of interviewees. The following actors were interviewed in the four countries: managers, researchers, project participants, farmers, extension agents, government representatives and members of other organisations involved in the cotton supply chain. A total of 85 interviews were completed between 16 December 2014 and 22 April 2015: 30 in Mali, 26 in Burkina Faso, 25 in Benin, and four telephone interviews with actors in Chad (see appendix 1).

The main challenge faced during the information gathering process in the field were difficulties involving the identification of actors who did not directly participate in the project but who had an opinion about its objectives and could therefore give an “outsider’s” perspective. Two representatives from international cooperation agencies who have knowledge of the cotton supply chain in the four countries were able to give us an “outsider’s” perspective on the project.

The team was unable to carry out fieldwork in Chad for security reasons and therefore the interviews were carried out by telephone.

Finally, to ensure that participants remained anonymous, the interviewees were quoted using the following acronyms: BR, MA, BF, BN, and CH for participants in Brazil, Mali, Burkina Faso, Benin, and Chad, respectively.

TABLE 5. INTERVIEWS CONDUCTED IN PARTNER COUNTRIES

Type of actor	Number
Partner organisation staff	52
Ministries	3
Agricultural extension organisations	1
Cotton societies	5
Project staff	4
Brazilian Embassy	3
International cooperation Agencies	2
Farmers who participated in capacity building	15
Total	85

PLANNING AND MANAGEMENT

ANALYSIS OF THE LOGFRAME

The analysis of the internal logframe aimed to evaluate project planning and design, and particularly the logical framework and logframe matrix described in the original project, in terms of consistency and relevance.²¹

The logical framework provides organised information about the desired future outcome and choice of action strategies to address the problem-situation. Although terminology varies, a logical framework comprises the general objective, specific objectives, results, products, activities and inputs that aim to mitigate the problems raised by the appraisal. Among these elements, there should be a description of cause and effect between the chosen means and desired goals in order ensure project effectiveness. Logical framework planning should also consider the governance of the chosen strategies.

After recognising the central problem – that the African cotton sector was facing major production challenges – the planning process translated this issue into the general objective of the logical framework: contribute to improving competitiveness in the cotton supply chain in the C4 countries.

Generally, the definition of the logical framework is justified based on the hypotheses that create a link between the various results of a given specific objective. Based on an examination of the specific objectives of the logical framework of the C4 Project and the connection between each objective and the five results, the evaluation team considers that, based on the form in which they were defined, the relationship between the results and specific objectives does not constitute a causal relationship.

²¹ This analysis was performed using the ABC's Manual of Management of South-South Technical Cooperation (ABC, 2013), which provides recommendations relating to the planning and design stages of the framework and logframe matrix for Brazil's South-South Cooperation projects. It should be noted that this manual was published after the C4 Project was elaborated and therefore did not serve as a guiding framework for the elaboration of this project.



The ABC Management Manual also suggests that the project planning phase should include the development of a “problem tree” which organises the causal relationship of the problems related to the baseline situation in order to develop a “solution tree”. This methodology is important because it helps to identify which actions are most appropriate to mitigate the initial problems. In this sense, specific objective 4²² is not translated from a diagnosed problem, and therefore should not be defined as a specific objective. Apart from being an activity, the preparation and dissemination of publicity materials should only be included in the logical framework if this action will contribute towards achieving one of the specific objectives.

However, the evaluation shows that the activities were clearly defined, verifiable and consistent with the results, were elaborated by specialist technicians and, according to the project beneficiaries, matched local needs.

Apart from the logical framework, project planning involves the elaboration of a logframe matrix that facilitates monitoring and evaluation by summarising the key-elements and establishing the baseline, goals, indicators/sources of verification, as well as risks and assumptions.

In the case of the C4 Project, the evaluation team believes that, in general, the elements contained in the logframe matrix are not sufficiently specific to facilitate the monitoring and evaluation of the project’s expected impacts. For example, the goals and indicators for Result 1 do not specify the necessary conditions in order to evaluate whether the station has been, or is being, effectively revitalised and operating as a pilot unit.

Another important aspect is that, although the appraisal mission produced an information-rich report, its findings were not translated in the Logframe Matrix into a quantitative baseline that clearly shows the impact of each result.

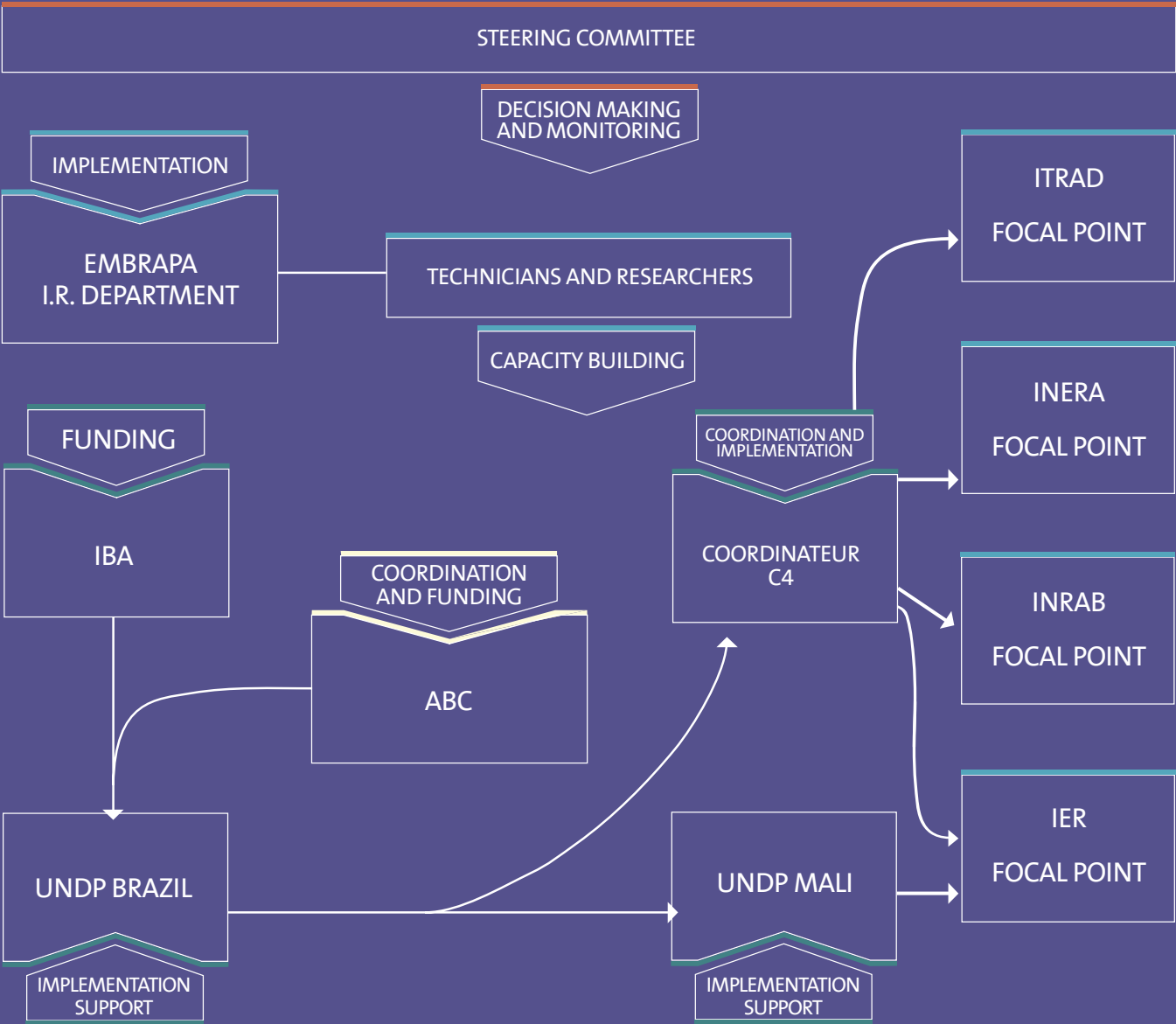
However, the evaluation shows that the fact that the preparation of the logframe did not strictly comply with formal planning procedures, this did not have a negative impact on the execution of activities, and the the expectations of the project actors in relation to the project and its results were clear.

MANAGEMENT

This section analyses the different aspects of management in terms of the relationship between the organisations involved in the project, coordination, human resources, communication and financial management. Other aspects of management are analysed in section 7, which explores the horizontality of the projects and partner participation in management. The figure 1 illustrates the institutions and their responsibilities in the project, together with the financial flows of the project (shown by the arrows).

²² Specific objective 4: Prepare and distribute dissemination material about validated knowledge to improve cotton production in C4 countries.

FIGURE 1 - C4 PROJECT: INSTITUTIONS AND RESPONSIBILITIES



One of the features of the project that differentiates it from other initiatives is the fact that it had a Project Steering Committee that met every six months during the first two years of project activities and once a year in subsequent years (between 2012 and 2013). Each meeting was attended by at least one representative of each institution involved in the project, except the Brazilian Cotton Institute (IBA). At these meetings project participants were brought up to date on activities and, based on this information, made recommendations for subsequent stages of the project.

The project allocated people who were dedicated and had the necessary aptitude, skills, and competences, as well as experience in cooperation, particularly in Africa, and particularly in the case of coordinator positions. This certainly contributed to the progress of the project. The knowledge and hands on approach of the Embrapa technicians is highly valued by the project partners.

The Brazilian researchers claimed that there are few incentives to encourage professionals to engage in cooperation projects and that most professionals participate out of personal interest. One of the factors cited for not participating in this type of project is the perception that it does not contribute towards career development and that the time invested could be better spent on research and publications in Brazil.

Furthermore, given the specialist professional requirements of each activity of the project, participation by Embrapa researchers was on a case by case basis. According to participants who were interviewed, this was a challenge, because it meant that there was a lack of consistency between the different workshops and many of the Embrapa trainers did not have a clear vision of the C4 project and its objectives.

According to an interviewee from the ABC, the presence of a person responsible for the project within Embrapa facilitated good communication between the two organisations. In this sense, the definition of a focal point responsible for the project in each executing institution was essential and greatly contributed to effective communication between the institutions. The interviews indicated that communication between the UNDP, ABC and Embrapa improved throughout the course of the project.

Interviewees also highlighted the importance of the involvement of the countries' respective embassies in the project. The opportunity of direct communication with the Brazilian Ambassador in Mali was cited as a project plus point. The role of the Ambassador and his ability to coordinate actors and generate support for the project was considered essential. The Brazilian Embassy in Benin also played an important role in the project.

Total project costs amounted to US\$5.21 million²³, including the prospecting and appraisal phase. ABC and IBA funds were executed by UNDP, allocated to fund the following main activities: purchase and transport of equipment and other inputs for the Sotuba Station, payment of local and international consultants, and travel costs related to capacity building and project monitoring.²⁴ Final costs were higher than originally envisaged. According to interviewees, budget increases were made according to project demands and approved by the ABC.

The acquisitions process was overseen by the coordinator in consultation with project partners. Requests were forwarded to the ABC for approval who then sent the request to the UNDP, who in turn processed the request through its offices in Brazil and Africa. Some of the interviewees from Brazil and the partner institutions questioned the role of the UNDP in the project, suggesting that the organisation's involvement led to an increase in administrative bureaucracy. The lack of a legal framework which allows the direct transfer of funds from the ABC to partner countries makes the acquisition process particularly complex.

On the other hand, a UNDP representative stated that UNDP's global structure allowed purchases in Brazil and abroad, leading to reduced costs and optimisation of resources. Additionally, it was emphasised that, in some cases, the responsibility for the delays in acquisitions processes was not UNDP's – for instance, delays due to problems in the preparation of technical specifications.

Delays and lack of clarity concerning purchase procedures were cited as problems by the interviewees and in project reports since 2009. In response to these problems, the ABC requested the Brazilian Embassy in Bamako to open a bank account to transfer project resources in order to carry out financial transactions with greater agility.²⁵ This problem continued however throughout the project.

Another point highlighted by the interviewees from the partner institutions is that activities were planned together, but resources did not arrive on time. The project's financial problems were rooted in changes that were made to the original project without adequate financial planning and administration. Initially, for example, capacity building actions were planned mainly for Brazil and Bamako. However, when it was decided to decentralise these activities to the other countries, there was a lack of resources and payment means to monitor the activities. It is important to resolve this problem before the next phase of the project to avoid loss of trust among local partners.

²³ Source: Embrapa, Consolidated Monitoring and Evaluation Report of the C4 Project : Supporting the Development of the Cotton Sector in the C 4 Countries (Benin, Burkina Faso, Chad and Mali)

²⁴ Source: ABC, Spending control spreadsheet, Subproject 04043 S110 and Subproject 12002 S002.

²⁵ Source: Telegram 23/09/2009 to Brasemb Bamako

RESULTS EVALUATION

THIS SECTION OF THE REPORT IS DEDICATED TO THE ANALYSIS OF THE LOGICAL FRAMEWORK CONSIDERING PROCESSES RELATED TO EACH SPECIFIC OBJECTIVE AND PROGRAMME QUALITY EVALUATION CRITERIA: EFFICIENCY, EFFECTIVENESS, PERFORMANCE, AND PLANNING.

MAP 1: AREAS REVITALISED BY THE C4 PROJECT



RESULT 1

REVITALISE THE SOTUBA RESEARCH STATION IN BAMAKO TO FUNCTION AS A PILOT UNIT FOR ADAPTIVE RESEARCH AND DEMONSTRATION OF INNOVATIVE TECHNOLOGIES

The Sotuba Agricultural Research Centre (CRRRA in French, but referred to as the Sotuba Station throughout the project documents)²⁶ is located in Bamako. Here, the project revitalised an old football pitch, transforming it into an experimental plot, built the C4 Cotton Centre and refurbished the soil and biotechnology laboratories (appendix 4, photograph 2).

The Sotuba Station was chosen as a project focus area because it already had an adequate structure in place to accommodate the predefined activities, had an adequate transport infrastructure and accommodation²⁷, and was located close to government buildings.

The revitalization works began in an area of abandoned land within the centre with an area of around two hectares. The land was cleared of obstacles and debris, levelled and marked out, fenced, and drainage channels were dug.²⁸ The map 1 shows the areas that were revitalised within the CRRRA-Sotuba.

The experimental plots were implemented during the first year of the project (2009), which gave the Brazilian proposal credibility. On the other hand, we noted that the funds used were allocated by the director of the CRRRA-Sotuba since the resources provided by the Brazilian government had not yet arrived in the country. It was also observed that the area is currently being fully used as a demonstration plot (appendix 4, photographs 3 to 5).

As mentioned in section 5.2, there was lack of clarity regarding the purchase procedures for the acquisition of material and equipment for R1. The construction of the buildings (the C 4 Cotton Centre) was completed only in December 2013.

The centre has two buildings, a cold room, which is not in use, a security booth, garage, kiosk for outside events, a covered area for prayer and covered area to house the generator and cotton ginning machines. The area is walled off and the corridors connecting the buildings are covered (appendix 4, photographs 6 to 11). The centre still does not have an official name and therefore the interviewees tend to call it *chez les Brésiliens* (the Brazilians' place). (MA)

²⁶ CRRRA: Centre Régional de Recherche Agronomique, in French

²⁷ Source: telegram 00191 to Addis Ababa on 19/12/2008

²⁸ Source: Telegram from SERE on 20/07/2009

²⁹ As previously mentioned, to ensure that participants remained anonymous, the interviewees were quoted using the following acronyms: BR, MA, BF, BN, and CH for participants in Brazil, Mali, Burkina Faso, Benin, and Chad, respectively.

The main building has an area of around 150m² and has a meeting room, coordination and administrative office, field technicians' room, entomology room, researchers' office, kitchen and toilets/bathrooms. All rooms have air conditioning and internet access.

The second building, which has an area of approximately 100m², houses the entomology laboratory. It has one large room, four smaller rooms, kitchen and toilets/bathrooms. Each room, including the kitchen, is dedicated to a segment of the *Trichogramma* production chain. It is important to note that the laboratory lacks basic equipment needed to optimise the production of *Trichogramma* and the humidifier does not work and the thermohygrograph is not in use. One technician is not enough for such a large laboratory and therefore one of the members of the field team is frequently called to work in the laboratory to give support (MA).

The cold room, which has an area of 20m², is also not in use, and its objectives and who will provide the necessary resources to guarantee its use are not clear. However, local actors mentioned that they have genetic materials available for storage in this facility.

On the other hand, the 165 KVA generator is in use. However, it appears excessively oversized for project activities, since it is capable of supplying power to Sotuba's main buildings. The CRRRA-Sotuba should therefore cover the cabling costs. However, this investment has yet to be made.

The project was also directly involved in the refurbishment of the biotechnology laboratory by carrying out the rewiring of the electrical system, installing a generator, and supplying research equipment and instruments. However, few activities are carried out in this laboratory due to lack of resources. The managers of the facility have presented various funding proposals to foreign donors, but none have received approval to date.

Although it has received a large amount of equipment, it can be concluded that the biotechnology laboratory (appendix 4, photograph 12) is far from being fully operational. A lot of the equipment is still in its packaging and other equipment has not been used yet (appendix 4, photographs 13 and 14) because the instruction manuals are in Portuguese and the plugs are official Brazilian standard. According to our inventory, none of the 20 main items of equipment bought for the laboratory are in use (appendix 3).

“We lack funds to carry out the activities in the laboratory. We need funding to pay the staff and provide training.”(MA)

Investments were also made in the soil analysis laboratory, including equipment and the reform of one of the rooms to house a carbon, nitrogen, sulphur and hydrogen analysis machine — the CHNS room (appendix 4, photograph 15) - which is in full use. In 2009, the team that runs the laboratory presented a list of purchase priorities to the project coordinator, part of this equipment was received in 2014. The replacement cost of the gas needed to carry out the analyses is being covered by IER. Finally, we noted that there is also donated equipment which is not in use as the space where they should be used is not yet organised (appendix 4, photograph 16).

The project also invested in the agricultural machinery listed in appendix 3. Of the larger items of equipment, only the tractor, grass trimmer and shredder are used often. The tractor is not used for the project, but was made available for use by the IER (MA). We also observed that the planter had never been used and other implements show little use (appendix 4, photographs 17 and 19).

The experimental area receives constant visits and the whole area within the perimeter fence is used. Furthermore, the construction of the centre had a significant impact on project visibility, and is considered a point of reference within the Sotuba Station. Many interviewees mentioned that this was the first time that an international project had made an investment on this scale within the CRRRA-Sotuba. The C4 Cotton Centre's meeting room is also used by researchers from various areas for meetings and training, contributing to the recognition of the project.

Apart from visibility, interviewees mentioned the importance of the C4 Centre in relation to the acceptance and adoption of Brazilian techniques, particularly the demonstration areas. The interviews with partner institution researchers and farmers confirmed the importance of this strategy.

“When there is an official visit to Sotuba, the first unit that is visited is the C4. It’s a real research showcase.” (MA)

With respect to the local coordination of the project, we observed that the project was flexible with respect to the redefinition of the budget line for the international coordinator. This amount ended up being allocated to cover the travel and subsistence expenses of the Sotuba Station researchers and the hiring of a new coordinator for Embrapa, which led to a reduction in costs.

With respect to the sustainability of the investments made in the Pilot Unit, the project still lacks concrete planning to define who will cover the maintenance costs currently paid by the ABC. However, the construction of the centre and purchase of equipment for the laboratories has contributed towards adaptive research activities.

Also with respect to the coordination of activities, the absence of a leadership figure at local level during the transition period between the two phases of the project resulted in a reduction in the intensity of project activities and it is evident that the roles of local actors have not been fully defined and shared.

With respect to the efficiency of the activities implemented relating to R1, it is evident that part of the equipment acquired for the CRRRA-Sotuba is underused and that certain items, such as the generator and tractor for example, are beyond the needs of the project and were not necessary in this phase of the project. However, they can be used in the second phase. The pulveriser and fertilizer spreader can easily be operated using the Indian tractors seen in the villages and therefore the planter and tractor will only be used if the project supports larger demonstration plots on large farms.

BOX 2 – SUMMARY RESULT 1

The C4 Cotton Centre has been built and equipped (including the entomology laboratory), the experimental plot has been revitalised, and the biotechnology and soil analysis laboratories have received equipment and new electrical wiring. Adequate facilities for the development of project’s technical and administrative activities therefore exist. The construction of the CRRRA-Sotuba also had a significant impact on project visibility and the centre is a point of reference within the Sotuba Station.

Furthermore, the experimental area has received constant visits and its whole area is used, thus promoting the validation and dissemination of Brazilian production techniques. However, the facilities and equipment are underused and some items of equipment are beyond the needs of project activities. There is a lack of qualified human resources to carry out the laboratory analysis activities and the management of the C4 Centre should be passed on to a local partner to ensure greater sustainability.

RESULT 2

DEVELOP ADAPTIVE RESEARCH INTO GENETIC IMPROVEMENT, SOILS/NUTRITION/NO-TILL FARMING, AND INTEGRATED PEST MANAGEMENT

The aim of adaptive research activities is to adapt techniques that have been tried and tested in one region to another. As such, it considers the soil and climatic conditions of the region where the techniques will be adopted. It is a method of promoting and adapting already proven techniques together with local actors. Research is initially developed in research centres by local researchers in experimental areas subdivided into comparative plots using visual analysis methods, such as trenches, productivity analysis and laboratory analysis.

The C4 Project’s research activities in the three main areas of knowledge transfer followed this process. An important aspect of this process was the donation of seeds of different varieties of cotton and green manures, showing Brazil’s openness with respect to seed production technology.

The installation of the experimental areas (appendix 4, photographs 3, 4, 5, 20 and 25) generally followed the same procedures: planting of different varieties of cover plants and types of intercropping throughout the research plots, followed by no-till farming of the crops, based upon a predefined crop rotation schedule. It is important to note that crop rotation systems are different in each country, showing the need for adaptation of strategies to the reality of each country. These Brazilian varieties were tested under the above system using maize and sorghum. In Sotuba the same varieties of cotton were tested but using cowpeas instead of maize and sorghum.

GENETIC IMPROVEMENT

One of the main technological contributions of the C4 Project was the donation of Brazilian varieties of cottonseeds with distinct morphological characteristics and with potential use in the region. Ten Brazilian varieties of cottonseeds were provided annually.

The first harvest of the Brazilian varieties in December 2009 showed good results.³⁰ In 2010, the Brazilian varieties were tested in the Sotuba Station in Mali and the centres in Sikasso and Ntala. In the following year, activities were initiated in Burkina Faso and Chad when experimental areas were implemented in Farako-Ba, Bobo-Dioulasso and Bébédjia.

Two varieties were selected for Mali (BRS 286 and BRS 293). Given their improved production potential in comparison to local varieties, these seeds are being tested for immediate dissemination with the support of the CMDT. Local researchers raised doubts about fibre quality however, suggesting that the dissemination of this variety was being used as an alternative to quickly improve productivity (MA). According to these researchers, they are currently crossing these varieties with local varieties in order to obtain improved productivity together with improved fibre quality. This work had already resulted in a new variety that is currently being studied by researchers.

“The Brazilian variety is good in this sense: colour, productivity, resistance against pests... we are also in the process of crossing Brazilian varieties with Malian varieties.”
(MA)

According to two researchers interviewed by the evaluation team (MA and BN), agro-economic studies are needed to better understand the benefits of the Brazilian varieties. The selectors from the Sikasso Research Centre in the southeast of Mali have been crossing and selecting Brazilian varieties for the last four years and are currently studying the Generation F4 - 2014. The main results of this validation process will be available in the next three years. It is expected that many of the results concerning adaptive research and validation will be observable only in the long term:

“We are experimenting new seeds... but it’s not something that can be done overnight... we’ll only know [the results] 10 years from now” (BR)

Only one variety (BR 293) was used in Burkina Faso with the aim of improving local varieties. Fibre quality is particularly important in this country and the researchers from Burkina Faso would like to explore other Brazilian varieties in order to improve other characteristics of local varieties.

The need to create a germplasm and seed bank to conserve the genetic characteristics of current and future varieties produced in the four countries was also mentioned. The cold room required for this process already exists in the C4 Cotton Centre in Sotuba and a decision is awaited regarding operating costs. Benin also has germplasm facilities.

It appears that the researchers in Benin have significant experience in genetic improvement. The local partner, INRAB, has collected 120 local varieties of cotton with the aim of conserving the genetic diversity of the country’s traditional varieties of cotton. In addition, INRAB is carrying out collaborative trials in the CRA-CFs and together with pilot farmers to evaluate the varieties of the five countries.

Seed storage capacity in Benin is good due to the existence of a germplasm bank located in three cold rooms in Parakou in the north of the country. Despite this, INRAB researchers showed an interest in creating a laboratory in Cotonou in the south of the country, mentioning that it would be widely used (BN).

³⁰ Fonte: Despacho Telegráfico em 30/03/2010 para Delegação do Brasil junto à Organização Mundial do Comércio e Outras Organizações Econômicas em Genebra - DELBRASOMC

Ten Brazilian varieties have been tested in Benin. Part of this research was carried out in the experimental area in Parakou, where the results show that there is no difference between the productivity of the Brazilian varieties and those being developed in Benin. However, researchers are using the Brazilian variety BRS 286 to improve the colour and shine of local fibres. This improvement and selection process is already in its third year.

In Chad, interviewees mentioned that Brazilian cotton is high quality, but the research centres do not have enough local human resources to develop the project's genetic improvement activities and ensure autonomy. The interviewees indicated that ITRAD hired a researcher to oversee research in this area this year and that this person will start activities in the next phase of the project. The evaluation team was also informed that Bébédjia, where the main activities of the project are carried out, does not have a cold room (CH).

NO-TILL FARMING

In the no-till farming system, seeds are planted without disturbing the soil through tillage together with cover crops in order to produce organic matter and permanently protect the soil. The findings of the project related to the transfer of this system show that its use leads to an increase in productivity of the crops used. The average yield per hectare of cotton in the demonstration plot using this system in the village of Sanankoruba (appendix 4, photograph 23), approximately 30km from Bamako, was 2.4 tonnes, compared the national average of one tonne.

"We gave life to the soil!" (MA)

Various interviewees, including people from the CMDT who possess the means of disseminating this methodology, evaluated no-till farming positively. The fact that the system involves other crops was mentioned as a plus point considering the poor soils in Mali and Burkina Faso and the deforestation caused by farmers to prepare new areas after the deterioration of the soils in older areas.

"[Answer given after asking if they were convinced about no-till farming] "Of course. The system produces over one-and-a-half tons of cotton. [...] The results were very positive [of the demonstration plot]: it didn't need drainage channels after the first year" (BF)

In Benin, researchers implemented research plots in the grounds of the research centres and in an experimental area in Parakou to test the no-till farming system. The results show that the system leads to an increase in crop productivity.

However, this system is only being tested in the research centres and not in demonstration plots in the field. A number of interviewees highlighted the challenges involved in transferring this technology related to cultural issues and the fact that its adoption requires changes to the production system:

"These techniques require a change in mentality. It is a new concept in management. It's no longer elimination. More than anything, it's going to be necessary to convince the technical staff [more than the farmers]. We have faced a lot of scepticism." (MA)

Another challenge identified by the evaluation team concerns the obstacles to the implementation and adaptation of the system at local level. In Chad, for example, delays in sending the seeds and lack of fencing to protect the plants from animals were cited as risk factors for adherence to no-till farming (CH). In Benin, other factors include fires caused by hunters, wind, access to cover plant and green manure seeds, lack of equipment to uproot the cotton stalks, and lack of access to post-emergence herbicides.

According to the interviewees, project participants are open to observing and evaluating local conditions and developing viable agricultural activities. For example, one interviewee mentioned that the local coordinator encouraged women to use plastic bottles to sow seeds.

Another adaption that would facilitate the use of the no-till farming system by farmers is the use of other cash crops such as beans, soybeans and peanuts as an alternative to the green manure plants. This could be done by implementing a minimum tillage system that incorporates part of the straw and stubble of the green manure plants to facilitate planting, and using hedges and fire breaks.

Lack of access to machinery and other technologies in the C4 countries is also an obstacle to the effective implementation of no-till farming. In Benin the system was tested by pilot farmers on their own land after they participated in a training course in Parakou. Different extension agents and farmers described their experiences with the system. In general, the benefits and problems reflect the findings of adaptive research in other countries: lack of access to seeds and machinery, presence of domestic animals, and fire. However, the farmers who used the system were satisfied with the results and would like to receive more support to continue using the system.

“The farmers started to use the system, but in the second year they weren’t able to plant over the straw and stubble. They don’t have the tools.” (BN)

INTEGRATED PEST MANAGEMENT

The main cotton pest in Africa is *Helicoverpa armigera* (the cotton bollworm) which attacks the fruit of the cotton plant, better known as the cotton boll, affecting the formation of the fibre. Excess use of pesticides has made this pest resistant, leading to an increase in the costs of insecticide application and an imbalance in secondary pests.

Integrated Pest Management (IPM) was one of the alternatives discussed with local actors and includes the following techniques: actions to increase soil fertility using green manure; crop rotation and the use of no-till farming to increase the amount of organic material and protect the soil against erosion; the use of resistant varieties of seeds and seeds adapted to local conditions; pest infestation analysis to ascertain the number of insects per metre; the use of selected insecticides which do not harm useful insects; and biological control. Therefore, genetic improvement and no-till farming contribute towards IPM.

In light of this, it was understood that the focus of the third main area of knowledge transfer was entomology. The project proposed the installation of a laboratory in Bamako aimed at the biological control of the pest through the production of its natural enemy the cotton bollworm, *Trichogramma chilonis*. According to researchers from Benin, Mali’s entomology laboratory is still in the experimental phase. In their view, Sotuba should be a training centre for technicians from other countries. Interviewees from Chad also proposed the creation of a seed bank in the country (CH). Researchers from all countries highlighted difficulties in finding and collecting *Trichogramma*.

The project promoted the elaboration of an insect behaviour analysis protocol for varieties tested in the countries’ respective experimental areas. According to researchers from Benin, the Brazilian varieties of cotton are hairier than other varieties, which inhibits the attack from insects, and are therefore more resistant.

The C4 Centre’s entomology laboratory is operational, and the evaluation shows that the production of *trichogramma*’s host *Anagasta kuehniella* is being well implemented (appendix 4, photograph 21). The *trichogramma* species produced in the laboratory were collected from *Helicoverpa armigera* eggs found on host plants such as tomato and a local weed (appendix 4, photograph 22).

According to interviewees, it was not possible to collect *trichogramma* eggs on cotton in the fields. Samples of the collected species were sent to Brazil for classification, but the researchers are still awaiting the results (MA). This issue was described by the researchers as an *obstacle* to the dissemination of this methodology, since not knowing the species hinders large-scale production and may cause risks (MA). According to the coordinators of the laboratory, between 100,000 and 150,000 individuals are required per hectare for effective biological control; however, *trichogramma* is not produced on this scale.

Due to its complexity, IPM must be well executed to be successful. The evaluation team was advised that there is still a lot of work to be done in order to better understand the main entomological issues:

“There are helicoverpa in Mali. We send a team to collect eggs three times a week... but we have never found Trichogramma in the cotton. The other plants were infested with eggs. Up to now, we have not discovered the vector that brings helicoverpa’s from Mali. ” (MA)

“The pest problem is a little complex. We still don’t have a very good understanding of which are the dangerous pests and which are not. We need support in this area as well... to be able to observe the pests more closely and know what products we should apply.” (BN)

The laboratory in the C4 Centre in Mali is also experiencing problems related to equipment, which are either broken or unused due to the lack of instruction manuals written in French, and the need for staff training to guarantee the large-scale production of *trichogramma*. Certain problems relating to field research were also mentioned. For example, in Burkina Faso the *Trichogramma* eggs placed in the field were eaten by ants (BF).

The interviewees believe that the laboratory should have a bigger team, as well as more equipment that works to guarantee a more significant impact on integrated pest control. In Mali, since the national coordinator of entomology is located in Sikasso, and not Bamako, one of the alternatives proposed by one of the researchers from Mali was to open up the laboratory to other areas of research, such as fruit and vegetable research, which also involves the study of *trichogramma*.

BOX 3 – SUMMARY RESULT 2

Brazilian varieties of cottonseeds have been used and adapted in the partner institutions’ experimental areas. In Mali, two varieties of seeds are being used for planting and crossed with local varieties to improve fibre quality. In Burkina Faso, local varieties are being crossed with a Brazilian variety to improve certain characteristics, while in Benin Brazilian varieties were selected to improve the colour and shine of the local varieties. However, differences exist between the countries in terms of seed storage facilities and qualified human resources required to carry out the activities and ensure autonomy. It should also be emphasised that, as expected, the results of the validation process are generally long run.

The results relating to transfer of technology (no-till farming to cover crops) are positively evaluated, and show that the use of this system leads to an increase in productivity. The fact that the system uses other crops was mentioned as a positive aspect. However, no-till farming requires a change in production habits, and therefore requires time and resources to ensure the successful dissemination of this technology. Certain adaptations have been suggested which take into account local conditions and culture.

The production of *Trichogramma* - the natural enemy of the cotton’s main pest (the cotton bollworm) – should be carried out using individuals collected from cotton plant in the fields. The two varieties of *Trichogramma* that are being reproduced in the laboratory in Sotuba were collected from tomato plants and in the open field. It was not possible to collect insects from cotton plants in plantations since the eggs placed in the field were attacked by ants. Furthermore, the insects have not yet been classified, generating uncertainty regarding the effectiveness of the use of *Trichogramma*. However, the greatest obstacle to production is the fact that the laboratory does not possess the necessary facilities to reproduce a sufficient number of individuals for an in-field analysis.

RESULT 3

STRENGTHEN THE CAPACITY OF RESEARCHERS, TECHNICIANS AND FARMER LEADERS FROM THE C4 COUNTRIES TO USE NEW COTTON PRODUCTION TECHNOLOGY.

22 courses were held throughout the project in Brazil and the partner countries: eight on no-till farming to cover crops; eight on Integrated Pest Management; five about genetic improvement; and training in the use of SISVAR (a statistical software programme) and software Genes (genetic analysis software programme). The 2013 Evaluation Framework document states that 425 people received training. However, it was not possible to confirm this number due to the lack of lists of participants for the courses.

Capacity building was carried out at two levels: courses targeting researchers in Brazil and the partner countries; and activities focusing on the dissemination of techniques to a wider public, including technicians from cotton companies, researchers not directly involved in the project, and farmers. The field days (*Journées de Portes Ouvertes*) held during the courses were an important part of the project's strategy to disseminate knowledge to other actors involved with the cotton sector and the authorities.

The fact that capacity building activities were organised to promote the participation of researchers from all the executing institutions and carried out not just in Mali, but also in other partner countries was particularly important.

Although cotton production is similar throughout the C4 countries, each country has its own specific characteristics. For example, during the second meeting of the Project Steering Committee, representatives from ITRAD (Chad) expressed interest in cereal production, thinking in food security, while the Mali members' demands focused on the production of sugarcane and vegetable oils, aimed at fuel production. The fact that the Brazilian researchers went to all C4 countries helped to detect these differences and tailor the courses to the particularities and demands of each country.

The capacity building activities had a significant impact on the diffusion of the techniques promoted by the project. For example, the experimental areas were implemented by the researchers using the techniques taught during the courses, and SISVAR was cited by the geneticists as being a key tool for analysing research data. On the other hand, we found that researchers did not grasp the software Genes, either due to the need

for further capacity building (BF), or because of a lack of available resources to use the software (MA).

We observed that the researchers and technicians from partner research centres were applying Integrated Pest Management knowledge gained from capacity building activities in the field.

The course activities appear to have been very productive and Embrapa researchers were willing to use various methodologies to optimise the use of the knowledge gained from capacity building activities. The African partners interviewed by the evaluation team mentioned that the methods used in the capacity building activities were dynamic, stimulating interest capturing the participants' attention, but at the same time very practical. They liked the fact that the courses were divided into classroom and field activities, including contact with farmers. A number of interviewees praised the course content as being comprehensive and relevant. Furthermore, the interviewees mentioned that they greatly valued the technical knowledge of their Brazilian colleagues.

“The methodology of the capacity building activities included a presentation, group dynamics exercises... very good. The approach used was really very good. Very open and participative.” (BF)

“A lot of the farmers who participated in the capacity building activities... they really liked it a lot [...]. It wasn't just theory, but also practice.” (BN)

Brazilian technicians commented that the African researchers were very well qualified, and therefore were fully able to continue working with the topics covered by the capacity building activities.

A negative point however was the high turnover of Embrapa technicians during the courses and the fact that courses addressing the same topic often lacked connection over time. Language was also mentioned as an obstacle to the smooth flow of the capacity building activities, as some participants mentioned that they lost track of the content due to the use of an interpreter who did not have knowledge of certain technical terms. Another problem was the lack of follow-up after the courses. Interviewees mentioned that they wrote to the technicians who gave the courses but did not receive any reply. Another obstacle mentioned was the lack of resources to implement the lessons learnt.

“We didn’t have the funds to put what we learnt into practice. In 2013, the project coordinator said he would send resources to take what we learnt to the field, but he never got back to us. It wasn’t applied.” (BN)

After participating in the capacity building activities in Bamako, the technicians from Benin committed themselves to lead the training of technicians and farmers in Parakou, in the north of the country. In September and October 2012, Embrapa technicians provided training to researchers. During the first week, the researchers and technicians worked together discussing field knowledge and experiences, performing educational group dynamics exercises and learning new content. During the second week, the local researchers trained the extension agents and farmers. Around 70 extension agents and farmers participated in this training activity and showed a great deal of interest in the project proposal, and are currently putting the no-till farming techniques into practice together with farmer leaders.

“During the training with the extension agents in Benin, we used the information we learned in Bamako [...] A good number of farmers participated in the training... they liked it a lot. There’s one farmer for example in Dgougou that was so happy with the training that he applied it on his farm.” (BN)

This is a particularly interesting observation, since it shows that the knowledge gained during capacity building was replicated in the experimental plots and plantations of the farmer leaders.

With respect to training in the use of software, the evaluation team believes that the results were better in Benin. SISVAR was highlighted by geneticists and entomologist as a key data analysis tool. One genetics researcher in particular showed a very good grasp of the Genes software and currently teaches how to use the program at the University.

In Chad, technicians from the ITRAD project and project partners participated in the training activities. The participants positively evaluated the activities. According to the interviewees from Chad, a course was given on no-till farming and another on entomology. Participants included representatives from Coton Chad (the organisation that oversees cotton production and harvesting, and the sale and purchase of cotton on the international market) and *L’Office National de Développement* (responsible for agricultural extension), and farmers’ representatives from cotton associations.

“[the capacity building activities] were very concrete... it was not just theory. We went to the field [to carry out] concrete actions. We saw the results in Brazil with small farmers. We saw concrete things.” (CH)

The courses were also seen as an opportunity for interaction and exchange of experiences between the actors involved in the five countries. Many mentioned that the capacity building activities brought the actors closer together. However, one of the demands raised is the possibility of maintaining contact with the Brazilian researchers after the capacity building activities.

One of the interviewees also suggested that lessons were learnt by both sides (African and Brazilian) and that learning was a two-way process:

“The training also helped the Brazilians. The Brazilian course tutor really appreciated the information that I passed to her about fire etc... It’s a real exchange.... we learn, we teach.” (BN)

In Burkina Faso however the researchers felt that they should have been more involved:

“We also have experiences that we can share; for example I have 15 years of experience with entomology... We feel that we could have improved the course content, but it was a bit closed [the content elaboration process].” (BF)

Some of the Brazilian interviewees thought that the visits of the African delegations to Brazil were also important for the C4 researchers, since they were able to gain a better understanding of Embrapa’s work, the technologies that were being tried and tested, and the quality of the research developed by the organisation.

The evaluation team was informed that the interpreters that participated in the training courses did not have technical knowledge, which affected the quality of the translations. The workload of the interpreters was also excessive since there was only one interpreter for each course. The participants also highlighted the need for a translated version of the presentations given by the Brazilians so that they could present them to authorities and farmers.

BOX 4 – SUMMARY RESULT 3

22 courses were given in Brazil and the partner countries throughout the project, which provided training for 425 people. The main beneficiaries of the project were the researchers from partner institutions. The interviewees evaluated the capacity building activities very positively, both in terms of content and methodology. The partners valued the knowledge and approach of the Embrapa technicians. However, the high turnover of technicians during the courses had a negative impact on the connection between the capacity building activities and language was mentioned as an obstacle to the smooth flow of the capacity building activities. Despite these obstacles, we observed evidence of the replication and dissemination of the knowledge gained to a wider public.

RESULT 4

PREPARE AND DISTRIBUTE DISSEMINATION MATERIAL ABOUT VALIDATED KNOWLEDGE TO IMPROVE COTTON PRODUCTION IN THE C4 COUNTRIES.

The following material was developed by the project: three manuals of good agricultural practices, five technical bulletins, and project publicity materials. The dissemination material was elaborated by both the Brazilian and African researchers. For example, a planning meeting was held in May 2012 to elaborate the manual of good practices with the participation of representatives from the executing institutions and the ABC.³¹

As planned, the activities related to R4 were the last to be implemented. As a result, the experiences gained from the capacity building activities, field days, and technology transfer already underway in Africa, served as inputs for the published material. One interviewee emphasised that the fact that these materials were produced collectively and validated by the partner organisations was particularly important (BR).

The positive aspects of the material highlighted by the researchers and local partners were the use of photographs, the level of detail of the material, the relevance of the content, and their practical use for the activities and research design.

On the other hand, some interviewees suggested that the material should be adapted to facilitate understanding among field technicians and farmers (appendix 4, photograph 29) and the use of other types of material, such as fact sheets and videos, which could be shared through internet.

“In its current form [the manual] is good for researchers, for technicians, for structuring research, but can’t be used with farmers. For farmers, it’s necessary to synthesise the document. For farmers the type of language used has to be different... The photographs should speak for themselves. The text is a summary to help extension agents train farmers.... the photos and illustrations are geared towards farmers.” (BN)

After the launch of the material in the last meeting of the Project Steering Committee in November 2014, 4,540 copies of the manuals of good agricultural practices and technical bulletins were sent to Bamako to be distributed. The material was forwarded to the local partners and is currently held at the main centres of each country but has not yet been distributed to the local institutions and stakeholders. Apparently, the distribution of the manuals is awaiting a formal event to present the material to local actors. This fact meant that it was impossible to assess the use and evaluation of the content by external actors, thus limiting the scope of impact analysis.

In Benin, the material is kept at INRAB and, according to interviewees, is distributed during specific training courses on relevant topics.³² However, some of the researchers who had participated in the production of the manuals interviewed by the evaluation team had not yet received the material.

BOX 5 – SUMMARY RESULT 4

The following material was produced by the project: three manuals of good agricultural practices, five technical bulletins, and two project publicity materials. This material was produced with the participation of all executing institutions. 4,540 copies of the manuals of good agricultural practices and technical bulletins were sent to Bamako to be distributed. However, the distribution of this material is awaiting a formal event to present the material to local actors. The evaluation team believes that the material serves the needs of the African researchers. However, the material is not adapted to the needs of the extension agents and farmers.

³¹ Source: Telegram 27/04/2012 to Brasemb Cotonou

³² Source: Telegram 10/03/2014 to Brasemb Bamako

RESULT 5

MONITOR AND EVALUATE THE PROJECT

The fact that the project has a logframe matrix is a positive aspect, since it guarantees alignment between all actors in relation to objectives and expected results. Furthermore, the inclusion of project monitoring and evaluation as an activity and specific objective shows that the institutions were concerned with this activity. However, few details about the local context prior to project implementation are included in the baseline. Furthermore, the fact that there are no indicators to help identify changes in the areas covered by the project hampers monitoring and evaluation.

We observed that the Project Steering Committee participated in the elaboration of the project's monitoring framework, and that the people who participated in committee meetings confirmed that there was open discussion and debate and that their voices and opinions were heard by the Committee.

There was no evidence of a unified system of monitoring of project activities and indicators. For example, it was not clear to the interviewees which person or institution was responsible for systematising and filing reports. No evidence was found from the reports read by the evaluation team of a standard form of systematising information and linking this information to the Logframe Matrix. Furthermore, there was no consensus between the interviewees in Africa and Brazil as to the total number of people who received training.

The mission reports and project coordinator's reports contain valuable insights that were not systematised and shared with all stakeholders. On certain occasions, the project coordinator shared his insights with local actors and with actors outside the countries, including the United Nations in Switzerland and partner institutions in Brazil. His six-monthly reports are very detailed and include important lessons learnt and relevant considerations for the next phase of the project.

An economic assessment of the techniques and varieties proposed by the project was not carried out in the first phase of the project; a fact highlighted by more than one interviewee. Such assessments are vital tools for demonstrating the economic benefits of new varieties and no-till farming for example. The lack of monitoring of the number of farmers who adopt the new techniques after the capacity building activities was also highlighted as a point that should be considered for the next phase of the project.

To monitor performance, the project formed missions made up of actors who were able to evaluate both management aspects, considering administrative and financial issues for example, and technical aspects, such as the adaptability of varieties and tolerance against pests and disease.³³ This approach shows that the institutions were concerned with the implementation of activities.

The mid-term review conducted in 2011 was a first attempt to evaluate project performance and results. The people interviewed during the final evaluation valued the proposal to evaluate The C4 Project and the fact that they were involved in the process:

“This evaluation shows the seriousness of Embrapa and ABC regarding the process” (BF)

BOX 6 – SUMMARY RESULT 5

The project demonstrated a commitment to monitoring and evaluation ever since the elaboration phase. The monitoring missions and meetings of the Project Steering Committee were the main tools used in this respect. However, the project lacked a unified system for monitoring the project's activities and indicators. The new 2013 Evaluation Framework established during the Project Steering Committee meeting at the end of 2013 provides an important framework for future phases.

³³ Source: Telegram 18/11/2009 to Brasemb Bamako



APPLICATION OF THE PRINCIPLES OF SOUTH-SOUTH COOPERATION

THIS SECTION DISCUSSES THE APPLICATION OF SSC PRINCIPLES IN PRACTICE, BASED ON THE FOLLOWING DIMENSIONS: HORIZONTALITY, OWNERSHIP AND MUTUAL BENEFITS. THE RESULTS ADDED IN THE 2013 EVALUATION FRAMEWORK WERE ANALISED AS PROXIS FOR THESE DIMENSIONS.



HORIZONTALITY

“Horizontality” relates to the shared management of projects and actions, consolidated through the direct and active involvement of cooperating institutions from Brazil and the partner country(ies), from the planning phase up to results monitoring and evaluation. This may be analysed using qualitative indicators to determine the level of participation and advocacy of local actors and leaders throughout the project cycle, shared responsibilities, quality of communication between actors, and level of interest of the partners in receiving cooperation. The latter refers to the so-called cooperation “inspiration factor”, or the cooperation interests or demands of a country based on the acknowledgement of the positive trajectory of another developing country, which ultimately implies equal power relationships.

Horizontality is understood to be interconnected with the application of other principles such as demand-driven concepts, economic ‘unconditionalities’, and respect for sovereignty of other countries. The result in the 2013 Evaluation Framework that corresponds to the application of this principle is R8: Promote participative management and horizontality in project relationships.

As mentioned previously, the project emerged from a common interest between the countries: the fight within the WTO against subsidies granted to cotton farmers in developed countries. We observed that the project was elaborated collectively, despite there being some difficulties. An interviewee from the ABC pointed out the following:

“The negotiations with the African countries took a long time... they had some difficulty understanding the Brazilian approach ...they were used to ready-made packages” (BR)

However, interviewees from the Brazilian Institutions believed that project design reflected the views and demands of the African actors. Many of the interviewees appreciated being heard during the elaboration and planning phase. However, since most of the investment went to Mali, the actors in Burkina Faso feel that they did not receive equal treatment.

We interviewed various people from both countries who participated in the meetings held by the Project

Steering Committee, which is responsible for promoting the participative management of the project. All participants, without exception, said that their experience of the committee was positive, particularly due to the climate of collaboration and equal treatment of members. In general, the meetings followed the following format: a representative of the host country took on the role of president or moderator of the meeting, which began with a presentation from each country about activities, problems, and results, followed by an evaluation of the results and recommendations of the previous meeting and discussion and definition of the resolutions and recommendations for the next stage of the project. Important decisions were taken during these meetings, such as the decision to carry out capacity building activities not only in Brazil, but also in Africa. The meetings also included the discussion and approval of the document for the second phase of the project.

“The Brazilians never tried to impose themselves. They were there as equal partners. Even the protocols were defined together. They said that they there to share. That is really important. It’s different to other countries that say ‘do this or do that’ ” (MA)

“[in the meetings of the Project Steering Committee] there was mutual respect. Each country had an equal voice. No country dominated the other. There were a lot of Brazilians in the meeting, but only two had the right speak... the same number as the other countries. ” (BN)

The influence of the partners in decision-making was also evident in the adaptations and alterations made to meet their needs. Examples include the modifications made to the training course in genetic improvement and the support given to the biotechnology laboratory, which were not planned in the original project and emerged from demands made by leaders in Mali.

The joint management of the project, led by the Project Steering Committee, was also evident in the field activities. For example, a number of courses were successfully planned and held jointly by Brazilian and African researchers (BF). The African directors and managers from both countries played an important role in this process by mobilising the project teams to ensure the adequate delivery of project results.

In Mali, the coordinator sought to develop team work and sharing by using the *Famille Forgeron* (the Smith family) metaphor, whereby researchers “forge”, working hard to reach their objectives. The term “*famille forgeron*” is engraved on the inaugural plaque of the C 4 Cotton Centre and was mentioned by a number of people during the visit. The efforts made by the project coordinator motivated project actors, particularly in Mali, where the project team faced a number of challenges during the construction of the C4 Centre.

As the project coordinator and his team were based in Bamako, there was an effective communication flow between the actors in Mali and the rest of the actors in the project. However, the participants in Burkina Faso and Benin were less positive about communication. The level of satisfaction is greater, the closer the interlocutor is to the C4 Cotton Centre in Sotuba. Some of the interviewees for example pointed out that certain promises were not kept:

“We agreed to prepare an area as a “showcase” to demonstrate technologies, but it remained an idea [failed to materialize]. With respect to the equipment we saw, like the wheeled tools for example, they [the project’s Brazilian partners] told us that they would transfer the technology, but nothing was done either. We saw it, but nothing was done” (BF)

“Communication with Brazil was very difficult. Our e-mails were never received in Brazil.... or when they were, they were lost somewhere... the Brazilians didn’t write to us... they started writing only when there was going to be a course.... [the project coordinator] created a network of African and Brazilian researchers with e-mails, but it didn’t work.” (BN)

In the first Project Steering Committee meeting, it was stated that, although a number of activities has been carried out, communication between researchers was considered ineffective. This issue was discussed again in the second meeting, in September 2010, leading to the creation of a discussion group to improve communication, which was apparently little used by researchers. We did not find any evidence of any alternative solutions to solve this problem.

In addition, the interviews showed that the researchers who participated in training courses did not receive information about the actions to be taken determined by the Project Steering Committee during its meetings. The researchers also stated that they were not allowed to give their opinion about the Committee’s activities.

Another important point regarding communication, mentioned by all the Brazilian technicians, is that language was a major problem. The lack of interpreters hindered communication. It was mentioned that on some occasions there was only one interpreter to accompany the team in its activities, including lectures, meetings and field visits. The interpreter’s heavy workload therefore affected the quality of communication, which evidently depended on the use of numerous technical terms, imposing strain on the interpreters.

The interviewees mentioned certain characteristics of the Brazilian team that served as an inspiration to the researchers from the Sotuba Station: the effort and commitment of the project coordinator, admired by a number of participants; and the proposal to carry out “open door” visits to demonstration plots.

For the first time in a long time, a space was created where small farmers, researchers and extension agents could meet to talk and exchange experiences. This model inspired the managers of the Sotuba Station to organise a “*journées de portes ouvertes*” (open doors day) involving the Station’s plots in 2014 (MA).

“With Brazil it was a shared experience. With other countries [with cooperation activities], the collaboration is bottom-up. In Brazil’s case it is much more shared. In Brazil, you have the same experiences. The farmers in Brazil face the same challenges as those in Benin.” (BN)

As mentioned earlier, Embrapa is an “inspirational example”. The interest to receive and adapt knowledge came from the partners, rather than being imposed by the Brazilians. There is also a perception that the countries have common development challenges, which means that those involved are more likely to establish equal relationships.

BOX 7 – SUMMARY HORIZONTALITY

We observed that there were high levels of participation and advocacy among the actors and local leaders throughout all stages of the project. The Project Steering Committee played an essential role in making this happen. The level of satisfaction with communication was greater the closer the interlocutor was to the C4 Cotton Centre in Sotuba. It was also noted that Embrapa and its researchers were an inspiration to the other project partners.

OWNERSHIP

In the context of this project, ownership relates to the capacity to generate endogenous and sustainable solutions through the exchange of knowledge and successful experiences. This may be analysed using qualitative indicators related to the following elements: alignment with national, organisation, and development community priorities; political support and commitment to the process; partner leadership in management and decision-making processes; role and level of involvement of local actors (stakeholders); adaptability, applicability and integration of knowledge into relevant systems and policies; and the incorporation of new technology into wealth-generating processes. Ownership is interconnected with the application of other principles, such as voluntary partnerships, non-interference and participation.

This principle corresponds to R 6 of the 2013 Evaluation Framework: Strengthening of the Cooperation Network addressing the project theme. The evaluation team understood “cooperation network” as the coordination and communication between the technicians and researchers involved in the project, as well as the mobilisation of new partners and knowledge exchange with stakeholders who contribute towards the ownership of new technology.

The interviewees from the Brazilian institutions emphasised that the opportunity to exchange knowledge and experiences between the four countries provided by the C4 Project differentiated the project from other interventions. This point was also highlighted by the coordinator in the report for the second half of 2011, mentioning as an example that the sending of 10 Brazilian varieties facilitated the resumption of the operations of a regional seed variety-testing network. The coordinator believes that this was the greatest benefit conferred by the project on the C4 team, given the quality of the current varieties of seed in the region.

It was also pointed out that the project is important for research in both countries, since it guarantees access to funding, new production technology, and research networks. However, it is important to remember that the C4 Project is considered a medium-sized project by large research institutions, which divide their attention across other projects.

O IER and INERA have long-standing partnerships with international institutions. The Chinese and Swiss governments, among others, also support projects that focus on the cotton supply chain. Although there are some synergies between these projects and the C4 Project, alignment occurs with other projects only on an informal basis. We found no evidence of strategic meetings with the funders of the different projects targeting the cotton sector.

In Benin, Turkey, India, China and the US have invested in projects that support the country’s cotton sector. These projects are considered complimentary, since they focus on different parts of the supply chain, including training and postharvest management (India), equipment and research (Turkey), and seed production and the implementation of a model school (China). The director of the CRA-CF in Benin informed the evaluation team that he seeks to create greater synergy and complementarity between project activities when negotiating with different donors: “we present different problems to each donor to guarantee alignment” (BN). However, this type of planning has not been translated into a system to ensure coordination of activities between projects, and donor countries tend to work on their project in isolation. The director explained that he would like to guarantee team training in the areas targeted by the different donors:

“Say Brazil wants to focus on technology transfer; I would allocate a technician to head technology transfer in the CRA-CF. Then, when the donor withdraws, I would have someone specialised in this area. With the Americans, it would be a specialist in soils, with the Turks, a specialist in postharvest. Each programme can help me train my staff. My greatest needs are in the human resources area.” (BN)

The C4 Project is part of strategic national cotton plans in Mali, Burkina Faso and Benin. The directors of the research institutions say that the project plays an important role in research into cotton production. One interviewee cited for example that the no-till farming technique promotes improvements in soil quality, which means that small farmers will have less need to abandon old areas that have lost their fertility and clear forest to obtain fertile soils. This initiative is therefore consistent with the actions of both countries' forest departments.

Local authorities only began to respond to project needs and demands and really get involved in the project after they saw that the project was achieving tangible results. Project participants were significantly motivated and committed to the project: in Burkina Faso, for example, the partners started activities even before receiving funding.

It was also mentioned that the involvement of senior staff from the institutions and government sectors involved in the project was important. One interviewee highlighted that “the African governments made a lot of people available. During the technical missions a state minister or high-ranking official greeted us. This is very rare.” (BR) The involvement and visits of politicians led to greater commitment among other actors in the project. The interviewees highlighted that the visits to Brazil, to the C4 Centre and demonstration plots played an important role in mobilising actors. Researchers in both countries mentioned that the field days (*les journées de portes ouvertes*) contributed significantly to the progress of the project and were an excellent opportunity to bring together the different actors from the different levels of the cotton supply chain in Mali and Burkina Faso.

Participants are interested in continuing the network's research activities, but this depends upon financial support. A number of people expressed interest in doing

research with academic institutions in Brazil and with Embrapa. However, some of these people said that language and communication problems could be an impediment.

“The project brought together researchers from the C4 and researchers from Brazil.” (BF)

“We don't have any relationship with Embrapa researchers. We do in the region. There wasn't an institutional capacity component. We want to tighten the bonds between INRAB and Embrapa, and not just between the researchers.” (BN)

The financial and technical management of the project remains concentrated in the hands of the project staff rather than local institutions. As a result, the actors still see the C4 Project as being Brazilian. The C4 Centre, for example is the project's regional centre, but a number of Malian cotton researchers are still working in offices in the Sotuba Station outside the centre, showing lack of integration between the activities of the Sotuba Station and C4 Centre, whereby the centre exists as a separate entity. Furthermore, it is still not clear who will bear the costs of the Centre after the end of the C4 Project.

A number of examples were seen of increased cooperation between the four African countries in relation to the cotton supply chain over past years, mainly due to the historical ties between their economies. One Malian researcher cited requests for seeds from partners in Burkina Faso and exchanges made between the centres in Sikasso (Mali) and Bobo Diolassou (Burkina Faso), which are towns 180 km apart located in the cotton-growing regions of these two countries.

“I wouldn't say there has been a coming together between the countries, but rather an integration.” (MA)

BOX 8 – SUMMARY OWNERSHIP

There was an alignment with national strategies and the priorities of the partner institutions, but little coordination with relevant external actors and projects. The involvement of senior officials from the partner governments and Brazilian embassies demonstrated political support for the project and gave the project more credibility. Partner motivation and commitment was evident. An example is the prefunding of activities. However, the financial and technical management of the C4 Centre remains in the hands of the Brazilian team, and this fact has a negative impact on the ownership process. Finally, as mentioned in results 2 and 3, Brazilian knowledge and technology is being adapted to the reality of the partner countries.

MUTUAL BENEFITS

Mutual benefits are benefits that contribute towards greater country autonomy generated for two or more partner countries. These benefits are associated with different levels of relationships - from the senior ranks of partner governments and project theme leaders, to researchers and technicians. This relationship can also be divided into three categories: political, economic and technical.

The measure of the strength of the relationships between the countries is based on indicators of the following elements: widening of knowledge of realities; mutual learning; expression of interest in, or concreting, new projects between countries; and new commercial and cooperation agreements, or coordination through multilateral forums. Mutual benefits are also interconnected with the application of other principles such as horizontality, mutual learning and self-reliance.

The result that corresponds to this dimension is R7:

strengthening relationships between the countries involved. It is important to note that this result is observable only in the long term. The above elements are therefore primarily indicative, and the strengthening of relationships between partner countries will be confirmed by analysis of the progress over time.

For the interviewees from the ABC and Brazilian embassies, the C4 Project is important because it is the largest cooperation project that exists between Brazil and Africa. The project also has a symbolic value because of its association with the cotton dispute. In this respect, the WTO Cotton Sub Committee requests six-monthly project updates which are forwarded to all the delegations.

The importance of the involvement of the embassies was also mentioned and it is evident that they have the potential to strengthen relationships outside the project. The possibility of direct communication with the Brazilian Ambassador in Mali was highlighted as positive aspect. The interviewees from Benin also mentioned this aspect.

“The Brazilian Ambassador was with us the whole time.” (MA)

“[the Brazilian Ambassador] invited us to dinner in his house. It was extraordinary.” (MA)

The Brazilian Embassy also played an important role in the project. The embassy organised administrative and logistical support, while in Benin and Chad, which did not have the constant presence of a project coordinator, embassy staff were seen as key figures in the project, since they helped to ensure the continuity of activities. Brazilian embassy staff also demonstrated great interest in the project, since it was the largest and most visible

cooperation activity between Brazil and Africa to date. As a representative of the Brazilian Embassy in Benin said: “it is a great example of soft power.”

The African countries have expressed an interest in opening up new opportunities for cooperation with Brazil. New projects with Brazil and between the partner countries were discussed in various forums, including meetings of the West African Economic and Monetary Union (WAEMU), where WAEMU representatives offered the project co-financing. However, we observed that the Project Steering Committee has decided not to involve this agency in the project for now because it includes countries that are outside the project and Chad is not a member country.³⁴

There are also examples of new initiatives that have emerged from the project. In April 2010 for example, an agreement was signed between the IER in Mali and Brazil’s Ministry of Foreign Affairs that focuses on research into fruits and vegetable (MA). The project - “Strengthening technical and dissemination assistance and support for the Institute of Rural Economics fruit and vegetable programme” – was elaborated after a technical visit to the country by a Brazilian team but has not yet started.

As a result of their participation in the C4 Project, researchers from Benin prepared a funding proposal focusing on postharvest technology. The process involved the mobilisation of partner researchers from Mali and Togo and the proposal was submitted to the Central African Council for Agricultural Research and Development (CORAF).

“We submitted a joint project... Togo, Mali, Benin... we invited Burkina Faso, but they didn’t participate. The contact with Togo was made possible after contacting the researchers in Togo. We did that in March [2015]. Thanks to the C4 Programme.” (BN)

We also observed that the lessons learnt through the project were shared both inside the countries (for example the annual meeting between CMDT and the IER in Mali) and outside (through visits made by the project coordinator to Geneva for example). Researchers from Chad mentioned the example of Genetically Modified (GM) Crops. Out of all partner countries, research into GMs is permitted only in Burkina Faso, and therefore partners from this country shared information with colleagues from Chad and the other countries.

Brazilian interviewees mentioned the importance of the lessons learnt regarding approaches to the management of cooperation projects, which contributed to the impulse to elaborate the ABC Management Manual and other cooperation projects focused on the cotton sector. Greater knowledge of realities in partner countries and West Africa was also mentioned as an important learning experience. New technology is also being introduced to Brazil, such as a water recycling system from Chad.

“The Africans are masters in cooperation... they have a lot to teach us.” (BR)

BOX 9 – SUMMARY MUTUAL BENEFITS

The evaluation observed knowledge enhancement regarding realities in partner countries, which is an important factor for consolidating relationships between partner countries. African partners are interested in opening up new opportunities for cooperation with Brazil and an agreement that focuses on research into fruits and vegetables has already been signed. In addition to technology transfer from Brazil to partner countries, technology has also been introduced to Brazil, such as the water recycling system from Chad. For Brazil, the project resulted in greater visibility within the WTO.

³⁴ Source: Telegram sent to Brasemb Bamako on 27/08/2014





CROSS-SECTIONAL RESULTS ANALYSIS

THIS SECTION AIMS TO CONDUCT A CROSS-SECTIONAL ANALYSIS OF ALL THE RESULTS BASED ON THE FOLLOWING ASPECTS: CAPACITY DEVELOPMENT (AT THE INDIVIDUAL, ORGANISATIONAL AND INTER-INSTITUTIONAL LEVEL), PERFORMANCE, EFFECTIVENESS, EFFICIENCY AND SUSTAINABILITY.



Both the interviews and the observations made during the fieldwork suggest that knowledge enhancement at an individual level was successful. In this respect, it is clear that capacity building and knowledge transfer within the three main areas of the project contributed towards the development of local human resources. During the interviews, the researchers who benefitted from these activities demonstrated that course content was relevant and some of them were already in the process of transferring this knowledge to extension agents and farmers:

Another positive aspect of the project worth highlighting is that it fostered leadership among the partner researchers, who took the lead in capacity building activities for extension agents and farmers in their countries, while in Mali activities targeting external actors, for example field days, were always carried out by the project partners.

Another important aspect of the project is that Embrapa became a source of inspiration for the partners, for who the fact that an institution in a developing country had reached this level of excellence was extremely motivating. In this respect, the coordination of the C4 Project with other departments within partner institutions has the potential to promote greater development of organisational capacity. However, the development of organisational capacity was not the focus of this project. The transfer of the management of the project in Mali to the Sotuba Station and the transfer of resources to other countries may contribute to this objective in future phases of the project.

With respect to capacity development at the inter-institutional level, certain interviewees mentioned that the project contributed towards a greater approximation between the African partner institutions in terms of research, not only into cotton, but also into other crops. In Benin, INRAB ensured that the project was aligned with other cooperation projects to obtain support for different stages of the cotton supply chain. However, the evaluation team believes that greater coordination with different national and international actors, policies and programmes would lead to a greater impact on the performance of the cotton sector.

Regarding the analysis of the evolution of the project based on its predetermined goals, the performance of the project was deemed satisfactory. Part of the Sotuba Research station (R1) was revitalised by the project: conversion of the old football pitch and construction of the Cotton 4 Centre.

The project also achieved tangible results with respect to knowledge transfer (R2). Without doubt, the main area

of knowledge transfer that stood out most in terms of results achieved was genetic improvement. The Brazilian varieties introduced by the project were adapted to each country's context and new varieties with improved characteristics were developed, indicating that knowledge ownership occurred in each partner institution. The productivity of the demonstration plots also increased as a result of the introduction of the no-till farming system. However, less progress was made with regard to technology transfer in the case of Integrated Pest Management, since this area traditionally requires greater investment in human resources.

The performance of the project in terms of the activities related to capacity building for researchers (R3) was deemed good. The main beneficiaries of the capacity building activities were the researchers from the project partner organisations. The participation of extension agents and farmers in this phase of the project was secondary and performance therefore depended on the guidance given to these actors by each partner institution, which varied from country to country. Various materials were produced to disseminate the validated knowledge and techniques (R4) but have not yet been distributed.

With respect to project effectiveness, the results are well matched to the needs of the beneficiaries but show varying degrees of success due to different levels of adherence to agricultural practices in line with local contexts. The researchers who benefitted from capacity building positively evaluated activities, suggesting that the content was enriching, adapted to local realities, and effectively shared in a participative manner. It is important to note that the challenges faced by the cotton sectors in these countries are complex. Therefore, the mitigation of the situation-problem will depend on a long term collective effort led by the partner governments.

The evaluation team believes that the approaches chosen to achieve the results are consistent. However, certain complementary strategic adjustments could enhance the impact of the project, which are discussed under the lessons learnt and recommendations sections. However, the evaluation team understands that adaptive research and capacity development are medium to long term processes.

Regarding project efficiency, in the opinion of the interviewees the project managed to carry out numerous activities with few resources. Some project activities, such as the hiring of the regional coordinator and capacity building in Brazil, were reviewed and modified to ensure the participation of a greater number of beneficiaries. These budget reallocations are considered normal for a

project of this scope and duration. However, it should be noted that some of the items of equipment purchased by the project were beyond the needs of its activities.

Another point raised was that the timing (slowness) of the disbursement of resources by the UNDP had an impact on the flow of scheduled activities. Logistical problems - such as a two-week time limit for visits made by Embrapa technicians and security issues in the countries – also had an impact on the budget and the implementation of scheduled activities. The fact that the time/salary of the technicians is covered by Embrapa means that project costs are lower than other cooperation projects.

The assessment of project sustainability considered different factors. The project managed to guarantee the participation of the partner institutions from the negotiation phase. The involvement of the Project Steering Committee in the monitoring and decision-making process led to the ownership of the project at this level. Brazilian interviewees mentioned that a commitment to developing a shared vision among project actors and strengthening collective skills was one of the strategies employed to ensure project sustainability.

Furthermore, as mentioned previously, knowledge was adapted and capacity building was replicated. The involvement of senior government officials in the project demonstrates political commitment to the project. All these aspects contributed to the ownership and, consequently, the sustainability of this initiative.

The project was implemented in anticipation of there being a second phase, which began in 2015. The evaluation team believes that, in certain cases, this factor hindered the development of strategies and negotiations that would otherwise ensure the continuity of activities after the end of the project or between phases. For example, an interviewee mentioned that the IER did not cover the maintenance costs of some elements of the project that appear to be essential to its sustainability and should therefore be considered during the current phase, including: the involvement of other actors from the cotton supply chain; focusing knowledge transfer on extension agents and farmers; and the elaboration of an exit strategy which encompasses the management and maintenance costs of the Cotton 4 Centre.



FINAL CONSIDERATIONS AND RECOMMENDATIONS

As described in the previous section, the performance of the project in relation to its predetermined goals was deemed satisfactory, meaning that the results were largely achieved. The approaches used to achieve these results were consistent; however, certain complementary strategic adjustments could enhance project impact. The conclusions of the section on the application of the principles of SSC shows consistency between Brazilian cooperation discourse and practice. The main challenges and drawbacks – such as issues relating to financial management, communication, monitoring and coordination with other relevant actors – were analysed taking into account the innovative nature of the project.

The C4 Project is innovative for various reasons: it is directly associated with the struggle waged by the partner countries in the WTO against subsidies granted to cotton farmers in developed countries; it is the first Brazilian cooperation project of this scale (in terms of number of countries and duration); it shares innovative agricultural technology; and it commissioned the first external evaluation of a Brazilian agricultural cooperation project.

As a pilot project, its impact on cotton productivity in partner countries will depend on ownership, in the widest sense of the term, and sustainability of the technology transfer and knowledge dissemination. There are therefore a number of opportunities to create synergies, identify common opportunities and exchange learning experiences between the project and other actors involved in the development of the African cotton sector.

The evaluation team therefore believes that the lessons learnt will be useful not just for ABC projects, but also for international cooperation projects in general.

The lessons learnt, challenges and recommendations for the next phase of the C4 Project are listed on the next pages. With regard to the recommendations, the evaluation team considered the issues that emerged during the evaluation exercise, and also the expertise of the institutions involved. It is suggested that these recommendations should be discussed together with the partner institutions, including the UNDP and Ministry of Foreign Affairs, in order to analyse the role and responsibilities of each partner with respect to issues raised by the evaluation.

Finally, it is important to note that some of the points raised by this report have already been considered for the second phase of the project, such as a clearer and more coherent logical framework, specific objectives, results and strategies that target agricultural extension workers, and an action plan for the adaption and distribution of the manuals produced by the project.

MANAGEMENT

The negotiation, appraisal and elaboration phases began in 2006 and ended in 2009, the year in which the project began. The lengthy planning period meant that the partners were able to participate and contribute to the process and obtain a greater knowledge and understanding of the realities of each other's countries.

The creation of the Project Steering Committee was essential to ensure horizontality and shared management. The committee opened a space for dialogue between the partners and gave the countries the opportunity to either to simply proceed with activities or review them together with the other partners. The presence of the committee also gave the project greater credibility and differentiated it from other cooperation projects.

The project was successful in appointing professionals who had the necessary aptitude and technical skills and competences that were compatible with the project's objectives. Many of the interviewees from the partner institutions highlighted the exceptional professional attitude of the technicians and their "hands-on" approach. On the other hand, the lack of incentive systems in Embrapa to encourage the involvement of its technicians in cooperation projects and limits on duration of the stay of technical visits were challenges to the prolonged participation of Brazilian technicians.

Another important aspect was the involvement of embassies in the project. The recognition of the skills and competencies and the importance of the role of the Brazilian Ambassador in Mali calls for a reflection about the potential role of embassies in cooperation projects.

The fact that some of the equipment in the C4 Centre in Sotuba is being underused and that some items are beyond the needs of this phase of the project suggests the need to set up decision-making processes which employ clear technical criteria agreed by the partners to guarantee efficient use of resources.

Another challenge is the lack of a legal framework to allow the disbursement of resources directly from the ABC to partner institutions. The administrative procedures led to delays that had an impact on the project schedule and meant that local partners had to carry out activities without funding. These factors could potentially damage the relationship of trust and confidence created between project partners.

With respect to monitoring and evaluation, the ABC and Embrapa showed commitment to the inclusion of Result

5, monitoring missions, mid-term revision, the elaboration of a new 2013 Evaluation Framework, and commissioning an external evaluation of the project. The weaknesses of the original logframe matrix and lack of a unified and operational planning and monitoring system were obstacles to more rigorous monitoring.

RECOMMENDATIONS

STRENGTHEN PLANNING AND FINANCIAL MANAGEMENT

Plan and budget activities annually, together with each local partner, and guarantee that resources are available before activities begin;

Seek solutions that lead to greater swiftness in the transfer of resources;

Create criteria for equipment purchase to ensure efficient use of resources.

STRENGTHEN THE MONITORING AND EVALUATION SYSTEM

Develop process and impact indicators for the project's specific objectives and application of the principles of SSC;

Adopt a unified monitoring system;

Adopt protocols and model reports to facilitate the systemisation of data and monitoring of project progress;

Systemise the data from the capacity building activities, including course topics, location, lecturers/instructors, list of participants and evaluation;

Monitor the adoption of technology by farmers;

Share and discuss monitoring reports with stakeholders and incorporate reflections into decision-making processes before and during implementation.

ENSURE THAT TECHNICIANS AND EMBRAPA RESEARCHERS RECEIVE SUPPORT AND INSTITUTIONAL INCENTIVES TO ENCOURAGE THEM TO PARTICIPATE IN PROJECTS

Support and prepare the technicians and researchers before the trip;

Ensure more flexibility in relation to the length of the trip;

Ensure that documents about the project (articles and reports) produced by researchers and technicians include the institution's existing evaluation processes.

TECHNOLOGY TRANSFER

The project showed particularly positive results regarding technology transfer. The main area of knowledge transfer that stood out most in terms of performance was genetic improvement. Furthermore, the increase in productivity of the demonstration plots due to the introduction of no-till farming was essential to “convince” the technicians and researchers. However, the project has not achieved better results because this requires skilled human capital, greater financial resources, the use of alternatives to adapt technology to local realities, and dissemination mechanisms.

If these human and financial resources are beyond the current capacity of the Brazilian Institutions, the evaluation team suggests that future phases of this project should prioritise specific areas or ensure greater coordination with other government and international cooperation projects.

Perhaps one of the most important lessons of the C4 Project is that project planning should consider not only individual capacity building, but also promote strengthening of the partner institutions as a whole. Furthermore, the role extension agents play in the on-farm replication of technologies is essential. This is particularly important because this issue is also associated with the sustainability of knowledge transfer. In this respect, the evaluation team recommends that the manuals and technical fact sheets produced by the project should be made accessible to small farmers.

The course content and methodology used during the capacity building activities were positively evaluated by the interviewees. The professional attitude of the technicians and “inspiration” provided by Embrapa appeared to be essential to the good performance of this result and differentiated the Brazilian cooperation project from traditional North-South cooperation projects. However, challenges include the lack of continuity of the capacity building activities and communication problems due to language.

RECOMMENDATIONS

ADAPT THE NO-TILL FARMING SYSTEM TO FARMER REALITIES

Define and disseminate practical solutions to the problem of grazing animals in Africa and its supposed incompatibility with the cover crop system;

Promote activities to guarantee access to cover crop and green manure seeds and therefore the wide scale reproduction and dissemination of varieties;

Guarantee that technology transfer ensures access to the right equipment for no-till farming and implements adapted to the reality of small farmers.

REASSESS THE INTEGRATED PEST MANAGEMENT THEMATIC AREA

Reassess the ambition of the expected result in light of the complexity of this theme;

Greater financial investment and/or increased follow-up by Embrapa technicians;

Increase coordination with other projects which seek to achieve the same results.

DISTRIBUTE MANUALS AND RETHINK DISSEMINATION METHODS TO REACH FARMERS

Distribute the manuals to all institutions that work with cotton as soon as possible. The distribution of these manuals should be a way of acknowledging the quality of the material and the efforts of the technicians from the five countries;

Create a proposal to review the material and adapt the content using extremely simple language and more pictures and illustrations;

Consider the use of pamphlets that can be printed locally and easily adapted to each country's reality;

Use other dissemination materials, such as videos, to obtain greater reach and impact.

START UP THE BIOTECHNOLOGY LABORATORY

Draw up a business plan for the biotechnology laboratory, including the identification of new sources of income;

Train staff to use the equipment and follow the protocols adopted by Embrapa;

Translate the equipment user manuals into French to facilitate maintenance.

STRENGTHEN COMMUNICATION BETWEEN THE INDIVIDUALS INVOLVED

Hire interpreters with specialised knowledge of agricultural terms;

Assure follow-up between capacity building activities;

Consider translating the SISVAR to French;

Translate the equipment manuals into French.

CREATE MECHANISMS TO AVOID THE DISCONTINUITY OF THE CONTENT OF CAPACITY BUILDING ACTIVITIES AND MAKE POST-COURSE MATERIAL MORE ACCESSIBLE

Facilitate communication between Embrapa technicians regarding the preparation of capacity building activities and trips;

Create means/tools that facilitate internet communication between technicians, researchers, extension agents and farmers;

Make the presentations given during the capacity building activities available to African technicians;

Ensure follow-up after the capacity building activities. Realizar follow-up depois das capacitações.

ELABORATE AN INVESTMENT PLAN AND ACTIVITIES PLAN FOR THE ENTOMOLOGY LABORATORY IN SOTUBA

Guarantee that the laboratory in Sotuba is fully operational before carrying out any new investments in the entomology main area;

Provide long term training for the technician responsible for overseeing the work of the laboratory and hire auxiliary staff for the laboratory to ensure an adequate and sustainable production of *Trichogramma* for large-scale use;

Classify the species of *Trichogramma* produced in the laboratory;

Carry out a cost-benefit analysis of implementing the entomology main area in the field;

Evaluate the possibility of opening the laboratory to other programmes, such as the fruit and vegetable programme for example;

Design a long term funding plan for the laboratory.

SUSTAINABILITY AND OWNERSHIP

The involvement, interest and influence of the project partners – from senior government officials to farmers – is conducive to project sustainability.

With respect to the sustainability of technology transfer, according to the Brazilian partners, the local researchers, in general, have the necessary technical skills and competences to continue activities in the experimental areas. However, Embrapa technicians who visited Chad and Benin mentioned that, although the local researchers have the necessary technical skills and competences to appropriate and implement certain activities, it is not clear whether the conditions of the experimental stations in these countries are conducive to the development of activities.

Another challenge to achieving greater sustainability and scale is that the project currently acts in isolation from other initiatives and there is little coordination with other cooperation projects or other areas of research in the institutions. The project has achieved a number of positive results. However, data analysis lacks robustness. This type of evidence is essential to the validation of new technology and, consequently, its sustainability.

RECOMMENDATIONS

GUARANTEE PROJECT ALIGNMENT WITH OTHER INITIATIVES WHICH ADDRESS THE COTTON SUPPLY CHAIN AND WITH PARTNER INSTITUTIONS

Include the activities of the Brazilian Embassy as an integral part of the project and guarantee its participation in activity planning;

Involve extension institutions in the design of activities;

Map stakeholders to guarantee project alignment and strengthen new partnerships.

WIDEN THE NETWORK OF ACTORS TO INCLUDE OTHER AREAS OF RESEARCH

Elaborate a management plan for the C4 Centre which aims to invite other researchers and actors to make use of the space.

STRENGTHEN THE ACADEMIC RESEARCH COMPONENT

Conduct agro-economic studies to demonstrate the positive impacts of the seed varieties, no-till farming system, and Integrated Pest Management;

Conduct more joint research between Brazilian and African institutions;

Publish more of the project's results in academic journals.

GUARANTEE THE LONG TERM SUSTAINABILITY OF INTERVENTIONS

Draw up a business plan for the C4 Centre, focusing on the interaction of more actors in the CRRRA – Sotuba;

Draw up a plan for activating the cold room located in the CRRRA-Sotuba;

Define the project vision for 2019 together with other partners (assuming no further support) and the path to get there.





APPENDIX 1: LIST OF INTERVIEWEES

APPENDIX 1.1: LIST OF INTERVIEWEES FROM MALI

NAME	INSTITUTION	POSITION
ABDOULAYE HAMADOUN	IER	DEPUTY GENERAL DIRECTOR
ABDOULAYE TRAORE	INTERCOMMUNAL ASSOCIATION	RURAL PRODUCER, SANANKOROBA
ADAMA SAMAKE	N/A	RURAL PRODUCER, DIALAKOROBA
AMADOU YATTARA	CRRA/ SIKASSO	HEAD OF THE COTTON PROGRAMME; SELECTOR Laboratory (Project C4)
BARRY TINAMOUDCISSÉ	PROJECT C4	RESPONSIBLE FOR THE ENTOMOLOGY LABORATORY (PROJECT C4)
BOUBA TRAORE	IER/ NTALA	COTTON RESEARCHER
BOUBAKAR DIOMBANA	PROJECT C4	RESPONSIBLE FOR THE C4 ADMINISTRATION AND FINANCES
BOURAMA TRAORE	N/A	RURAL PRODUCER, SANANKOROBA
BOUREMA DEMBELÉ	IER	GENERAL DIRECTOR
CHEICK ABDOUL KADER BOUARÉ	IER/SOTUBA	
CHEICKHAMALADIAKITE	CRRA/ SOTUBA	RESEARCHER (LABORATORY OF SOIL, WATER, PLANT)
DRAMANE TRAORE	N/A	RURAL PRODUCER, SANANKOROBA
EL HADJI MAMOUDOU KASSAMBARA	ESTAÇÃO DE PESQUISA, NTALA	RESEARCHER, SELECTOR
FAGAYE SISSOKO	CRRA/ SIKASSO	RESEARCHER, AGRONOMIC SYSTEMS (INCLUDING COTTON)
GAMBY KADIATOU TOURÉ	CRRA/ SOTUBA	HEAD OF THE FRUITS AND VEGETABLES PROGRAMME
HAROUNE YOOSI	CRRA/ SOTUBA	DIRECTOR
HASSANE DAOU	CRRA/ SOTUBA	C4 FOCAL POINT AND REPRESENTATIVE OF THE COTTON PROGRAM
IBRAHIMA DIAKITÉ	CNU/CRU	PRESIDENT
ISSA SIDIBE	OHVN	HEAD OF THE RESEARCH AND CULTURE DIVERSIFICATION DEPARTMENT
JOSÉ JÚLIO DE OLIVEIRA	BRAZILIAN EMBASSY IN MALI	ARCHIVE COMMISSIONER (REPRESENTING THE BRAZILIAN AMBASSADOR)

NAME	INSTITUTION	POSITION
KONARÉ HAMIDOU	CRRA/ SOTUBA	HEAD OF THE LABORATORY OF SOIL, WATER, PLANT
MAMA KONÉ	CRRA/ SOTUBA	RESEARCHER, LABORATORY OF SOIL, WATER, PLANT
MAMADOU TRAORÉ	PROJECT C4	SUPERIOR TECHNICIAN OF AGRICULTURE
MAMOUTOU TOGOLA	CRRA/ SIKASSO	RESEARCHER (ENTOMOLOGY)
NGOLO	CRRA/ SIKASSO	DIRECTOR
NIABA TEMÉ	BIOTECHNOLOGY LAB CRRA, SOTUBA	RESPONSIBLE FOR THE BIOTECHNOLOGY LABORATORY
OUSMAN CISSÉ	CMDT	
SIDIKI DIARRA	PROJECT C4	AGRICULTURE TECHNICIAN
SOULAYMANO KONATE	N/A	RURAL PRODUCER, TADANABOUGOU
TERÉ TRARORÉ	IER/ SOTUBA	

APPENDIX 1.2: LIST OF INTERVIEWEES FROM BURKINA FASO

NAME	INSTITUTION	POSITION
BAYILI YOMBOÉ	SOFITEX	TRAINER, KOUDOUGOU REGION
BOURGOU LARBOUGA	INERA	SELECTOR
FOFANA TAIROU	UNPCB	SECOND VICE-PRESIDENT
GALA CELESTIN	UNPCB	GENERAL SECRETARY
HEMAOMER	INERA	ENTOMOLOGY (FOCAL POINT, ENTOMOLOGY)
JACOB SANOU	INERA	REGIONAL DIRECTOR
KIANE SIDIKI	INERA	SELECTOR
KONÉ AMIOLOU	UNPCB	SECRETARY IN CHARGE OF THE ORGANIZATION

NAME	INSTITUTION	POSITION
KOULIBALY BAZOUMANA	INERA	AGRONOMIST, COTTON DIRECTOR AND C4 FOCAL POINT
KOURA YACOUBA	UNPCB	FIRST VICE PRESIDENT
N'KAMLI NIKIÉBO	UNPCB	DEPUTY GENERAL SECRETARY
N'DO GABRIEL	SOFITEX	TRAINER, BOBO REGION
OUATTARA ADAMO	INERA	AGRONOMIST
OUATTOURA MAMADOU	UNPCB	INFORMATION AND COMMUNICATION
REGINA BITTENCOURT	FOREIGN AFFAIRS MINISTRY	BRAZILIAN AMBASSADOR IN BURKINA FASO
REMY DABIRE	SUISSE COOPERATION	SINBRIO PROJECT COORDINATOR
SANFO DENYS	INERA	SELECTOR (FOCAL POINT, GENETIC IMPROVEMENT)
SANOU CHARLES	UNPCB	ASSISTANT TREASURER
SENE MOUSSA	UNPCB	GENERAL TREASURER
SIBIRI SOU	SOFITEX	DEPUTY DIRECTOR OF DEVELOPMENT OF COTTON PRODUCTION
TIANHOUN CASIMIR	SOFITEX	HEAD OF RESEARCH SERVICE AND DEVELOPMENT
TRAORE KARIM	UNPCB	PRESIDENT, UNPCB
TRAORÉ MOUSSA	UNPCB	ASSISTANT FOR INFORMATION AND COMMUNICATION
TRAORE OUSSEINI	FASO COTON	DEPUTY TECHNICAL DIRECTOR
VOGNAM GASPAR	INERA	AGRO-ECONOMIST
ZOUGRANA DELPHINEE	UNPCB	COORDINATOR

APPENDIX 1.3: LIST OF INTERVIEWEES FROM BENIN

NAME	INSTITUTION	POSITION
AGOUGOU EHUZU GHISLAIN	CRA-CF, CANA /INRAB	ENTOMOLOGY TECHNICAL ASSISTANT
ALEXIS HOUGNI	CRA-CF /INRAB	DIRECTOR AND C4 FOCAL POINT
AMADJI FIRMIN	CRA-CF /INRAB	CONSULTANT
AMONMIDE ISIDORE	CRA-CF /INRAB	HEAD OF THE COTTON AND FIBRE SECTOR
BEATRICE DOSSOUMOU GBADAMASSI	CRA-CF /INRAB	HEAD OF FINANCIAL SERVICES
BELLO ILIYATH	CRA-SUD, CANA /INRAB	RICE SELECTOR
BONNI GUSTAVE	CRA-CF, COTONOU /INRAB	ENTOMOLOGY RESEARCHER
DAVID ARODOKOUN	INRAB	GENERAL DIRECTOR
DJABOUTOU COSSI MOUSSIBAOU	INRAB	RESEARCHER (FORMER C4 FOCAL POINT)
ERIC ARAYE	CRA-CF, PARAKOU /INRAB	RESPONSIBLE FOR THE C4 PROJECT
FAYALO DOSSOU GERMAIN	CRA-CF / INRAB	RESPONSIBLE FOR THE AGRONOMIC ACTIVITIES, NORTE PARAKOU SECTOR
FELIX	MINISTRY OF AGRICULTURE	TECHNICAL ADVISOR FOR DEVELOPMENT AND RURAL EQUIPMENT
GUSTAVE DAGBENONBAKIN	INRAB	RESEARCHERS MANAGER
HENRIETTE GOTOECHAN ÉPSE HODONOU	INRAB	APRA COORDINATOR (MONITORING AND EVALUATION)
HOUNDETE THOMAS AIDJO	CRA-CF, CANA /INRAB	ENTOMOLOGIST
HOUNSOUN ANTOINE DAGNON	DRSSA	HEAD OF SUPPLY INPUTS SERVICES
IDRISA YAKOUBOU TOURÉ	MINISTRY OF AGRICULTURE	DIRECTOR OF CABINET
JOÃO ZANINI	BRAZILIAN EMBASSY	FIRST SECRETARY

NAME	INSTITUTION	POSITION
KOUKE ROSANOFF YANNICK	CRA-SUD, CANA /INRAB	RICE SELECTOR
MOISE OBAYOMI ADEGNIKA	IFDC	NATIONAL COORDINATOR (FORMER INRAB ENTOMOLOGIST)
NESTOR AHOYO ADJOVI	INRAB	SCIENTIFIC DIRECTOR
SATURNIN AZONKPIN	CRA-CF, PARAKOU /INRAB	RESEARCHER, NORTH SECTOR
SINHA MAURICE	CRA-CF, COTONOU /INRAB	HEAD OF SERVICE,, TECHNICAL AND ADMINISTRATIVE
TEMLA SALAMI	MINISTRY OF AGRICULTURE	TECHNICAL ADVISOR

NAME	INSTITUTION	POSITION
DJONDANG KOYE	ITRAD	MONITORING AND EVALUATION
MICHEL NAITOMBAIDE	ITRAD	C4 FOCAL POINT
NODJASSE DOYAM	ITRAD	ENTOMOLOGY
REOUNGAL DJINODJI	ITRAD	RESEARCHER

APPENDIX 1.5: LIST OF INTERVIEWEES FROM BRAZIL

NAME	INSTITUTION	POSITION
ADRIANA MESQUITA CORREA BUENO	EMBRAPA	PROJECT ANALYST
ALEXANDRE CUNHA BARCELLOS DE FERREIRA	EMBRAPA	RESEARCHER (NO-TILL)
ANA LUIZA BORIN	EMBRAPA	RESEARCHER (NO-TILL)
ANDRE DUSI	EMBRAPA	COORDINATOR OF TECHNICAL COOPERATION, INTERNATIONAL RELATIONS SECRETARIAT
CAMILO MORELLO	EMBRAPA	COTTON RESEARCHER
DANIEL AUGUSTO FURST GONCALVES	PNUD	SSC SPECIALIST
FELIPE MARQUES	ABC	FINANCIAL ADMINISTRATIVE ASSISTANT
FERNANDO MENDES LAMAS	EMBRAPA	WESTERN AGRICULTURAL RESEARCH CENTRE
FRANCISCO FARIAS	EMBRAPA	RESEARCHER (GENETIC IMPROVEMENT)
GEOVANDO VIEIRA PEREIRA	EMBRAPA	C4 TECHNICAL COORDINATOR, BAMAKO
GILVAN BARBOSA FERREIRA	EMBRAPA	RESEARCHER (NO-TILL)
JANAÍNE SOUZA SARAIVA	EMBRAPA	RESEARCHER (NO-TILL)
JOÃO CARLOS SOUB	ABC	CHANCELLERY OFFICIAL
JOÃO LUIZ DA SILVA	EMBRAPA	RESEARCHER (GENETIC IMPROVEMENT)
JOSÉ EDNILSON MIRANDA	EMBRAPA	COTTON RESEARCHER
JOSÉ GERALDO DI STEFANO	EMBRAPA	C4 LOCAL TECHNICAL COORDINATOR
JULIO POHL	ABC	ADMINISTRATOR
MARIA DA CONCEIÇÃO CARVALHO	EMBRAPA	RESEARCHER (GENETIC IMPROVEMENT)
MOHAMMED HADJAB	ABC	INTERPRETER

NAME	INSTITUTION	POSITION
NELCI PERES CAIXETA	ABC	PROJECT MANAGER
PAULO COHEN	ABC	INTERPRETER
PEDRO AUGUSTO FRANCO VELOSO	ABC	PROJECT MANAGER
RAUL PORFÍRIO DE ALMEIDA	EMBRAPA	ENTOMOLOGY RESEARCHER
SEBASTIÃO BARBOSA	EMBRAPA	HEAD OF COTTON

APPENDIX 2: LIST OF INDICATORS

THE FOLLOWING TABLE DESCRIBES THE MAIN INDICATORS THAT GUIDED THE EVALUATION, AS WELL AS THE PAGE IN WHICH THE INFORMATION IS PRESENTED. QUALITATIVE INDICATORS WERE BROKEN DOWN INTO QUESTIONS THAT COULD, IN AGGREGATED FORM, REPRESENT THEM. WHEN THE COLLECTION OF INFORMATION ABOUT A SPECIFIC INDICATOR WAS NOT POSSIBLE, THE SECOND COLUMN PRESENTS THE DIFFICULTIES FOUND. THIS TABLE DOES NOT REPRESENT AN EVALUATION OF EACH INDICATOR AND THE INFORMATION ON THE PAGE REFERENCED IS NOT AN INDICATION THAT THE INDICATOR WAS ACHIEVED.

INDICATOR	PAGE REFERENCE/ DIFFICULTIES
1. REVITALIZE THE SOTUBA RESEARCH STATION IN BAMAKO TO SERVE AS A PILOT UNIT	
A INCREASE IN NUMBER OF ACTIVITIES IN THE STATION RELATED TO THE COTTON PRODUCTION CHAIN	THERE IS NO RELATION BETWEEN THE INCREASE IN ACTIVITIES IN THE STATION CRRA – SOTUBA WITH THE C4 PROJECT. THE GREATEST DIFFICULTY CONCERNING THIS INDICATOR IS THE CONFUSION BETWEEN WHAT IS MEANT BY THE STATION: CRRA - SOTUBA VERSUS COTTON C4 CENTRE
B LEVEL OF INFRASTRUCTURE IMPROVEMENT	PAGE. 33-34
C LEVEL OF IMPROVEMENT OF THE STATION'S MANAGEMENT	THE SOTUBA STATION IS DEFINED AS CRRA-SOTUBA. THE PROJECT DID NOT ACT DIRECTLY IN THE CRRA - SOTUBA MANAGEMENT ACTIVITIES. THE COTTON C4 CENTRE'S MANAGEMENT ACTIVITIES ARE SEPARATED FROM THOSE OF THE CRRA-SOTUBA
D OPTIMUM USE OF THE NEW CAPACITIES INSTALLED IN THE STATION	PAGE. 34
E SUSTAINABILITY LEVEL OF THE STATION	THE PROJECT IS NOT YET SUSTAINABLE, AS IT IS STILL NOT MANAGED AND FUNDED EXCLUSIVELY BY IER. THE ACTIVITIES CONTINUITY CURRENTLY DEPENDS ON THE PROJECTS' NEW PHASE. THE CENTRE IS CURRENTLY WORKING WITH ABC'S FINANCIAL SUPPORT.
F NUMBER OF PROJECTS (NATIONAL/INTERNATIONAL) THAT INCLUDE THE STATION IN THEIR STRATEGY PLANS	THERE ARE DIFFERENT PROJECTS IN THE CRRA-SOTUBA BEING FINANCED BY VARIOUS DONORS, BUT THEY ARE NOT INTEGRATED OR LINKED TO THE C4 PROJECT. THE GREATEST DIFFICULTY CONCERNING THIS INDICATOR IS THE CONFUSION BETWEEN WHAT IS MEANT BY THE STATION: CRRA - SOTUBA VERSUS COTTON C4 CENTRE
G INCREASE IN THE NUMBER OF PEOPLE WORKING AT THE STATION	EMPLOYEES WHO WORK AT THE COTTON C4 ARE PAID BY THE PROJECT. THE GREATEST DIFFICULTY CONCERNING THIS INDICATOR IS THE CONFUSION BETWEEN WHAT IS MEANT BY THE STATION: CRRA - SOTUBA VERSUS COTTON C4 CENTRE
H BUDGET INCREMENTS TO THE STATION FROM OTHER SOURCES RATHER THAN THE PROJECT	THERE IS NO RELATION BETWEEN BUDGET INCREASE IN THE STATION CRRA – SOTUBA AND THE C4 PROJECT. THE GREATEST DIFFICULTY CONCERNING THIS INDICATOR IS THE CONFUSION BETWEEN WHAT IS MEANT BY THE STATION: CRRA - SOTUBA VERSUS COTTON C4 CENTRE
I LEVEL THE IMPORTANCE OF THE RESEARCH FOR AGRICULTURAL PRODUCTION	PAGE. 34 AND 50

J	LEVEL OF COMPLEMENTARITY WITH OTHER POLICIES/ PROGRAMS AND RELEVANT PROJECTS	PAGE 51
K	REVITALISATION ACTIVITIES WERE ADAPTED AND RELEVANT TO LOCAL CONTEXT	PAGE 35
L	VOLUNTARY COUNTERPARTS	NOT CLEAR. THERE WAS PRE-FINANCING OF ACTIVITIES BUT THERE ARE INVESTMENTS THAT NEED TO BE MADE BY IER TO ENSURE OPTIMUM USE OF FACILITIES THAT HAVE NOT BEEN DONE SO FAR.
M	LEVEL OF INVOLVEMENT OF OTHER STAKEHOLDERS	THERE WAS VERY LITTLE INVOLVEMENT BEYOND PEOPLE DIRECTLY PARTICIPATING IN THE PROJECT
N	THE APPROPRIATENESS OF CHOOSING SOTUBA AS THE EXPERIMENTAL STATION TO BE REVITALISED	THERE WAS NOT A PREVIOUS DIAGNOSIS IN THE FOUR PARTNER COUNTRIES , THUS, IT WAS NOT POSSIBLE TO EVALUATE THIS INDICATOR

2. ADAPTIVE RESEARCH INTO GENETIC IMPROVEMENT, SOILS/NUTRITION/NO-TILL FARMING, AND INTEGRATED PEST MANAGEMENT VALIDATED

A	INTRODUCTION AND ADAPTATION OF BRAZILIAN COTTON SEEDS	PAGE. 36
B	LEVEL OF IMPROVEMENT IN THE QUALITY OF COTTON	PAGE 36-37
C	INCREASE IN PRODUCTIVITY	PAGE 37
D	IMPROVED PEST RESISTANCE OF COTTON	PAGE 38
E	IMPROVEMENT OF PESTS CONTROL	PAGE 39
F	VALIDATED RESULTS DISSEMINATED TO OTHER STAKEHOLDERS	PAGE 40
G	DEMONSTRATION OF POLITICAL WILL TO CONTINUE THE PROJECT'S ACTIVITIES	EVEN THOUGHT THE PROJECT HAD POLITICAL SUPPORT, THE TEAM FOUND NO CLEAR EVIDENCE THAT THERE IS WILL TO CONTINUE ACTIVITIES WITHOUT A NEW PHASE OF FUNDING.
H	LEVEL OF INVOLVEMENT OF LOCAL LEADERS AND PARTNER ORGANISATIONS IN THE ADAPTIVE RESEARCH VALIDATION PROCESS	PAGE 40
I	LEVEL OF RELEVANCE, INNOVATION AND QUALITY OF TECHNICAL/TECHNOLOGICAL SOLUTIONS	PAGE 42

3. CAPACITY OF RESEARCHERS, TECHNICIANS AND FARMER LEADERS FROM THE C4 COUNTRIES TO USE NEW TECHNOLOGY IS STRENGTHENED

A	NUMBER OF EXTENSION WORKERS WHO APPLY THE TECHNIQUES DEVELOPED DURING THE PROJECT	IT WAS NOT POSSIBLE TO VERIFY THIS INDICATOR, AS THE PROJECT DOES NOT SYSTEMATISE QUANTITATIVE INFORMATION
B	NUMBER OF RESEARCHERS, EXTENSION AGENTS AND FARMERS LEADERS TRAINED BY THE INSTITUTION	THE EVALUATION TEAM COULD NOT CONSOLIDATE THIS INFORMATION AS IT DID NOT HAVE ACCESS TO ALL PARTICIPANTS' LIST FROM TRAININGS
C	LEVEL OF CONTRIBUTION OF THE TEACHING METHODOLOGY TO THE TRANSFER OF KNOWLEDGE	PAGE. 41
D	TRAINING SKILLS WERE MULTIPLIED AND DISSEMINATED TO OTHER PARTS OF THE INSTITUTION	THE EVALUATION TEAM FOUND NO INDICATION IN THIS RESPECT
E	DEMONSTRATED CAPACITY TO REPLICATE KNOWLEDGE GAINED BY TRAINED RESEARCHERS, EXTENSION AGENTS AND FARMERS AND LOCAL LEADERS	PAGE 41
F	NUMBER OF TRAINING ACTIVITIES PROMOTED BY PARTICIPANTS	ABSENCE OF EVIDENCE TO INFORM THIS INDICATOR, AS THE PROJECT DOES NOT SYSTEMATISE QUANTITATIVE INFORMATION
G	NUMBER OF EXTENSION AGENTS USING MATERIAL DEVELOPED TO TRAIN PRODUCERS	ABSENCE OF EVIDENCE TO INFORM THIS INDICATOR, AS THE PROJECT DOES NOT SYSTEMATISE QUANTITATIVE INFORMATION
H	NUMBER OF PRODUCERS USING NEW TECHNOLOGIES	ABSENCE OF EVIDENCE TO INFORM THIS INDICATOR, AS THE PROJECT DOES NOT SYSTEMATISE QUANTITATIVE INFORMATION
I	KNOWLEDGE WAS ABSORBED, ADAPTED AND APPLIED AS ORGANISATIONAL PRACTICE	PAGE 40-43
J	RELEVANCE AND ADAPTATION OF METHODS, TECHNIQUES, CONTENTS AND TOOLS TO SOLVE LOCAL PROBLEMS	PAGE 40-43
K	PARTICIPATION OF LOCAL STAKEHOLDERS IN THE TRAINING PLANNING	PAGE 40
L	LEVEL OF PARTNER SATISFACTION WITH COMMUNICATION	PAGE 42
M	ELABORATION OF COMPETENCES AND SKILLS DIAGNOSIS BEFORE TRAININGS	NOT OBSERVED

4. DISSEMINATION MATERIAL ABOUT NEW COTTON PRODUCTION TECHNOLOGY PREPARED AND DISTRIBUTED TO AGRICULTURAL EXTENSION TECHNICIANS AND FARMERS

A	CLARITY AND RELEVANCE OF CONTENT	PAGE. 43
B	LEVEL OF SATISFACTION WITH THE CONTENT OF THE MATERIALS PRODUCED	PAGE. 43
C	NUMBER OF PEOPLE WHO RECEIVED THE MATERIAL	MATERIAL HAS NOT BEEN DISTRIBUTED YET
D	NUMBER OF COMMUNICATION CHANNELS USED FOR DISSEMINATION OF MATERIALS PRODUCED	MATERIAL HAS NOT BEEN DISTRIBUTED YET
E	MATERIALS BEING USED BY ACTORS OTHER THAN THE INTENDED BENEFICIARIES	MATERIAL HAS NOT BEEN DISTRIBUTED YET
F	MATERIAL DISSEMINATED THROUGH NEW CHANNELS	MATERIAL HAS NOT BEEN DISTRIBUTED YET
G	MATERIALS PRODUCED TAKE INTO CONSIDERATION OTHER MATERIALS USED BY THE EXTENSION AGENTS AND PRODUCERS	NOT OBSERVED
H	PLANS FOR EXPANDED DISSEMINATION	MATERIAL HAS NOT BEEN DISTRIBUTED YET
I	CONTENT IS ADAPTED TO LOCAL REALITIES	NOT OBSERVED
J	CONTENT CLARITY	PAGE. 43
K	PARTICIPATION OF STAKEHOLDERS IN THE PREPARATION AND DISSEMINATION OF MATERIALS	PAGE 43

5. PROJECT MONITORED AND EVALUATED

A	LEVEL OF SATISFACTION WITH THE MEETINGS, CONTRIBUTIONS AND RECOMMENDATION OF THE STEERING COMMITTEE	PAGE 44
B	FREQUENCY OF COLLECTION OF INFORMATION AND DATA CONCERNING THE PROGRESS OF THE ACTIVITIES	PAGE 44
C	SYSTEMS IN PLACE TO IDENTIFY SUCCESSES AND PROBLEMS	PAGE 44
D	PROJECT LEARNINGS SHARED WITH OTHER RELEVANT ACTORS	PAGE. 44
E	MONITORING FRAMEWORK PREPARED COLLECTIVELY	PAGE. 44

6. COOPERATION NETWORK STRENGTHENED

A	NUMBER OF RESEARCHERS INVOLVED IN THE PROJECT INCREASED	IT WAS NOT POSSIBLE TO QUANTIFY THIS NUMBER, AS THE PROJECT DOES NOT SYSTEMATISE QUANTITATIVE INFORMATION.
B	INCREASED LEVEL OF NETWORK'S ACTIVITIES	PAGE 50
C	NUMBER OF VISITS TO SOTUBA STATION AND DEMONSTRATION UNITS	IT WAS NOT POSSIBLE TO QUANTIFY THIS NUMBER, EXCEPT THE NUMBER OF VISITS TO SOTUBA (150)
D	EXISTENCE OF PLAN TO ENSURE CONTINUITY OF THE NETWORK'S ACTIVITIES	NOT IDENTIFIED
E	NUMBER AND QUALITY OF THE PARTNERSHIP ESTABLISHED WITH OTHER STAKEHOLDERS	IT WAS NOT POSSIBLE TO QUANTIFY THIS NUMBER. THERE IS NOT A CLEAR STRATEGY TO ENSURE SYNERGIES BETWEEN THE PROJECT AND OTHER INITIATIVES.
F	LINKS WITH OTHER GOVERNMENTAL ACTIVITIES ESTABLISHED	PAGE. 51
G	EXISTENCE OF NEW INITIATIVES ARISING FROM THE NETWORK	PAGE. 52
H	EXISTENCE OF WORK PLAN/PLANNED ACTIVITIES FOR THE NETWORK	NOT OBSERVED
I	STAKEHOLDERS' NEEDS AND PERSPECTIVES INTEGRATED INTO THE PROJECT	PAGE 48
J	QUALITY OF COMMUNICATION BETWEEN THE PROJECT'S ACTORS	PAGE 49

7. RELATIONSHIPS BETWEEN THE PARTNER COUNTRIES IS STRENGTHENED

A	PROJECT LEARNINGS SHARED WITH OTHER RELEVANT ACTORS	PAGE. 52-53
B	ALIGNMENT OF POLICY POSITIONS IN MULTILATERAL FORUMS	PAGE. 52
C	NEW COOPERATION PROJECTS DISCUSSED AND/OR ESTABLISHED	PAGE. 52
D	POLITICAL AND/OR ECONOMIC RELATIONSHIP STRENGTHENED	INDICATOR NOT ACCESSED, AS INFORMATION WAS NOT ROBUST (ONLY ONE INTERVIEWEE MENTIONED CLOSER RELATIONSHIPS).
E	IMPROVED COMMUNICATION	PAGE. 52
F	EXISTENCE OF MUTUAL GAINS	PAGE. 53

8. PARTICIPATIVE MANAGEMENT AND HORIZONTALITY IN PROJECT RELATIONSHIPS PROMOTED

A	PARTICIPANTS' MOTIVATION LEVEL AND COMMITMENT	PAGE 51
B	LEVEL OF SATISFACTION WITH THE MEETINGS, CONTRIBUTIONS AND RECOMMENDATIONS OF THE STEERING COMMITTEE'S	PAGE. 48
C	THE LEVEL OF THE PROJECT'S LEADERS CONTRIBUTION TO RESULTS	PAGE. 49
D	LEVEL OF PARTICIPATION IN TECHNICAL AND FINANCIAL MANAGEMENT	PAGE. 48-49
E	SATISFACTION WITH DEGREE OF DIALOGUE OF BRAZILIAN ACTORS	PAGE. 49
F	ABILITY TO INFLUENCE THE REDESIGN OF ACTIVITIES	PAGE. 48-49
G	ACTIONS MONITORED AND EVALUATED IN A PARTICIPATIVE MANNER	PAGE. 48





APPENDIX 3: LIST OF THE KEY EQUIPMENTS PURCHASED FOR THE SOTUBA STATION

ITEM	QUANTITY	TOTAL VALUE (R\$)	USE	ARRIVAL DATE	CURRENT SITUATION
GROUP ELECTROGENE DIESEL GENERATOR 165 KVA	1	72.928*	GERAL	MAY-13	NOT IN USE
COLD CHAMBER	1	69.612*	GERMPLASM BANK	MAY-13	NOT IN USE
DIGITAL BINOCULAR STEREO MICROSCOPE	1	6.950	BREEDING ENTOMO	MAY-13	NOT IN USE
PORTABLE THERMOHYGROGRAPH	1	6.750	BREEDING ENTOMO	MAY-13	BROKEN/ MISSING PART
BOD INCUBATOR HERMETIC COMPRESSOR 1/8 HP 340 LTS GAS	2	6.476	BREEDING ENTOMO	MAY-13	NO DEFINED USE
ROOM HUMIDIFIER 30 M2 CAPACITY 300 A 500 ML/H	2	1.700	BREEDING ENTOMO	MAY-13	BROKEN

ITEM	QUANTITY	TOTAL VALUE (R\$)	USE	ARRIVAL DATE	CURRENT SITUATION
CHNS ELEMENTAL ANALYZER	1	303.375*	SOIL LABORATORY	JANEIRO-14	IN USE
TRACTOR 105 VC MF 4X4	1	-	AGRICULTURE	OCTOBER-10	IN USE
TILLAGE PANTOGRAPHIC SEEDER WITH 08 LINES DE 45 CM	1	57.788	AGRICULTURE	OCTOBER-10	NOT IN USE
ROLLER GIN EQUIPMENT	2	26.000	AGRICULTURE	OCTOBER-10	IN USE

The main equipment were identified through the project's documents in C4 Center. The values are based on the imports or invoice data. In some cases (marked with an asterisk in the column values *), the original values are in other currencies and are translated to US\$ at the exchange rate of 20 February 2015.

ITEM	QUANTITY	TOTAL VALUE (R\$)	USE	ARRIVAL DATE	CURRENT SITUATION
MOWERS / ROTARY CUTTERS	1	26.000	AGRICULTURE	OCTOBER-10	IN USE
SHREDDER 1,6 M 04 THONGS 14 HAMMER	1	18.780	AGRICULTURE	OCTOBER-10	IN USE
SILENT AIR COMPRESSOR WITHC 24 A 25L MOTOR BIVOLT. 10 METERS HOSE AND NOZZLE	2	17.000	SOIL LABORATORY	AUGUST-13	NOT IN USE
FUME HOODS CAPACITY : 15 M3/MIN 120X60X100 WITH ACRYLIC DOOR ADVENT TRANSP. WITH VERTICAL GAS MOVEMENT. PVC DUCT WITH 100MM DIAMETER	3	9.900	SOIL LABORATORY	AUGUST-13	NOT IN USE
SPRAY MACCHINE 9,5 M 600 LTS, TANK	1	8.897	AGRICULTURE	OCTOBER-10	NOT IN USE
MOWERS / ROTARY CUTTERS WITH 1,8M ANT 2 SHAVES	1	6.250	AGRICULTURE	OCTOBER-10	IN USE
FERTILIZER SPREADER AND SEEDS, WITH A 600 KG POLIETHYLENE CONTAINER	1	3.780	AGRICULTURE	OCTOBER-10	IN USE
MANUAL SPRAY MACCHINE WITH WHEEL ARO 20 LTS CAPACITY	2	3.480	AGRICULTURE	OCTOBER-10	IN USE
HIDRAULIC RIPPER WITH 5 RODS 2,20 M	1	2.390	AGRICULTURE	OCTOBER-10	IN USE

ITEM	QUANTITY	TOTAL VALUE (R\$)	USE	ARRIVAL DATE	CURRENT SITUATION
GROUP ELECTROGENE DIESEL GENERATOR 110 KVA	1	53.843	LABORATORY	MAY-13	NOT IN USE
LYOPHILIZER WITH ½ INC. 24 VÁLVES. 6LTS CAPACITY WITH VACUUM PUMP CAP. 200L / MIN	1	53.495	LABORATORY	AUGUST-13	OBSOLETE/ NOT IN USE
GEL DOCUMENTATION CAM	1	32.000	LABORATORY	AUGUST-13	NOT IN USE
MINI BEADBEATER -	1	24.645	LABORATORY	AUGUST-13	NOT IN USE
ULTRA LOW TEMPERATURE FREEZER AT -86 ° C CAPACITY358 LITRES, TEMP. SELECTOR -50 A -86°C FILTER CLEANING INDICATOR	1	23.900	LABORATORY	AUGUST-13	NOT IN USE
REFRIGERATED BENCHTOP CENTRIFUGES WITH ROTOR FOR 24 2ML TUBES	2	22.000	LABORATORY	AUGUST-13	NOT IN USE
MICRO-VOLUME SPECTROPHOTOMETER	1	20.985	LABORATORY	AUGUST-13	NOT IN USE
LABORATORY AGITATORS EQUIPMENT 1000MMX500 VARIABLE SPEED TEMP, FOR 200 TO 1000ML TUBES	1	19.000	LABORATORY	AUGUST-13	NOT IN USE
TANK FOR ELECTROPHORESIS DIM. 38X50 CM; VOLUME RECIPENTES : SUPERIOR CONTAINNER 1500ML, LOWER CONTAINNER 400 ML	2	15.888	LABORATORY	AUGUST-13	NOT IN USE

ITEM	QUANTITY	TOTAL VALUE (R\$)	USE	ARRIVAL DATE	CURRENT SITUATION
ICE MACHINE CONUOUS PRODUCTION CAPACITY : 100 KG /24H. WITH PRE FILTER AND TANK	1	15.000	LABORATORY	AUGUST-13	NOT IN USE
PLATE CENTRIFUGE WITH ROTOR FOR PCR 96-WELL PLATES	1	13.000	LABORATORY	AUGUST-13	NOT IN USE
STAINLESS STEEL PLANTS CRUSHER, WITH 10, 20 E 30 MESCH SIEVES	1	10.550	LABORATORY	AUGUST-13	NOT IN USE
ORBITAL SHAKERS VARIABLE SPEED 1000X500MM	1	10.500	LABORATORY	AUGUST-13	NOT IN USE
BENCHTOP CENTRIFUGES WITH ROTOR FOR 2 ML TUBES14.000RPM	1	8.000	LABORATORY	AUGUST-13	NOT IN USE
VERTICAL AUTOCLEVE 100 LTS	1	7.500	LABORATORY	AUGUST-13	NOT IN USE
FLOW CHAPEL KANUBAIRE HORIZONTAL. HEPATYPE FILTER A-3. DIM. 1300X1000X800MM	1	5.835	LABORATORY	AUGUST-13	NOT IN USE
SAFETY SHOWERS AND EMERGENCY EYE/FACE WASH EQUIPMENT	3	4.200	LABORATORY	AUGUST-13	NOT IN USE
GROW CONTROL CHAMBER WITH GERMICIDAL LAMP	1	4.000	LABORATORY	AUGUST-13	NOT IN USE
HOT PLATE ORBITAL SHAKER , CAPACITY 10 LTS . ROTATION CONTROL DE100 A 1500TR/MIN	1	3.450	LABORATORY	AUGUST-13	NOT IN USE
ROCKING SHAKERS, WITH CONSTANT SPEED ELECTRONIC ADJUSTER FROM 0 A 300 TR/MIN + REULATED CLOCK FROM 0 A 60 MIN	4	2.740	LABORATORY	AUGUST-13	NOT IN USE

APPENDIX 4:

PHOTOGRAPHS



PHOTOGRAPH 3: GENETIC IMPROVEMENT EXPERIMENTAL FIELD IN CRRA - SOTUBA



PHOTOGRAPH 4: NO-TILL FARMING EXPERIMENTAL FIELD CRRA - SOTUBA



PHOTOGRAPH 5: EXPERIMENTAL FIELD CRRA - SOTUBA (CORN AREA OVER DIFFERENT TYPES OF VEGETATION)





PHOTOGRAPH 6: ENTRANCE OF THE COTTON C4 CENTRE



PHOTOGRAPH 7: MAIN BUILDING OF THE COTTON C4 CENTRE



PHOTOGRAPH 8: MAIN BUILDING (ON THE RIGHT), KIOSK (ON THE LEFT), CORRIDOR LEADING TO THE BUILDINGS, AND ENTOMOLOGY LABORATORY (IN THE BACKGROUND)



PHOTOGRAPH 9: ENTOMOLOGY LABORATORY



PHOTOGRAPH 10: COLD CHAMBER



PHOTOGRAPH 11: MEETING ROOM IN THE MAIN BUILDING OF THE COTTON CENTRE C4



PHOTOGRAPH 12: BIOTECHNOLOGY LABORATORY



PHOTOGRAPH 13: UNUSED EQUIPMENT FOR THE BIOTECHNOLOGY LABORATORY



PHOTOGRAPH 14: UNUSED EQUIPMENT FOR THE BIOTECHNOLOGY LABORATORY



PHOTOGRAPH 15: CHNS ANALYSIS ROOM IN THE CRRA SOIL LABORATORY - SOTUBA



PHOTOGRAPH 16: MACHINE WAITING FOR THE RENOVATION OF THE SOIL LABORATORY TO BE INSTALLED

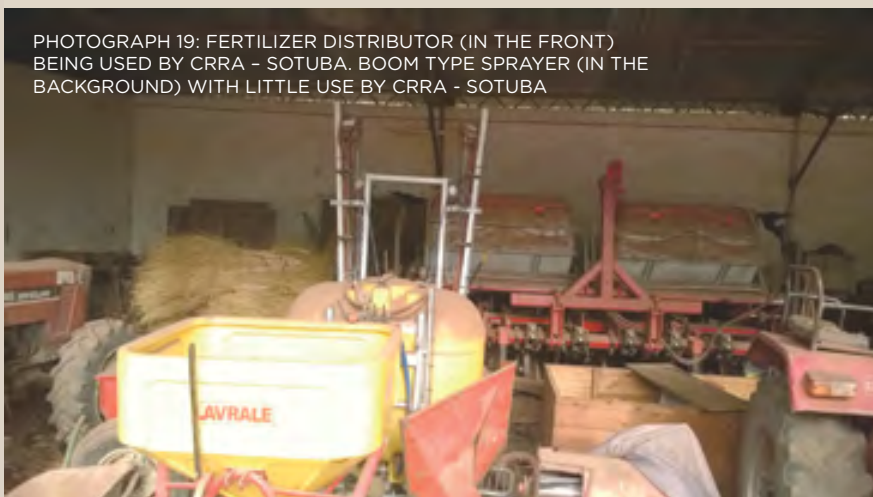
PHOTOGRAPH 17: TRACTOR BEING USED BY THE CRRA - SOTUBA



PHOTOGRAPH 18: COTTON PLANTER FOR NO-TILL, UNUSED



PHOTOGRAPH 19: FERTILIZER DISTRIBUTOR (IN THE FRONT) BEING USED BY CRRA - SOTUBA. BOOM TYPE SPRAYER (IN THE BACKGROUND) WITH LITTLE USE BY CRRA - SOTUBA



PHOTOGRAPH 20: EXPERIMENTAL FIELD IN THE CENTRE OF SARA-KO-BA, BOBO-DIOULASSOU, BURKINA FASO





PHOTOGRAPH 21: BREEDING OF ANAGASTA IN THE LABORATORY OF THE COTTON C4 CENTRE



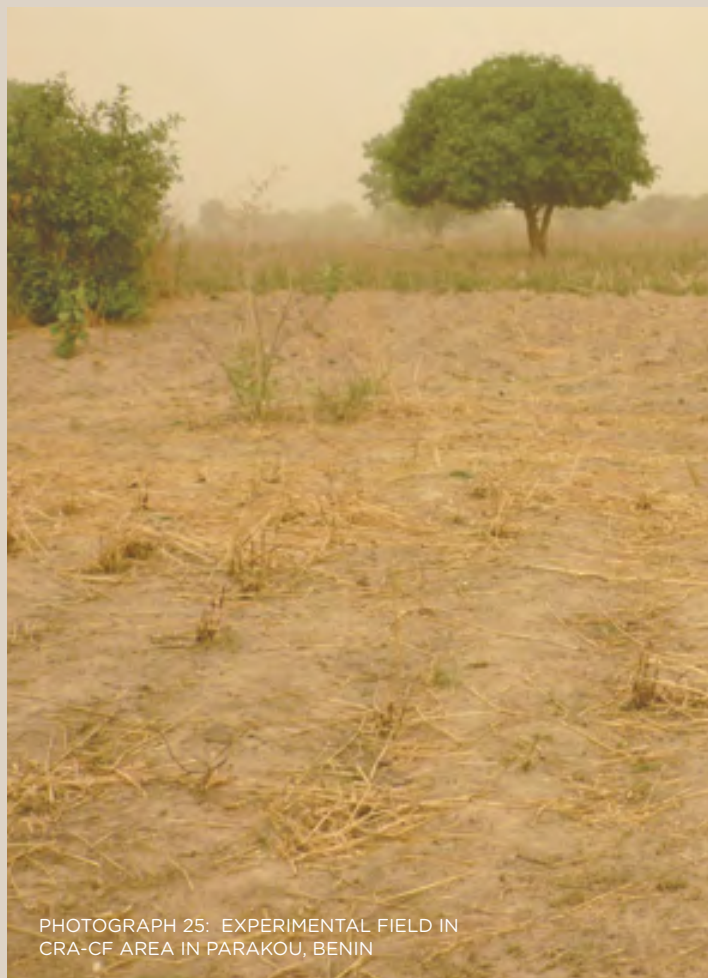
PHOTOGRAPH 22: BREEDING OF TRICHOGRAMMA IN THE COTTON C4 CENTRE



PHOTOGRAPH 23: DEMONSTRATIVE UNIT IN SANANKORUBA VILLAGE - MALI



PHOTOGRAPH 24: COTTON READY FOR TRANSPORTATION



PHOTOGRAPH 25: EXPERIMENTAL FIELD IN CRA-CF AREA IN PARAKOU, BENIN



PHOTOGRAPH 26: COLD CHAMBER - BANK OF GERMLASM IN CRA-CF HEADQUARTERS IN PARAKOU, BENIN



PHOTOGRAPH 27: GERMLASM BANK, PARAKOU, BENIN



PHOTOGRAPH 28: COLOUR GENETIC IMPROVEMENT- DETAIL OF THE COTTON FLOWER POLLINATED BY THE BRAZILIAN VARIETY, BENIN



PHOTOGRAPH 29: EXAMPLES OF FACT SHEETS FOR FARMERS PREPARED BY INRAB, BENIN



PHOTOGRAPH 30: TECHNICIANS FROM CARDER - ZOU - COLLINES IN BOHICON, BENIN



PHOTOGRAPH 31: TRUCKS LOADED WITH COTTON READY TO UNLOAD

APPENDIX 5: IMPORTANT ACTORS IN THE PARTNER COUNTRIES' COTTON SECTOR

BENIN	
COOPERATIVES	COOPERATIVES OF COTTON PRODUCER VILLAGERS (COOPÉRATIVES VILLAGEOISES DE PRODUCTEURS DE COTON – CVPC)
COUNCILS ³⁵	<p>MUNICIPAL COUNCIL (CONSEIL COMMUNAL DES PRODUCTEURS DE COTON - CCPC)</p> <p>DEPARTMENTAL COUNCILS (CONSEIL DÉPARTEMENTAL DES PRODUCTEURS DE COTON - CDPC)</p> <p>NATIONAL COUNCILS (CONSEIL NATIONAL DES PRODUCTEURS DE COTON - CNPC)</p>
ASSOCIATIONS	<p>THE INTERPROFESSIONAL COTTON ASSOCIATION (L'ASSOCIATION INTERPROFESSIONNELLE DU COTON - AIC).</p> <p>FORMED BY REPRESENTATIVES OF THE CNPC, THE GINNING INDUSTRIES AND COMPANIES OF IMPORTING AND INPUTS SALE. THE ASSOCIATION AIMS AT CREATING A DIALOGUE SPACE BETWEEN THESE ACTORS AND THE STATE; DISCUSS PRODUCT PRICE; COLLECT AND PUBLISH COTTON STATISTICS AND MEDIATE CONFLICTS BETWEEN PRODUCERS' REPRESENTATIVES AND THE INDUSTRY.</p>
SOCIETIES	NATIONAL MARKETING AND EXPORT SOCIETY FROM BENIN (SOCIÉTÉ NACIONAL DE COMMERCIALISATION ET D'EXPORTATION DU BENIN - SONACEB), WHICH LATER BECAME NATIONAL SOCIETY FOR AGRICULTURAL PROMOTION (SOCIÉTÉ NATIONALE POUR LA PROMOTION AGRICOLE - SONAPRA)
EXTENSION	REGIONAL ACTION CENTRE FOR RURAL DEVELOPMENT (CENTRE D'ACTION REGIONAL POUR LE DEVELOPPEMENT RURAL - CARDER). THE COUNTRY IS DIVIDED BETWEEN SIX CARDER, WITH HEADQUARTERS LOCATED IN THE COUNTRY'S MAIN AGRICULTURAL CENTRES: ATLANTIQUE-LITTORAL (ABOMEY-CALAVI), MONO-COUFFO (LOKOSSA), ZOU-COLLINES (BOHICON), BORGOU-ALIBORI (PARAKOU), OUÉMÉ-PLATEAU (PORTO-NOVO) E ATACORA-DONGA (NATITINGOU)

³⁵ Source: Borgui Yerima et Fabien Affo. *Normes, institutions et configurations politiques dans les réformes des filières cotonnières en Afrique de l'Ouest*: Cas du Bénin - Analyse institutionnelle. Background Paper, Volume 1, Oct 2009

³⁵ Source: Borgui Yerima et Fabien Affo. *Normes, institutions et configurations politiques dans les réformes des filières cotonnières en Afrique de l'Ouest*: Cas du Bénin - Analyse institutionnelle - Background Paper Volume 1, Oct 2009

MALI	
COOPERATIVES	NATIONAL UNION OF COTTON PRODUCERS' COOPERATIVE SOCIETIES (UNION NATIONALE DES SOCIÉTÉS COOPÉRATIVES DES PRODUCTEURS DE COTON - UN-SCPC) ³⁶
ASSOCIATIONS	ASSOCIATION OF PROFESSIONAL PEASANT ORGANISATIONS OF MALI (ASSOCIATION DES ORGANISATIONS PROFESSIONNELLES PAYSANNES DU MALI - AOPP) GROUP OF COTTON UNIONS OF MALI (GROUPEMENT DES SYNDICATS DE COTONNIERS ET VIVRIERS DU MALI - GSCVM)
ASSEMBLIES	PERMANENT ASSEMBLY OF AGRICULTURE CHAMBERS OF MALI (ASSEMBLÉE PERMANENTE DES CHAMBRES D'AGRICULTURES DU MALI - APCAM)
COMMISSIONS	NATIONAL COMMISSION OF THE USERS OF RESEARCH RESULTS (COMMISSION NATIONALE DES UTILIZATEURS DES RESULTATS DE LA RECHERCHE - CNU)
COMPANIES	MALIAN COMPANY FOR TEXTILE DEVELOPMENT (COMPAGNIE MALIENNE POUR LE DÉVELOPPEMENT DU TEXTILE - CMDT): STATE OWNED COMPANY IN CHARGE OF THE PRODUCTION AND MARKETING, AS WELL AS EXTENSION
OTHERS	OFFICE OF THE UPPER NIGER VALLEY (OFFICE DE LA HAUTE VALLÉE DU NIGER - OHVN). THIS ORGANIZATION WORKS IN THE BAMAKO DISTRICT AND THE REGIONS AROUND THE NIGER RIVER. IT AIMS AT TAKING PRODUCERS' DEMANDS TO RESEARCH CENTRES AND DISSEMINATING INNOVATIONS TO PRODUCERS

BURQUINA FASO	
UNIONS	NATIONAL COTTON PRODUCERS' UNION OF BURQUINA (UNION NATIONALE DE PRODUCTEURS DE COTON DU BURQUINA - UNPCB). COMPOSED OF LOCAL PRODUCERS TO IMPROVE ACCESS TO INPUTS. THESE GROUPS ARE UNDER REGIONAL ASSOCIATIONS, WHICH FORM THE NATIONAL UNION
COMPANIES	BURQUINABÈ TEXTILE FIBRE COMPANY (SOCIÉTÉ BURQUINABÈ DES FIBRES TEXTILES - SOFITEX), PROVIDES INPUTS, BUYS THE PRODUCTS AND PROVIDES TECHNICAL ASSISTANCE IN THE WESTERN REGION FASO COTON, PROVIDES INPUTS, BUYS THE PRODUCTS AND PROVIDES TECHNICAL ASSISTANCE IN THE CENTRAL AREA SOCOMA, PROVIDES INPUTS, BUYS THE PRODUCTS AND PROVIDES TECHNICAL ASSISTANCE IN THE EAST REGION OF THE COUNTRY

³⁶ Source: BÉLIÈRES, Jean-François et al. Available at <http://economierurale.revues.org/498>. Accessed on 15th March 2015.

OTHERS

INTERNATIONAL
ORGANIZATIONS

SEMI-ARID FOOD GRAIN RESEARCH AND DEVELOPMENT
(SAFGRAD), AFRICAN UNION

ECONOMIC COMMUNITY OF WEST AFRICAN STATES (ECOWAS)

INTERNATIONAL
PROJECTS

PASÉ1 E PASÉ2, FRENCH COOPERATION

APAM, WORLD BANK

PROGRAME RÉGIONAL DE PROTECTION INTEGRÉ DE
COTONNIER EM AFRIQUE (PRPICA)

SIPROBIO, EUROPEAN UNION AND SUISSE COOPERATION

TCHAD

SOCIETIES

CHAD'S COTTON SOCIETY (SOCIÉTÉ COTONNIERE DU TCHAD - COTON
TCHAD): JOINT STOCK COMPANY WHICH HAS THE COMPAGNIE
FRANÇAISE POUR LE DÉVELOPPEMENT DES TEXTILES (CFDT) AS A
SHAREHOLDER

