Annex

Joint Terminal Evaluation Report

For

the Project for Improving Research and Technology Transfer Capacity for

Nacala Corridor Agriculture Development, Mozambique

December, 2015

Joint Terminal Evaluation Mission

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Abbreviations

ABC	Brazilian Cooperation Agency
C/P	Counterpart
CZnd	Northeast Zonal Center (Nampula)
CZno	Northwest Zonal Center (Lichinga)
DAC	Development Assistance Committee
DPASA	Provincial Directorate of Agriculture
EAL	Lichinga Agriculture Station
EMBRAPA	Brazilian Agricultural Research Corporation
IAMRAP	Internal Annual Meeting on Research Achievements and Planning
IIAM	Institute of Agricultural Research of Mozambique
JCC	Joint Coordinating Committee
JICA	Japan International Cooperation Agency
JTC	Joint Technical Committee
M/M	Minutes of Meeting
MASA	Ministry of Agriculture and Food Security
MTR	Mid-Term Review
ODA	Official Development Assistance
OJT	On the Job Training
OLM	Output Leader Meeting
PAN	Nampula Agricultural Station
PDM	Project Design Matrix
PEDSA	Strategic Plan for Development of Agricultural Sector
PIAIT	Platform for Agricultural Research and Technological Innovation in Mozambique
ProSAVANA-PEM	Project for Establishment of Development Model at Communities' Level
ProSAVANA-PD	Support of Agricultural Development Master Plan for the Nacala Corridor
ProSAVANA-PI	Project for Improving Research and Technology Transfer Capacity for Nacala Corridor Agriculture Development, Mozambique
PO	Plan of Operation
R/D	Record of Discussions
TCM	Technical Coordination Meeting

Chapter 1 Outline of the Evaluation

1.1 Background of the Terminal Evaluation

Institute of Agricultural Research of Mozambique (IIAM) under Ministry of Agriculture and Food Security (MASA) has been established so as to introduce, develop and disseminate improved agricultural technologies.

The Triangular Cooperation Program for Agricultural Development of the African Tropical Savannah in Mozambique (ProSAVANA), implemented by the Government of Mozambique with support from the Governments of Japan and Brazil and Mozambique, was conceived as a Programme for agricultural and rural development in the region of the Nacala Corridor, in Mozambique, aiming to improve the livelihood of inhabitants of Nacala Corridor through inclusive and sustainable agricultural and regional development.

From September, 2009 to March, 2010, the preparatory survey on ProSAVANA has taken place to collect local information and also to prospect the future cooperation. Result of the preparatory survey highlighted to establish a decision-making support model for agricultural development of the Nacala Corridor, and its surrounding area for farmers to select suitable cropping system and agricultural technologies. In order to establish the model, analysis of research results and its demonstration are necessary. Thus, it is proposed to improve research capacity of two (2) agricultural research centers in Nacala Corridor and to demonstrate appropriate agricultural techniques to farmers. In order to do that Mozambique has requested to support "Project for Improving Research and Technology Transfer Capacity for Nacala Corridor Agriculture Development, Mozambique" (ProSAVANA-PI).

Considering the fact that Project is to be completed in May, 2016 after more than four (4) years since its launch in May, 2011, the Joint Terminal Evaluation (hereinafter referred to as Evaluation) conducted the review of activities and Outputs, that came up as the final stage of the Project. The Evaluation also aims to extract lessons learnt from implementing the Project up to the time of Evaluation and to make recommendations, in particular on issues to ensure continuity of the effect created by the Project, and sustainability by the Mozambican side, on the activities after the completion of the Project period.

1.2 Outline of the Project

Project Design Matrix (PDM) was revised as the 4th version with specified verifiable indicators. The 4th version of PDM was agreed with Brazilian Cooperation Agency (ABC), and approved at the

6th Joint Coordinating Committee (JCC) in August, 2015. The summary of the current Project based on the 4th version of PDM is shown as follows (See Annex 1):

Overall Goal	Appropriate agricultural technology is adopted in Nacala Corridor.
Project Purpose	Appropriate agricultural technology is developed and transferred in Nacala Corridor.
Outputs	1. Capacity of IIAM research centers in Northeast and Northwest is strengthened. 2. Natural resources and socio-economic conditions in Nacala Corridor are evaluated. 3. Soil improvement technology for Nacala Corridor is developed. 4. Appropriate cultivation technology for Nacala Corridor is developed. 5. Technology transfer activities for extension workers are implemented on newly developed/validated agricultural technologies.
Target Area	Nacala Corridor, Northern Area in Mozambique
Intended Beneficiaries	Staff of Northwest and Northeast IIAM Zonal Research Centers and farmers from pilot units and its surroundings
Project Period	5 Years: May, 2011 to May, 2016 (R/D was signed on February 22, 2011)
Responsible and Implementing Agencies	Responsible Agency: Ministry of Agriculture and Food Security (MASA) Implementing Agency: Institute of Agricultural Research of Mozambique (IIAM)

Actual schedule implemented and timing of activities carried out are shown in Plan of Operation (PO) (see Annex 2).

1.3 Objectives of the Evaluation

The Terminal Evaluation (Evaluation) has as its objectives the following:

(1) To evaluate performance, achievement and implementation process of the Project on the verifiable indicators defined in the PDM as well as other relevant information, such as quality and suitability of project design, planning, management and coordination.

(2) To evaluate the Project, according to the Organization for Economic Co-operation and Development, Development Assistance Committee (DAC-OECD) five (5) evaluation criteria (Relevance, Effectiveness, Efficiency, Impact and Sustainability), and the ABC South-South Technical Cooperation Management Handbook.

(3) To identify the promoting factors and impeding factors of achievements of the Project,

(4) To make recommendations and suggestions for further improvement of the Project in order to fulfill the required level of the targets and to secure sustainability after the termination of the Project, and

(5) To obtain lessons learned from the Project for similar projects in the future.

1.4 Members of the Evaluation Team

The Terminal Evaluation Team (hereinafter referred to as the Evaluation Team) consisted of the following members from the three (3) parties:

The Japanese side:

Position	Name	Title/ Organization
Team Leader	Mr. Yasuhiro Tojo	Executive Advisor to the Director General, Rural Development Department, JICA
Evaluation Planning	Ms. Miki Motomura	Officer, Agricultural and Rural Development Group 2, Rural Development Department, JICA
Evaluation and Analysis	Ms. Rie Kawahara	Managing Director, R-Quest Corporation

The Brazilian side:

Name	Title/ Organization
Mr. João Carlos Soub	Chancery Officer and PEM Technical Coordinator, ABC (Brazilian Cooperation Agency)
Dr. César Miranda	PI Resident Technical Coordinator in Mozambique, Embrapa (Brazilian Agricultural Research Corporation)
Dr. Celso Mutadiua	External consultant to ABC

The Mozambican side:

Name	Title/ Organization
Dr. Américo Uaciquete	Focal Point, ProSAVANA in Nampula Province

1.5 Methodology of the Evaluation

1.5.1 Methodology of the Study

Document review, questionnaires, interviews, observation through the visit of the pilot site and discussions

1.5.2 Items of the Study

Achievement and current situations of the Project activities were studied and analyzed from following points of view:

- Achievement of Inputs

- Achievement of the Project Activities
- Implementation Process of the Activities and Project management
- Achievement of the Outputs
- Achievement of the Project Purpose
- Prospect of the Achieving the Overall Goal

1.5.3 Evaluation Criteria

Following the Evaluation Grid, a comprehensive evaluation was made based on the following Five Evaluation Criteria:

Criteria	Description
Relevance	Degree of compatibility between the development assistance and priority of Policy of the target group, the recipient, and the donor.
Effectiveness	A measure of the extent to which an aid activity attains its objectives.
Efficiency	Efficiency measures the Outputs - qualitative and quantitative - in relation to the inputs. It is an economic term which aid uses the least costly resources possible in order to achieve the desired results. This generally requires comparing alternative approaches to achieving the same outputs, to see whether the most efficient process has been adopted.
Impact	The positive and negative changes produced by a development intervention, directly or indirectly, intended or unintended. This involves the main impacts and effects resulting from the activity on the local social, economic, environmental and other development indicators.
Sustainability	Sustainability is concerned with measuring whether the benefits of an activity are likely to continue after donor funding has been withdrawn. Projects need to be environmentally as well as financially sustainable.

1.6 Schedule of the Evaluation

The Evaluation was conducted from November 16 to December 4, 2015 in Mozambique. Detailed schedule is shown in Annex 3.

Chapter 2 Achievement and Implementation Process

The following shows the Project performance as to inputs, achievement and implementation process.

2.1 Records of Inputs

2.1.1 Japanese Side

(1) Dispatch of JICA Expert Team

A total of twenty one (21) experts have been dispatched, and dispatched persons month to Mozambique will be 158.98 by the end of the Project (May 2016). Assignment fields and duration of the 21 Experts are shown in Annex 4. Besides there is one (a) long-term expert employed by JICA as the Project coordinator for five (5) years.

(2) Training in Japan and the third Countries

In total, two (2) research staff participated trainings that were conducted in Japan in 2013 and 2014. List of the participants' name and designation of the trainings in Japan is listed in Annex 5.

Besides, a total of three (3) Mozambican counterparts (C/P) participated, and made presentations in international academic conferences with the fund by the Japanese side as follows:

- One (1) C/P from CZno: African Crop Science Society (Entebe, Uganda) in October 2013
- Two (2) C/P (from CZnd and CZno each): African Soil Science Society to Burkina Faso February, 2016 (planned).

(3) Other Modalities of Seminar and Training Conducted in Mozambique

In addition to the above trainings in Japan, there have been seventeen (17) other events of seminars and trainings organized by the Project from 2011 to November 2015, as details are summarized in Annex 6.

(4) Construction of Laboratories and Other Facilities at CZnd

Soil and plant analysis laboratory (area size: 522 m^2 costs to the contractor was 18,677,839 Mozambican Meticais), were constructed in July 2015 with one (1) year delay of completion. The completion ceremony was held on June 8, 2015 in advance of its completion with attendance of Mozambican President.

Main reasons of delay in completing the laboratory construction were: little attention was paid by the contractor to observe the schedule, budget management by the contractor, time consuming process on importing and transporting materials from South Africa etc..

Outlines of the laboratory's facility at CZnd are shown in Table 1 below.

Table 1: Soil and Plant Analysis Laboratory's Facility

Facility	No.	Area (m^2)
Sample Preparation Room	1	33
Chemical Analysis Room	1	48
Physical Analysis Room	1	45
Seminar Room	1	72
Office	5	132
Storage	3	56
Toilet	1	-

Besides construction of the laboratory, the following major facilities were constructed. Boreholes to supply water for the laboratory in October, 2014, costs to the contractor: 1,253,437 Meticais, soil erosion measurement facilities at CZnd and CZno one each, costs of 8,875 US Dollars, drip irrigation facilities at CZnd and PAN, and fence of three (3) meteorological stations at Nampula, Lichinga andMutuali Research Stations, total costs MZN 573,254.

(5) Local Operation Costs Borne by the Japanese Side

Up to September 2015, in total, 1,094,852 US Dollars has been borne by the Japanese side. Besides, Japanese Consultant Team had borne 192,601 US Dollars, up to June 2015, for operating and facilitating the Project. Details are shown in Annex 7.

(6) List of Equipment and Tools Provided by the Japanese Side

Equipment and tools worth 272,111 US Dollars, in total, by the end of the Project. Those provided equipment and tools in details listed in Annex 8. Among the equipment provided, five (5) items are out of services as of November 2015, as current status are also identified in Annex 9. Additional inputs of equipment after November 2015, will be two (2) items as follows:

Item	Purpose of Use	Quantity
Ventilation system for MP-AES	Soil and plant analysis	1
Hot air dry oven	Soil and plant analysis	1

Equipment and tools provided by the Japanese side were mostly for agricultural research, analysis and demonstrating as well as office equipment.

2.1.2 Brazilian Side

(1) Brazilian Experts

Forty six (46) experts, in total of 2,688 person days, were delegated from 2011 to 2015. Experts delegated include a variety of expertise: Coordinator, Agronomist, Forest engineer and, Socio-economy, Biologist, etc. (see Annex 10).

(2) Counterpart Trainings in Brazil and Mozambique

There have been three (3) times of training in Brazil for six (6) C/P in 2012 and 2013. Besides, there were training and workshops held four (4) times in 2012, and five (5) times in 2015 as shown in Annex 10.

(3) Equipment Provided

Brazilian side provided office equipment (notebook PC, telephone and printer etc) and two (2) vehicles with a total cost of 52,070.99 US Dollars. (see Annex 10)

(4) Laboratory Construction Plan (Multi-function laboratory at CZno)

It was planned to construct the multi-functional laboratory in CZno, and the construction design plan was made and submitted by the Brazilian side. However, due to ABC financial constraints, allocation of budget for construction was not realized.

(5) Local Cost borne by the Brazilian Side

Up to June 2015, ABC shared 1,239,833.10 US Dollars (see Annex 10) for project activity cost while Embrapa shared 2,150,400 US Dollars for technical hours, which is equivalent of delegation costs of experts.

2.1.3 Mozambique Side

(1) Assignment of C/P for the Japanese side

A total of thirty (30) C/Ps have been assigned to the Project. The total number of designated C/P, as of November 2015, is twenty eight (28). List of Mozambican C/P is provided in Annex 11.

(2) Assignment of C/P for the Brazilian side

In total, thirteen (13) technical personnel at each center has been designated as the Brazilian side C/P, as follows.

- CZnd: 6 personnel
- CZno: 7 personnel

(3) Cost Borne by the Mozambique side

Total invested amount, up to August 2015, is 48,968,085 Meticais at CZnd and 14,761,846 Meticais at CZno. In 2015, the Mozambican government budget to the IIAM centers increased, and consequently allocation of funds to the Project increased rapidly as compared with previous years. (see Annex 12)

(4) Project Office provided by the Mozambican side

- For the Japanese side: two (2) office rooms at CZnd and one (1) office room at CZno
- For Brazilian side: one (1) each at CZnd and CZno

IIAM has the above office spaces of the Project Experts with the costs for utilities (electricity and water) and ground telephone lines.

2.2 Achievements of Outputs

Achievements of the five (5) planned Outputs are described below.

2.2.1 Output 1

Output 1 Capacity of IIAM research centers in Northeast and Northwest is strengthened.

Output 1 is partially achieved, and considering progress of the planned activities and achievement of set indicators it may not be able fully completed by the end of the Project period, in particular on training of soil and plant analysis to research staff at CZnd.

Achievement status and current issues (if any) of Outputs based on each objectively verifiable Indicator (in total, seven (7)) is as follows:

Indicator 1-1: Experimental laboratories and research equipment are repaired, constructed and installed at IIAM CZnd (soil and plant analysis laboratory).

- Construction of the laboratory was completed in July 2015, and repair and replacement of some equipment will be finished by the end of the Project.

Indicator 1-2: Laboratory construction plan for IIAM CZno is developed.

- Partially Completed:

Indicator 1-3: Record of use and maintenance of research facilities and equipment are kept by IIAM.

- In progress and to be completed by the end of the Project.

Indicator 1-4: Meetings to evaluate experimental plans and results are taken place annually at IIAM.

- Completed:

Indicator 1-5: C/Ps' self-evaluation on research and transfer abilities shows advance as compared to baseline survey results.

- In progress, and to be completed by the end of the Project:

Indicator 1-6: Guidelines of research center management are accepted by IIAM

- In progress and to be completed by the end of the Project:

Indicator 1-7: C/Ps present on their research works regarding soil improvement technology and cultivation technology more than a total 8 times in meeting, workshop, IAMRAP, ARM, symposium between IIAM and university, conference, etc.

- Completed.
- C/P of the Japanese side presented soil improvement and cultivation technologies fourteen (14) times, in total, as summarized below.

Occasions	No
IAMRAP	8
ARM	2
PIAIT	2
Soil improvement seminar	1
Academic conference in Kenya	1
Total Number	**14**

- C/P of the Brazilian side presented at ARM times in total, as shown below.

Year	Times
2013	Nampula: 8, Lichinga: 8
2014	Nampula: 6, Lichinga: 5
2015	Lichinga:10, Nampula:17
Total Number	**54**

Capacity of IIAM research center has been, in general, raised through construction of soil and plant analysis laboratory at CZnd, and provision of equipment for the soil and plant analysis laboratory, organizing research meetings and presentation of the research paper or results by C/P during the course of the Project.

On the other hand, some of operation activities remain, therefore some of Outputs are not satisfied, such as training on soil and plant analysis laboratory testing, equipment management at CZnd, assessing what extent C/P's capacity improvement as well as finalization of management and operation guideline for both research centers. Currently, Project faces difficulties to carry out training of soil and plant analysis laboratory to research staff at CZnd by the following three (3) reasons.

- Research staff has been busy working on samples brought from outside clients.

- CZnd is accepting student interns from local agricultural university and research staffs are occupied to take care of the student groups.
- Some deficiencies of equipment at the laboratory are identified, and Japanese experts .are waiting them to be repaired and their parts to be replaced. Once they are repaired, and when the Japanese expert, who is in charge of training to research staff will be assigned, training to research staff will be resumed.

Progresses of main activities for Output 1 are summarized as follows:

(1) Construction of Laboratory

- Construction of the soil and plant analysis laboratory of CZnd was completed in July 2015, after delaying about a year (original plan was to be completed in August 2014). (Activity 1-4)
- Construction of the multi-functional laboratory at CZno, which was initially planned to be supported by the Brazilian side was not materialized, being changed to develop the laboratory construction blueprint. The drawing was submitted to the Mozambique side. (Activity 1-8).

(2) Procurement of research equipment

- Almost all research equipment for CZnd and CZno, excepting two (2) equipment that will be supplied by the end of the Project, has been provided by Japanese side in year 4. Deficiency of some equipment, such as MPAES, was found after starting test-use of them, and measures to repair or replace parts have been undertaken. (Activities 1-1, 1-2, 1-3). (see Annex 8)
- The Brazilian side also procured equipment, such as two (2) pick-up trucks, one (1) seeder attachment, and three (3) manual seeders, as listed in Annex 9. (Activity 1-3)
- Six (6) meteorological/weather stations were provided and installed at Nampula, Lichinga, Gurue, Mutuali, Namialo Research stations and Lumbi, Murrimo, Muriazi villages by the Japanese side. Fencing meteorological/weather stations were installed in 3 stations at Nampula (PAN), Lichinga (EAL) and Mutuali (PAM), and ¼ ha of drip irrigation facility at PAN was constructed for horticulture research. (Activity 1-3)

(3) Trainings for equipment and recording systems for equipment and facilities

- Recording systems (in which name of researchers, date, measurement, out of order or maintenance status shall be recorded) on pH and EC meters, and electric muffle furnace were formulated, and instructions to C/P on record keeping were provided. Appropriate systems for remaining equipment will be additionally formulated by the end of the Project. (Activities 1-3, 1-5)

- Trainings for some equipment (on weather station, data logger, soil moisture meter, water turbid-meter, use of spectrophotometer, flame spectrophotometer, and absorption atomic spectrophotometer) were carried out. Guidance to download meteorological data was provided to persons in change at each station, by Japanese experts. (Activity 1-5)

(4) Management activities on IIAM Research Centers

- Baseline survey on C/P research capacity for seventeen (17) IIAM C/Ps (of the Japanese side) was carried out in February 2013. It is planned that the final self-evaluation will be conducted by the end of 2015 in order to asses comparison in degree of capacity development of C/P. (Activities 1-5, 1-6, 1-7)
- Agricultural Research Meeting in Nacala Corridor (ARM-Nacala) has been started, and two (2) times of the meetings were held since April 2014. Concept of ARM is to disseminate the progress of agrarian research results in Nacala Corridor, and to share the experiences and strengthen partnerships among different actors in researches of the agricultural sector. ARM includes program of Field Day to observe the field trials on experimental fields by the participants. (Activity 1-6)
- As for management purpose of centers, all related documents/guidelines on management of the research centers have been compiled as a set of the guideline for operation and management of regional research centers. It is composed of five (5) items, namely General regulation for soil and plant analysis laboratory, soil and plant analysis laboratory safety use manual, Soil and plant analysis manual, Soil analysis results interpretation manual and Plant growth observation and sampling manual. The manuals will be submitted to discuss in each center by the end of 2015. (Activity1-6, 1-7)
- Eight (8) times of Internal Annual Meeting on Research Achievements and Planning (IAMRAP) were held at Lichinga and Nampula since 2012. From 2014, IAMRAP were held at each zonal center separately. (Activities 1-7)

(5) Training of Research Center Staff

- Due to the delay in completing the construction of soil and plant analysis laboratory at CZnd, most of associated trainings were also delayed. Besides delaying the construction, C/P have been rather occupied their time in test samples from outside clients, and teaching students as the CZnd has a protocol to accept the students from a local agricultural university since June/August 2015 up to the end of 2015. Therefore, timing to provide training on soil and plant analysis by Japanese experts to research staff has not fully started so far. (Activity 1-5)

Physical analysis trainings were carried out three (3) times by May, 2015, but chemical analysis training is not yet started, and will be commenced after delivering of the necessary equipment at CZnd. (Activity 1-5)

- As stated above, training of soil and plant analysis is not fully started, and will be carried out by the end of the Project. However, it is assumed that the remaining time is not enough for research staff to acquire knowledge on analysis to an appropriate level by the end of the Project period. (Activities 1-5, 1-7)
- Besides planned activities, three (3) research staff are dispatched to conferences of international academic societies to make presentations (one was already done in 2013, and two will be sent in February 2015.).

2.2.2 Output 2

Output 2 Natural resources and socio-economic conditions in Nacala Corridor are evaluated.

Output 2 are in progress, and to be completed by the end of the Project.

At the stage of planning, it was planned that analysis of natural resources and socio-economic conditions in Nacala Corridor on soil, vegetation, land use, meteorology, water resources and landscape would be mainly implemented by the Brazilian side. However, the input from the Brazilian side was not realized influenced by increasing financial constraints on ABC since 2012. Studies on soil, land use, meteorology and socio-economic aspects, which were initially planned to be carried out by the Japanese side, have been only implemented in the Project.

Achievement status and current issues (if any) of Outputs based on two (2) objectively verifiable Indicators is as follows:

Indicator 2-1: Reports and databases on natural resources evaluation in Nacala corridor (soil, vegetation, land use, meteorology, water resources and landscape) are accepted by IIAM.

- In progress, and to be completed by the Project.
- Data collection and analysis on soil, land use and meteorology have been, in progress, by the Japanese side.
- Reports and database will be completed and to be submitted to IIAM by the end of the Project. Reports and databases on vegetation, water resources and landscape were not carried out, due to cancellation of the studies by a shortage of finance of the Brazilian side.

Indicator 2-2: Reports of socio-economic assessment are accepted by IIAM

- In progress and to be completed by the end of the Project.
- Incorporation of the results in 2014/2015 season is in progress, and the final report of the socio-economic assessment will be submitted to IIAM by the end of Project.

Progresses of the planned activities are summarized as follows:

(1) Evaluation of soil and land use and meteorology

- Soil fertility analysis of about three hundred (300) samples taken from the whole Nacala Corridor area and from individual trial sites, was completed, and results will be reflected to soil improvement manual (Activity 2-1)
- Studies and results of analysis carried out by ProSAVANA-PD on land use plans and zoning results and water resources in Nacala corridor were incorporated for the PI project. (Activities 2-3, 2-4, 2-5).
- Land use plan for agricultural purpose at sites of PAN and EAL, based on characteristics of soil, topography, water accessibility etc., will be formulated, and to be submitted to each center by the end of the Project (Activities 2-5, 2-6)
- Collection and analysis of meteorological data has been in progress, and results will be compiled in the report by the end of the Project. (Activity 2-2)

(2) Socio-economic survey

- Implementation of Socio-economic survey was primarily intended for fulfill valuables and parameters for the decision support model. The socio-economic situations of 113 farmers: 24 farm households in Nampula, 24 farm households in Monapo, 22 farm households in Chimbunila, 36 farm households in Gurue and 7 households in Alto Molocue were investigated in 2012. Some C/Ps came to learn communication skills with farmers and methodologies of interview and data analysis. (Activity 2-6)
- Beside planned activities, analysis results of socio-economic survey were presented in Japanese scientific journals.

2.2.3 Output 3

Output 3 Soil improvement technology for Nacala Corridor is developed.

Output 3 is in progress, and to be completed by the end of the Project. All experiments on fertilization, soil improvement and soil conservation were completed, and data has been analyzed.

Remaining works on soil improvement are experiment data analysis and manual making based on the analysis.

Achievement status and current issues (if any) of Outputs based on an objectively verifiable Indicator is as follows:

Indicator 3-1: A soil improvement manual (including fertilization and soil conservation) is accepted by IIAM.

- In progress, and to be completed by the end of the Project:

Progresses of the main activities are depicted as follows:

(1) Development of soil improvement technology

Through implementing field trial of soil improvement, eight (8) techniques for soil improvement are identified and proved as listed in the following. (Activity 3-1). Details of explanation on the following technologies and its effects are summarized in Annex 12.

Developed Technology	Effects
Crop residue incorporation and Mulching	Increase Maize and Soy bean production twice (quantificar). Maize in PAN: 2.4t/ha→4.5t/ha Maize in Muriaze: 1t/ha→1.7t/ha Soy bean in PAN: 0.6t/ha→0.8t/ha Soybean in Muriaze: 0.3t/ha→0.45t/ha
Fertilization for Maize, Rice, Wheat, Cowpea, Common bean, Soybean Potato, Cotton	Optimal Nitrogen (N), Phosphorus (P), Kalium (K), application for each crop was determined.
Lime application for Maize and Soybean	Optimal Lime application for each crop was determined.
Chicken manure application for Maize and Soybean.	Increase P, K, Calcium (Ca) in soil. However to increase crop production, it is necessary to combine N application.
Minimum tillage	Decrease 40-91% of soil erosion Reduce production cost Increase net income 500-3000 MT/ha
Mulching with crop residue	Decrease 50-95 % of soil erosion Mitigate drought effect Increase net income 1500-4000 MT/ha
Vetiver grass hedgerow	Decrease 78-91 % of soil erosion Increase net income 0-800 MT/ha
Alley cropping with Pigeon pea	Decrease 86 % of soil erosion

(2) Trials of fertilization

- Project completed long-term trials on essential nutrients requirements in different agro-environments and experiment on optimal fertilizer dose for soybean (Mutuali, Nampula, and Lichinga) and potato (Lichinga) in Nampula, Lichinga and Mutuali in the 2nd implementation year. Results have been compiled in the report. (Activity 3-2)

(3) Development of soil conservation technology

- Trials on fields on soil conservation were completed, and results will be compiled in the report. (Activity 3-3)
- Beside planned activities, as for scientific validation of developed soil conservation technology, research papers will be presented in academic journals based on results of trials in near future. (Activities 3-1, 3-3)

(4) Soil improvement manual

- The 1st version of soil improvement manual was completed by November 2015, and validity on the 1st version of the manual contents was tested by the seminar to extension workers in November 24 and 27, 2015 at both Nampula and Lichinga before finalization of the manual. Revision of the manuals will be carried out, if necessity arises. (Activity 3-1)
- Experiments on soil improvement, soil conservation and fertilization were completed, and the data has been processed, and compiled into soil improvement manual. The final version of soil improvement manual will be completed by the end of Project, and to be submitted to both CZnd and CZno by the end of the Project. (Activities 3-1, 3-2 and 3-3)

2.2.4 Output 4

Output 4 Appropriate cultivation technology for Nacala Corridor is developed.

Output 4 is mostly achieved, and to be completed by the end of the Project. Based on the results of experiments and assessment, cultivation manual on groundnut, potato, soy beans and sorghum were already formulated, and submitted to IIAM HQ. Results of the 2014/15 season will be also compiled to the manual for elaboration. Cultivation technology manual has to be formally accepted at IIAM center level.

Achievement status and current issues (if any) of Outputs based on an objectively verifiable Indicator is as follows:

Indicator 4-1: A cultivation manual (including crops, varieties, seed production, microorganism, access to water and cropping system) is accepted by IIAM.

- In progress and to be completed by the end of the Project.

Progresses of major activities are summarized in the following.

(1) Development of appropriate cultivation systems and crop manual

- As to select appropriate crops /varieties, Project evaluated adaptability of ten (10) edible soybean cultivars (eight (8) from Brazil and two (2) from Uganda) to Nacala corridor. The Brazilian team also carried out the following field experiments to verify appropriate crop and its suitable fertilization in Murease (Nampula) and Lichinga from the 2012/2013 and 2013/2014 crop seasons: (Activity 4-1) item 1: fertilization scheme (i) Effect of Phosphorus application (Target crops: Soybean, Maize, Cotton), (ii) Effect of Nitrogen application (Target crops: Soybean, Maize, Upland rice, Cowpea, Cotton, Wheat, Common bean). (Activity 4-1); item 2: tests of varieties (same target crops of item 1); item 3: planting period of target crops; item 4: production system. Thirty essays by Embrapa researchers about the results in the field experiments were presented and shared with IIAM in Niassa, in August 2015.
- As for development of seed production systems, the activity was implemented by the Brazilian side through training courses in Brazil in management of seeds units processing, potato and vegetables seed production, wheat and soybeans seed production, cotton and groundnut seed production, fruit seed production and rice and beans seed production performed through the Agricultural Innovation Technology Platform Project, implemented by the trilateral agricultural technical cooperation among the United States of America, Brazil and Mozambique. This decision was made in order to optimize the Brazilian resources applied to the technical cooperation in agriculture with Mozambique. (Activity 4-2)
- For appropriate microorganism for crops, Project collected soybean nodules in fields and analyze molecular biological diversity. Nodules were taken from the roots of soybean plants in a total of six (6) fields of four (4) IIAM and two (2) IITA experimental stations (Activity 4-3)
- Cropping manual on groundnut, potato, soy beans and sorghum were already formulated based on the results of experiment, and submitted to IIAM two (2) years ago. Results during the 2014/15 season will be incorporated to the cultivation manual made prior.
- SFinal version of the crop manuals shall be made by the end of the Project, and it is planned that acceptance by IIAM will be made by respective center basis. (Activity 4-5).
- On-farm trials of inter-cropping system with Maize and Soybean in Nampula, Lichinga and Gurue have been continued to collect necessary data in order to reflect to the decision support model. (Activity 4-5)

- Through implementing field trial of cultivation technologies, five (5) promising techniques on cropping systems have been identified and proved as summarized listed in the following. (Activity 4-5). Details of explanation on the following technologies and its effects are summarized in Annex 12.

Developed Technology	Effects
Appropriate cultivars	Performance of several cultivars (Maize, Rice, Wheat, Cowpea, Common bean, Soybean, Potato, Cotton, and Forages) in Nacala corridor was evaluated.
Rhizobium Inoculation	Rhizobium (SEMIA 5079) significantly increased 40-50 % of soybean production.
Maize- Soybean Intercropping	Mitigate drought effect Increase 20-50 % of land equivalent ratio
Maize-Soybean crop rotation	Maize-Soybean crop rotation increased 54-59 % of crop production.
Low pressure drip irrigation	The system can supply uniform amount of water to around of 0.1 ha.

- As for scientific validation of developed cultivation technology, one (a) research paper on results of inter-cropping trials was posted in an international academic journal (Activity 4-5)

2.2.5 Output 5

Output 5 Technology transfer activities for extension workers are implemented on newly developed/validated agricultural technologies.

Output 5 is in progress, but training for extension workers to learn the concept of the decision support model and to utilize it, is not yet started. Thus, it may not be completed by the end of the Project.

Achievement status and current issues (if any) of Outputs based on three (3) objectively verifiable Indicators is as follows:

Indicator 5-1: Technology transfer activities (seminars and field days for farmers, training courses for extension workers, etc.) are held over 15 times.

- In progress, and to be completed by the end of the Project.

Indicator 5-2: A decision support model is accepted by IIAM.

- In progress, and to be completed by the end of the Project.

Indicator 5-3: Training for extension workers to use the decision support model is taken place.

- Training to extension workers on the model has not yet started, and may not be completed by the end of the Project.

According to the original plan, the Brazilian side was in charge of the majority of activities of Output 5. Due to ABC financial constraints, the activities could not be implemented, so the Japanese side took over some parts of activities in Outputs 5 in addition to the originally planned activities by the Japanese side.

Training on crop cultivation technologies, soil improvement technologies, and development and utilization of decision support model to extension workers have experienced a little late in progress. Progress of activities are summarized as follows.

(1) Organizing technology transfer activities

- Fourteen (14) times of training were carried out up to November 2015 as follows, and in total, more than fifteen (15) times of training will be held by the end of the Project.
  - 5 times of Field Days
  - 2 times of ARMs
  - 4 times of IAMRAP with extension workers
  - 1 time of soil improvement technology seminar for extension workers
  - 2 workshops for extension workers on soil improvement technology manual and cultivation manual at Nampula and Liching respectively in November 24 and 27, 2015. (The seminars in November 2015 were organized with PEM jointly). (Activities 5-1, 5-2, 5-3)
- It is planned at least two (2) times of training on the decision support model will be taken place in February 2016, to research staff and extension workers respectively.

(2) Development of decision support model, and training of the model to extension workers

- On farm trials at about 20 households around Lichinga (selected two (2) villages: Lumbi and Chiluco), and another about 20 households around Gurue (selected two (2) villages) for demonstrating intercropping system and data-collection have been carried out for two (2) cultivating cycles since 2012. (Activity 5-1)
- Two (2) types of sub-models (yield prediction, profit prediction) on the decision support model were made, and currently results/data of on farm trial and soil analysis have been incorporated into the model. (Activities 5-1, 5-3)

- Data accumulation through multi-location trials was completed. Results in the 2014/15 season shall be elaborated into the first version of model. Formulation of the first version of the model will be completed before February 2016. Having that formulated model, at first, researchers will be trained in order to make the researchers understood principles (the concepts and designs) of the model, and conditions of the models that shall be accommodated in accordance with local specific contexts. And then, extension workers will be trained on the concept of the model and how to simulate and to circulate volume of corps and profits using the model in ground in February, 2016. (Activity 5-3)
- According to the Japanese experts, understanding the model may take time for extension workers to understand the concept and simulate yield and income prediction by the software, and may be necessary to carry out further training. (Activity 5-3)

2.3 Prospect to Achieve Project Purpose

Project Purpose: Appropriate agricultural technology is developed and transferred in Nacala Corridor.

Prospect to achieve Project Purpose based on objectively verifiable indicator is evaluated as follows.

Indicator: Appropriate agricultural technologies are validated by IIAM and transferred to more than 100 extension workers.

- Two hundred eighteen (218) extension workers (gross) have attended training by the end of the November 2015, and numbers of set indicators were thus satisfied by the time of Evaluation. While the target numbers of extension workers who received training were already achieved, it is judged transferring of appropriate agricultural technology to extension workers has not been fully completed in the following reasons.
  - There are some Outputs, which has not started to implement trainings yet, such as the decision support model, and soil and plant analysis.
  - Even the trainings carried out prior, training did not cover the whole and comprehensive topics, so it is assumed that trainees were not able to gain the whole ideas of developed technology.
  - While number of the extension workers who attended the training was satisfied, there seems to be a limitation that extension workers perceive and understand well only attending one time of training.

It is therefore evaluated Project Purpose was not filled sufficiently. There are remaining tasks to enhance capacity of IIAM centers and technical personnel continuously including extension workers through disseminating agricultural technologies, in particular to Outputs 1 and 5.

Table 2: Number of Extension Workers Participated in Technology Transfer Activities

No.	Activities	Date	Location	Participants (Extension workers)
1	Field day in EAL	2014	Lichinga	-
2	Field day by Embrapa	2014	Nampula	-
3	1st ARM	23 Apr 2014	Nampula	19
4	Soil improvement seminar	14 Dec 2014	Nampula	29
5	Field day in Muriaze and Namuatho B	14 Apr 2015	Nampula	13
6	Field day in UFF	16 Apr 2015	Meconta	4
7	Field day in Lussanhando	21 Apr 2015	Lichinga	3
8	Workshop on the 2014 results and 2015 plans of soil related trials (5th IAMRAP) in Lichinga	22 Apr 2015	Lichinga	9
9	Workshop on the 2014 results and 2015 plans of crop and soil related trials (6th IAMRAP) in Lichinga	5 May 2015	Nampula	11
10	2nd ARM	25-26 Aug 2015	Lichinga	5
11	Workshop on the 2015 results and 2016 plans of crop and soil related trials (7th IAMRAP) in Lichinga	1 Oct 2015	Lichinga	7
12	Workshop on the 2015 results and 2016 plans of crop and soil related trials (8th IAMRAP) in Nampula	13 Oct 2015	Nampula	7
13	Workshops to Extension Workers on Soil Improvement and Cropping Manuals	24 Nov 2015	Nampula	71
14		27 Nov 2015	Lichinga	40
			Gross Number of Participants	**218**

2.4 Prospect to Achieve Overall Goal

Overall Goal: Appropriate agricultural technology is adopted in Nacala Corridor.

Prospect to achieve Project Purpose based on objectively verifiable indicator is evaluated as follows.

Indicator: Appropriate agricultural technologies validated by IIAM are practiced by more than XX% of farmers in the target areas.

- Numbers of the indicators was not decided/set by the end of the Project, and it is hard to predict the extent of practices by farmers

It is hard to predict the extent of practices carried out by the farmers since numerical numbers were not set clearly. However, according to estimation by the Project, it was assumed that about 10 % of farmers in Nacala Corridor could adopt appropriate technology invented by the Project in 2025, in case extension workers keep their extension works as it is practiced currently. (This estimate was made by Japanese Expert Team, with conditions of the present level of extension activities). Therefore, once understanding of extension workers on developed technologies is ensured, it may be possible to achieve Overall Goal.

As for pre-conditions for achieving Overall Goal there is a little question on validity of logic in PDM version.4. It shall be that addressing about how extension workers who receive training, understand appropriate technology developed, and if they could effectively transfer and guide their knowledge and skills to farmers in appropriate manners. **2.5 Assessment of the Implementation Process (Project Operation and MonitoringCoordination Among Three (3) Countries)**

Described below are the Evaluations made on the crosscutting project implementation process.

For the sake of implementing the Triangular Cooperation, systems for communication and decision making among stakeholders were established at multiple levels, as illustrated in the following Figure 1.

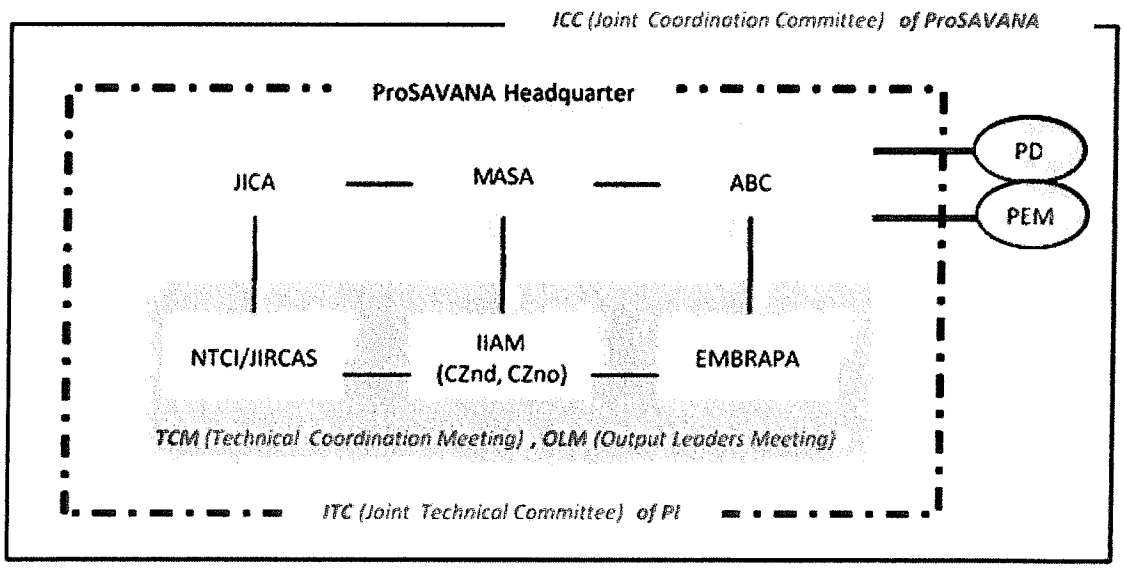


Figure 1: Organogram of the Project

The roles and what has to be decided at each committee are also summarized also as follows:

Committee	Role/Decision making
Joint Coordinating Committee (JCC)	The first JCC was held on August 29, 2011. In the occasion, JCC was designated as a decision making body of the whole ProSAVANA to discuss political matters, not the matters of the Project.
Joint Technical Committee (JTC)	Project matters like a work plan, annual achievement, etc. are discussed and approved.
Output Leader Meeting (OLM)	It was intended for output leaders from three (3) countries to discuss and plan activities of each output. Some meetings were held for some outputs but it was not functioning well due to difficulty of meeting schedule among leaders.
Technical Coordination Meeting (TCM)	It has been held to discuss and decide technical matters of PI once in 1 or 2 months among three (3) parties. It is still functioning well.

Note: Except for OLM, other committees are still functioning for smooth implementation of the Project.

Major activities and achievement through organizing the above committees are as follows:

Committee	Achievement
JCC	· According to R/D, JCC was a decision making body of PI. · But after discussion among stakeholders, JCC became a decision making body of the whole ProSAVANA to discuss political matters at the first JCC. So that some JCCs were not directly related to PI, while project matters like a work plan, annual achievement, etc. have been also reported in some other JCCs. · Six (6) times of JCCs and one (1) time of a JCC level meeting were held annually or bi-annually by November 2015. · Major agenda of each JCC were as follows: 1) 2011/8/29 (Maputo): Establishment of JCC and JTC, Approval of PI work plan 2) 2012/6/18 (Maputo): Coordination of Project activity report of PI, PD, PEM, Joint public private mission 3) 2012/12/3 (Nampula): Coordination including district level, Joint statement of mechanism and private investment, Coordination mechanism among ProSAVANA Projects 4) 2013/6/17 (Maputo):Coordination on administration unit and communication strategy plan, Progress of post graduate courses to the Mozambican professionals, Actions to enhance the Coordination of ProSAVANA, Consultation with the civil society <u>(JCC level meeting)</u> 5) 2013/11/14 (Maputo): First joint coordination committee, Activity of the ProSAVANA PI and PEM 6) 2014/4/14 (Maputo): Approval of PEM's document and PI by the Brazilian side. Monitoring meeting on ProSAVANA'S political/technical level document, Activity of Brazilian side, Monitoring meeting on ProSAVANA (political/technical level) 7) 2014/12/4 (Maputo): Activity report by ProSAVANA HQ, Discussion and approval session (PI work plan, laboratory assessment mission from Brazil, PD-draft zero approval, PEM project document 2015-2020 approval), Progress on post graduate course to the Mozambican professionals.
JTC	· Six (6) times of JTCs were held once in a half or one year. · Project matters like a work plan, annual achievement, IAMRAP, ARM, etc. are discussed and approved. · Major agenda of each JTC were as follows: 1) 2011/8/29 (Maputo): Establishment of JTC 2) 2012/2/26 (Nampula):Activity report of 2011, Approval of planned activity of 2012, confirm PDM 3) 2012/8/16 (Lichinga): Approval of PDM, Work plan for 2012/2013 4) 2013/9/10 (Nampula):Approval of work plans for 2013/2014, Activity report of 2012/2013, Introduction of the ProSAVANA-PEM, Concept note for ARM-Nacala, laboratory, Construction in Nampula and Lichinga, Explanation on Mid-term Evaluation 5) 2014/9/9 (Maputo): Activity report of 2013/2014, Approval of work plan for2014/2015. Revision of PDM, Laboratory function and maintenance in Nampula 6) 2015/8/24 (Lichinga):Activity report of 2014/2015, Revision of PDM, Work plan for 2015/2016, Process of Terminal Evaluation, Concept of the PI Wrap-up meeting, Progress of laboratory construction in Czno

OLM	· OLM for output 3 and output 4 was held during April 24 and April 26, 2013. OLM for output 2 was held during September 2 to 5, 2013. However, to hold OLM was very difficult, because the schedule to visit Mozambique for Brazilian and Japanese experts must be adjusted for every output. So in parallel with decrease of Brazilian inputs, OLM died out.
TCM	· Eighteen (18) times of TCMs were held to discuss technical matters of ProSAVANA-PI once in 1 or 2 months since December 2012 until August 2015.

2.6 Countermeasures Towards Suggestions at the Time of Mid-term Review

At the time of Mid-term Evaluation in October 2013, seven (7) suggestions were made by the Mid-term Evaluation Team. The followings are countermeasures taken by the Project to the suggestions.

1) Importance of joint work among three parties

The MTR Team had observed that the activities are conducted by the Japanese and Brazilian sides separately, and therefore, recommended to promote the activities under the joint work. The Project Team has responded to the recommendation of the MTR Report, and had implemented some experiments of fertilization and rhizobium at Embrapa's field.

The MTR Team had also recommended to formulate the joint activity plans and research plan, and implement the activities based on the plan under the joint understanding, and to implement joint monitoring and evaluation activities. However, these measures were not taken due to methodology differences in the implementation process between Japanese and Brazilian sides, and also to the uncertainty of inputs from the Brazilian side.

2) Further Communication among three parities

The MTR Team had observed that the communications at implementation level was still insufficient, and therefore, recommended to have further close and frequent communications for smooth implementation of daily activities. The Project Team has responded to the recommendation, and strengthened their communication through organizing TCM regularly. (It has been held once in 1 or 2 months to discuss and decide technical matters of the project activities.) Also, they had tried to keep the daily communication through easy communication tools (e.g. e-mail, etc.) even during the period that Japanese and Brazilian experts are not stationed in CZnd and CZno.

3) Strengthening the leadership by Mozambican C/P

The MTR Team had observed that the Japanese experts and Brazilian experts tend to take the leadership in whole process from planning, implementation and analysis to report writing, and therefore, recommended that the technical knowledge and the responsibility be gradually transferred from the Japanese and Brazilian experts to Mozambican C/P in implementing the activities. Having this recommendation, the sense of the Project ownership by the IIAM and each research centers has been increasing through the implementations of field experiments and regularized IAMRAP. Awareness of research institute management is improved by the collaboration with Japanese experts in producing of a management manual for the new soil and plant analysis laboratory.

4) Improvement of research environment

The MTR Team had observed that the necessary research equipment has not been sufficiently provided and the planned additional laboratories also have not yet been constructed, and therefore, recommended that the research environment be improved at the earliest convenience through the joint efforts by three parties. The Project Team has responded to the recommendation, and the soil and plant analysis laboratory at CZnd was constructed on June 2015, and laboratory construction design plan of CZno had been prepared. Also, most of the planned equipment was procured.

5) Contribution of the supporting partners (Japan and Brazil) in aligned with the original plan

The MTR Team had observed that the several contributions be the supporting partners are behind schedule, and therefore, recommended that the necessary contributions, which have been reached consensus among the three parties, be provided as planned without delay. The Japanese side had implemented its activities aligned with the plan, however, the Brazilian side has faced increasing financial constraints that deeply affected its contribution as it had been planned. Unfortunately this situation has become more critical in the last two years of the project implementation, influenced by the 2014 economic slowdown and 2015 economic recession in Brazil.

6) Budget by the Mozambican side

The MTR Team had observed that the financial inputs by the Mozambican side are still at low level, and therefore, recommended that the Mozambican side makes the strongest efforts to secure necessary budget.

Increasing trend of financial allocation at CZnd and CZno is observed. While there have been efforts to raise budget by the Mozambican side noticed, it is also noticed research costs are mostly

depending on donors' funds at this time. Wherever financial sources come from for research activities, securing budget adequately for research shall be a key to maintain quality of research.

It was seen increasing trend by the Mozambican side for costs of workshop, seminars and logistic arrangement for the activities.

7) Importance of the Project (ProSAVANA-PI) in the ProSAVANA

The MTR Team had reminded that ProSAVANA-PI plays very important roles in the agricultural development in Nacala Corridor, and all of those who are involved in the project activities are expected to make their continuous efforts to develop the practical and applicable agricultural techniques through daily research activities. The stakeholders are well recognizing the importance of the Project, and making their continuous efforts. Especially, the Government of Mozambique have been trying to strengthening the linkage between "Research" and "Extension" through several systems. (such as, establishment of Joint Planning Meeting, field days, technology transfer unit, and analyzing the profitability and adaptation of technology, etc.) so as to maximize the impact of the project outputs.

Chapter 3 Evaluation Criteria

The Terminal Evaluation Team conducted an assessment based on the five evaluation criteria using the following rating scales:

1) "High": results were produced far exceeding as compared with the plan.
2) "Relatively high": results were produced better than it was planned
3) "Medium": results were produced to meet the plan.
4) "Relatively low" : results were not produced enough as compared with the plan
5) "Low": results were not well attained and far lower than that of expected in the plan.

The major findings are described below.

3.1 Relevance

Relevance is high.

The Project is consistent with Mozambique's policies on development.

Strategic Plan for Agricultural Development (PEDSA) 2010-2019 formulated by MASA (October 2010) emphasizes the following five (5) strategic objectives:

1) Increase in competitiveness of agricultural production and productivity
2) Improvement of infrastructures and services for markets
3) Sustainable use of land, water, forest and wildlife resources
4) Appropriate setting of legal framework and policies conducive on agricultural investment
5) Strengthening of agricultural institutions

The Project is thus adhere to PEDSA as it is emphasizing agricultural production and productivity as well as capacity development of agricultural institutions.

The Project has been also in accordance with Japan's policies and priority on cooperating to Mozambique.

Japan's ODA Policy for Mozambique formulated in March 2013 indicates priority of cooperation on "facilitation of sustainable economic development and poverty reduction by utilizing potential of Mozambique." The policy shows

1) Vitalization of regional economy including corridor development
2) Human capacity development
3) Disaster prevention and climate change as priority areas.

The Project has been focusing on Nacala Corridor development in an attention with agricultural research capacity development at CZnd and CZno, and this aim is matching with the cooperation policy of Japan. This Project is one of three (3) projects comprising ProSAVANA, triangular cooperation programme for agricultural development of the tropical savannah in Mozambique, by Japan, Brazil and Mozambique. The Project is thus consistent with the JICA's country assistance policy for Mozambique.

The Project is consistent with Brazilian Policy/Strategy for International Technical Cooperation for Development

African Portuguese-speaking countries are priorities for the Brazilian technical cooperation, and Mozambique plays an important role in the ABC portfolio. Brazil counts on an accumulated experience in national programs in tropical agriculture, family agriculture, and food security, that led the country from a situation of food importer to become a major global food supplier in few decades. Brazilian South-South cooperation is absolutely based on technical support, horizontal approaches, ownership by the beneficiary institutions, mutual partnership and shared responsibilities. It reflects Brazilian domestic agenda of fighting hunger and poverty combining economic development and social technologies. Under PorSAVANA PI, Brazil contributes with its expertise in agricultural research and strengthens its participation in international development initiatives.

Appropriateness of Approach and Selecting Target Group

Primary beneficiaries of the Project are the research staff of CZnd and CZno. IIAM is the largest research institute of agriculture in Mozambique, and its zonal centers play hub roles for research institutes in the region. IIAM is also responsible for technical transfer of their research results towards agricultural extension workers. Considering the responsibilities of IIAM zonal centers, target selection of CZnd and CZno was assessed appropriate for development of agricultural potentials of Nacala Corridor.

At both center, including those of their branch stations were poorly equipped, as the ability of researchers neither sufficient to ensure quality of research results. Introduction of appropriate agricultural techniques for the area was not fully implemented, and as a result, an agricultural potential endowed in the area had not been fully developed. Since the Project aims to improve facilities/equipment and institutional capacity of centers through experiment and development of cultivation technology, soil improvement technology and training to research staff and extension workers so on, it is assessed the Project has been highly responding to the needs of the beneficiaries.

Agricultural sector of Mozambique accounts for 27% of the GNP, and 10% of the total export amount. Approximately 80% of the workforces of the country engage in agriculture. However, with about 36.0 million hectares of arable land, only 5.7 million hectares are exploited by approximately 3.34 million small and medium-sized farms with approximately 1.5 hectares size, with basic food crops and small livestock. While in the area of Nacala Corridor in the north of the country agricultural potential is promised high, level of the production has not been high since traditional and conventional cultivation techniques largely prevail among farmers there, and research capacity of IIAM has been also rather limited. By introducing appropriate agricultural technique through development of technologies on cultivation and soil improvement, the surrounding area of Nacala Corridor is expected to raise agricultural productivity as well as livelihood of the people. The Project is for development and introduction of improved techniques, therefore the Project has been in line with the needs of the target area.

Project Design and Approaches

In general, it is assessed that Project design and approach were generally relevant. However the Project sets the final purpose as adoption and transferring developed technology through extension, there has been some difficulties experienced to accommodate some research oriented activities, such as developing and introducing the decision support model. Ideally, demonstrating research results to bridge extension works, is one of the major functions, and roles of IIAM zonal centers to fulfill. Before starting the Project there were many factors and data, which need to be collected for creating the decision support model, but there were not been clearly identified. Therefore it has been taking rather longer time to collect and analyze some information to create the model in accordance to the contexts of locality.

Selecting target groups was assessed valid as stated prior, but approach towards raising institutional capacity building as whole, not personal capacity of research staff, seems to be challenging during the course of the Project. In the nature of the Mozambican institution, once responsible person left the office, it is not easy to keep and remain institutional memory, and what has been accumulated by the Project is easily faded out. Therefore, it could be said that the Project should have, and could have tried to more focus on approach emphasizing on "institutional capacity building," or "team work" that could be mobilizing human resources and duties of personnel better.

As for change of the Project plan (PDM), it was attempted to accommodate the plan in the occasion of, and after the MTR, along with possible Inputs both the Japanese and Brazilian sides.

Japan's Comparative Advantage of Technology and Knowledge

During the last 4 years, knowledge in terms of soil improvement/conservation and cultivation technologies in Japan and Brazil have been utilized for various experiments for Output 3 and 4 in the Project. As for selecting equipment in the laboratory, technical knowledge in those fields accumulated in Japan has been applied. The Decision Support Model consists of two (2) sub-systems, namely the production forecast system and the liner planning system, to predict farmer's profit through agricultural production, and the liner planning system adopting a model developed in Japan.

Brazil's Comparative Advantage of Technology and Knowledge

Embrapa is a world-class reference in tropical agriculture and it dispatched high qualified experts of its own staff to be part in the Project. These experts have carried out training courses and experiments in the field, and supported IIAM staff and local smallholder farmers with the accumulated Brazilian experience in a wide array of crops, such as corn, wheat, bean, cotton, rice and soy. Two Embrapa's researchers were residents in Nampula, working full time at the IIAM station. Despites the unpredicted financial constraints that affected Brazilian inputs during the Project implementation, Brazilian knowledge and technology in tropical agricultural have proved to be the most valuable asset and the most effective tool of the Brazilian cooperation.

3.2 Effectiveness

Effectiveness is relatively high.

Achievement of Project Purpose

It is observed that Project Purpose has filled as long as number of trained extension workers is two hundred eighteen (218) (gross) so far during the course of the Project, is considered. However, as it is pointed out earlier, technical transfer of agricultural technology to extension workers have not fully satisfied, since a limitation that extension workers to perceive and understand is observed, and there are some Outputs which have not started training or not completing the training fully.

Activities to satisfy most of Project Outputs are progressing towards achievement, and Outputs 2, 3 and 4 would be attained by the end of the Project. However, it is observed that achievement of Outputs 1 and 5 may need more time beyond the end of the Project period (May 2016).

Relations between Outputs and Project Purpose

Logical structure from Outputs to Project Purpose is reasonable.

External Conditions

Important Assumptions for the process to connect Project Outputs to Project Purpose (1. Equipment conditions of the research centers do not get worse, 2. Large-scale weather disaster or abnormal climate does not occur) are still reasonable. But, in fact, as explained prior, starting of use for supplied equipment at the laboratory was rather late and it started in May 2015, therefore deterioration of equipment has not been found in a short time.

3.3 Efficiency

Efficiency is assessed medium.

Achievement of Outputs

As explained before, some Outputs are satisfied while achievement levels of some Outputs are not fully satisfied yet, at the time of Evaluation. Main reasons why efficiency was not fully high as compared with the plan, was delays in construction of soil and plant analysis laboratory, and changes of planned inputs by the Brazilian side while some adjustment of the activity plans were made at the time and after the Mid-term review.

In general, most Outputs have been in progress while there are still remaining activities, such as training to researchers on soil and plant analysis, training to extension workers, and finalization of the decision support model. Output 1 requires evaluation of C/P's capacity improvement and compilation of the management guideline of research centers. Output 2, 3 and 4 require consolidation of all the experimental results into reports, manuals, guidelines as deliverables, with experimental results of 2014/2015 crop seasons. Output 5 requires technology transfer activities to both researchers and extension workers by using technical outputs including the Decision Support Model.

Having completed the laboratory facility and equipment provided at CZnd it is highly prospected implementing research and analysis activities would be more efficient and effective as long as they will be utilized in appropriate manners, and research staffs will demonstrate enough capacity of knowledge and skills for experiments at the laboratory.

Logical linkage between Activities and Outputs

Logical relationships between Activities and Outputs are observed appropriate in general.

Cost for Outputs (Cost efficiency)

Influenced by one (1) year delay in completing construction of the laboratory, equipment for the laboratory had not been utilized by May 2015, and this made efficiency of the Project is not high as compared with the initial plan.

Financial input by the Mozambican side was low, in particular at the beginning of the Project, although there has been gradual increasing trend is seen. Number of technical staff (C/P) assigned to the Project were, in general, appropriate while allocating their time to Project activities, in particular, to training of soil and plant analysis, as observed in status of a little late progress, have been not in good timing.

As for inputs of the Brazilian side, it is observed most technical experts were highly qualified and with high levels of knowledge with tropical agriculture while their assignment periods were in general rather in short, as two (2) weeks excepting for resident coordinators. Financial input for operation by the Brazilian side was unfortunately not enough due to the ABC's financial constraints after 2012 , in particular after the MTR.

3.4 Impact (prospect)

Impact is prospected relatively high.

Prospect to achieve Overall Goal

Once conditions are satisfied it is expected that Overall Goal may be achieved. For example, conditions for adoptions of developed agricultural technology are met, and resources to facilitate extension works, such as transport, and political supports from MASA to promote extension works are ensured, prospect for impact will be higher. Developed technology which will be compiled in the manuals, and management guidelines of the IIAM centers, shall also be accredited by IIAM and MASAto promote further.

In the same way, once the manuals and guidelines developed through the Project will be validated and endorsed by IIAM to utilize as regional guidelines or possibly national guidelines for technology development and application for agricultural development, impact of the Project outcomes in future is predicted rather high.

Indicator of the Overall Goal was changed to "Appropriate agricultural technologies validated by IIAM are practiced by more than XX% of farmers in the target areas" since PDM version 3, which was suggested during the Mid-term evaluation. However, this change was unfortunately not

sufficiently shared and discussed among stakeholders, so the numerical target has not been even set since then.

External Condition to Overall Goal

It was found a little missing link on logic between the existing external conditions towards Overall Goal. In order to evaluate degree or success about adopting developed agricultural technology through the Project, setting an indicator to address effects of extension works was suitable rather assessing connections of activities with other existing project in Nacala corridor.

Influence on Environmental and Social Aspects

Neither positive nor negative impacts have been observed so far in terms of environmental and social aspects.

3.5 Sustainability (Prospect)Sustainability is prospected relatively high.

Policy Aspect

Agricultural development is still very important for Mozambique and also for Nacala Corridor even after the Project, because about 80 % of people depends on agriculture. PEDSA (2011- 2020), the strategic document for agricultural development in Mozambique, aims sustainable agricultural development and ProSAVANA program is implemented under triangular cooperation. Therefore political support for agricultural development in the area will be expected.

Institutional/ Financial Aspect

IIAM is a key organization with mandate to carry out agriculture research and field trials which contribute agricultural development and bridging between research and extension, and this duty will not change after the Project.

As stated prior, the Project mainly aims to raise and consolidate capacity of the target IIAM centers as institution, not only personal development of research staff. It was a challenge to envisage "team work" or "supplemental ways of working among colleagues", since command and chains of works at IIAM centers is observed not the ways promoting team works much albeit limitations on numbers of technical personnel and others resources available are observed at the IIAM centers and stations. In order to facilitate "institutional capacity building", as suggested prior, some innovative changes of ways that IIAM centers are mobilizing human resources and duties of personnel shall be

taken into account. Improving internal connections among specialists to increase research quality within the IIAM centers shall be considered.

In similar ways, it was not clear if IIAM has pre-existing internal technical transfer systems, such as OJT or TOT in order to maintain quality of works with standards, and to consolidate capacity of technical human resources available among research and technical staff. To maintain standards of technical capacity enhanced through the Project experience and practices, formulation of internal technical transfer systems, like OJT or TOT, shall be considered at the IIAM centers.

It was observed the cost sharing by CZnd and CZno has gradually increased as mutual consultations and discussions taken places during the course of the Project as the amount of activity costs shouldered in Fiscal Year 2015 raised after allocation of Mozambican government budget to IIAM centers increased. Seeing that, financial sustainability is judged relatively high, at the time of Evaluation. On the other hand, there is a concern that research costs at the IIAM centers largely depend on donors' capital currently, and the government budget shares mainly for operation and maintenance costs. Another issue is about numbers of clients (samples) for the laboratory. Present numbers of sample tested are not much, as most of them are taken from the IIAM stations. A strategy shall be created by IIAM in order to ensure sustainability of the laboratory. By doing so, impact through enhanced functions and capacity of the laboratory and equipment, with trained researchers, could be demonstrated better in near future. This is also related to technical sustainability of research staff since dealing larger numbers of samples make the researchers to accumulate experiences and to create environment for pursuing quality of results.

After the Project, without the support of operation costs for activities shouldered by both the Brazilian and the Japanese sides during the Project, to ensure the cost on carrying out researches and trials, and to maintain equipment are critical questions. It is highly expected IIAM will ensure allocation of budget on research activities as well as operation costs in sufficient ways, to keep quality of researches and trials.

Technical Aspect

Technical knowledge and capacity on field trials by C/P has been developed and could be maintained by themselves while capability on ensuring quality of soil and plant testing results by C/P are not yet confident levels. Therefore, training to raise quality of soil and plant analysis will be one of the priority remaining activities to be continued up to the end of the Project

In case developed technology is accepted and utilized as well as using guidelines and manuals made by the Project by the Mozambique side, it is anticipated technical sustainability is ensured in a certain level.

Approaches and Methodologies of Technical Transfer

Because of delay in completing the soil and plant analysis laboratory, some equipment has not been started to be used. Their actual use started May 2015, in parallel with their installation and starting of operation of tests in the new laboratory.

After starting test use of them, defects in some equipment were identified, so the Japanese Expert Team and CZnd have been trying to fix them currently. In this way, use of equipment supplied is not yet much as it was planned. Maintenance and recording system of the laboratory facility and equipment has not completed, and to be finalized by the end of the Project period.

Most technologies developed during the course of the Project through cultivation and soil improvement trials are highly promising to be applied to areas of Nacala Corridor but some technologies can be applied in other regions possibly, because they have been already verified scientifically. However, attentions should be further paid for natural conditions of the local contexts, like precipitation, temperature, soil character, plant population, etc. when they are applied.

Most C/Ps have had some opportunities to provide presentations to the public and extension officers, so it is proved that their technical capacity and skills to transfer learned technologies and knowledge to extended beneficiaries is gradually raised. Project also contributed towards progressive requirement of research personnel as it is observed some researchers are pursing further studies after experiencing of field trials and presentation.

Social, Cultural, and Environmental Aspects

Technologies generated in the Project, are not expected to have negative impacts, in particular for farmers who are the end target beneficiaries. Some technologies, soil conservation and improvement, appropriate fertilization, soil analysis, etc. were developed to prevent negative impacts to the environment, so their use contributes to improvement of environment.

3.6 Conclusion

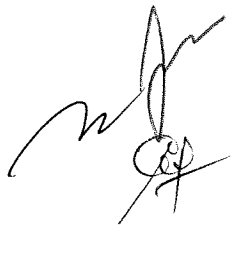
Status and prospects of achieving the Project Purpose by the end of Project period is relatively high. In fact current trend shows IIAM and MASA increase annual budget for research and technology transfer. At the same time, there is a little uncertainty remains about in what way outcomes and deliverables of the Project, such as manual and guidelines, in which process of field trials, developed technologies and appropriate use of the laboratory and equipment etc., are compiled, will be endorsed and utilized.

Among the five (5) evaluation criteria, relevance of the Project is high. It conforms to Mozambican policies and needs, and Japanese and Brazilian cooperation policies. Effectiveness is relatively high as most parts of Project Outputs will be achieved by the end of the Project as it is in progress. Efficiency is medium since completing construction of soil and plant analysis laboratory at CZnd was delayed for a year, and affected to training of Mozambican researchers on the soil and plant analysis. Besides, financial constraints of the Brazilian side made it not possible to supply all inputs to the Project as it was planned. This also influenced achievement of Outputs and progress of the Project as contrary to the original plan. Efficiency is assessed medium because some Outputs were not fully attained by the time of Evaluation, and required time for remaining activities for Outputs 1 and 5 will be beyond the Project period. Impact is predicted relatively high. While it is not able to predict in accurate manners because numerical numbers for Overall Goal was not set, and adoption of developed technology by the farmers may be possible once conditions for adopting developed agricultural technology, such as penetration of technology through extension works will be ensured.

As for sustainability in terms of financial aspects of the Mozambican side, it is noted that increasing trends of budget allocation on operation activities at CZnd and CNno is observed. However, there is a still concern how IIAM centers secure budget, which is specifically for research purpose, and to sustain laboratory in terms of adequate frequency in usage by increasing number of clients (samples to be tested). As stated prior, a strategy for maximizing utilization, and ensuring quality of test results of the laboratory shall be determined clearly by the IIAM centers.

Ensuring ways of maintaining and raising technical capacity of research staff further by IIAM as institution also need to be clarified in details, and consolidated within the target two (2) IIAM centers, possibly with a support of MASA.

The evaluation team confirmed that the project has generate a great change in the agricultural technology in Nacala Corridor, through strengthening the capacity of research centers (in the aspects of human resource, facility, equipment), evaluating the natural resources and



socio-economic condition, developing the appropriate technology on soil improvement and cultivation, and transferring it into the field.
There are, in general, high evaluation towards the activities and outputs of the project. However, to evaluate the project achievement in terms of capacity of soil and plant analysis, and ability to utilize the decision support model, it is evaluated that it cannot be achieved to the target level during the remaining project term.

The Parties recognized the necessity for the project extension for another one and a half year, so as to complete the remaining activities under the outputs 1 and 5. The extension period is to cover additional 2 crop seasons, which is to continue the trainings on soil and plant analysis, data accumulation through trial fields to create decision support model, and to implement the training of the decision support model.

Nevertheless, for the implementation of the activities under responsibility of the Brazilian side with regard to the Outputs 1 and 5, new arrangements will be needed in order to guarantee the necessary resources (financial and non-financial). Considering that neither ABC nor Embrapa have staff in Mozambique, the implementation of these activities and dispatch of technical missions would need support and even financial inputs from the Mozambican and Japanese sides. In this regard, the Brazilian side should rearrange its intervention based on a revision of the original Project Document in order to establish a new intervention that is according to the current ABC budgetary scenario.

4. Recommendations

4.1 Recommended Actions to be taken by the Project in the Remaining Cooperation Period

Based on the conclusion above, the evaluation team recommends the below items:

4.1.1 Continuation of the Project Activities

- It is necessary to continue the trainings of soil and plant analysis (includes the appropriate utilization of the equipment), so as to complete the activities under the output 1.
- It is necessary to prepare strategy plan for sustainable management of soil and plant analysis laboratory
- It is necessary continue the data accumulation through trials and to elaborate the validity of decision support model, and to conduct the training for extension workers to utilize the decision support model, so as to complete the activities under the output 5.
- It is necessary to continue the technology transfer activities, so as to achieve the project goal.

4.1.2 Strengthen the communication among stakeholders

- It is necessary that the communication among stakeholders (Project, researchers, extension workers, and farmers) shall be strengthened, and the research process and result shall be shared with the stakeholders in appropriate timing.
- Also it is necessary that each process (planning, implementation and analysis to report writing etc.) shall be taken having the involvement of every stakeholder to create consensus of the activities, and to improve Mozambican C/P's capacity and their sustainability.

4.1.3 Enhance the exploitation of the research outputs

- It is necessary to promote and advertise the research outputs, since the appropriate agricultural technologies shows its impact when it is disseminated and utilized in the field.
- It is strongly recommended to develop the technical information materials, which can be easily understood and utilized by the end users (extension workers and farmers, etc.), and also to promote through field demonstration and public relation activities (through radio, website, television, etc.)

4.1.4 Institutionalize the project implementation process/ outputs

- It is observed that Internal Annual Meeting on Research Achievements and Planning (IAMRAP) and Agricultural Research Meeting on Nacala Corridor (ARM) showed a great effect to disseminate the agricultural research result among the stakeholders, and to share experience, create relationship, and to improve each research activities. For this end, it is advisable to continue IAMRAP, ARM and state as institutional activities.
- Also it is important that the manuals produced by the project shall be endorsed as "IIAM manual" and utilized in every research center/ branch stations and on extension activities.

4.1.5 Strengthen the linkage between "Research" and "Extension"

- Project is responsible for the development of the appropriate agricultural techniques to be extended to and applied by local farmers in Nacala Corridor in the near future. Without appropriate technology transfer process, the livelihood of local farmers will not change. Also it is important that the appropriate technology which is generated shall be disseminated, utilized and adapted by the farmers. At the same time, the feedbacks from the farmers have to be utilized to improve the quality of the agricultural technology.
- For this purpose, the Government of Mozambique has been trying to strengthening the linkage between "Research" and "Extension" through several systems. (Establishment of Joint Planning Meeting, field days, technology transfer unit, and analyzing the profitability and adaptation of technology, etc.)

- It is necessary that these efforts shall be sustained and to strengthen the linkage to maximize the effects of research activities, so as to achieve the aim of research, i.e. to improve the livelihood of local farmers.
- Also, since ProSAVANA-PI is one of three on-going projects under ProSAVANA, it is necessary to have further collaboration between ProSAVANA-PEM, for dissemination and adaptation of appropriate technology by extension workers and farmers.

4.2 Recommended Actions to be taken by the Mozambique Side

- It is necessary that Mozambique side to assign necessary staff in the IIAM research centers (CZnd and CZno) so as to create the necessary environment for the staff to receive necessary training, technology transfer from Japanese and Brazilian Side.
- It is necessary that Mozambique side shall transfer or share their knowledge properly, when there will be a replacement of the staff.
- It is necessary that Mozambique side to take necessary action to secure necessary budget and human resources to sustain the project activities.

4.3 Recommended Actions to be taken by the Brazilian Side

- It is necessary that the Brazilian side calculate its own conditions to implement the remaining activities up to 2017 and decide on its further involvement to accomplish the implementation of the activities not implemented under the Project Agreement by the time of the next JCC.

4.4 Recommended Actions to be taken by the Japanese Side

- It is necessary that the Japanese side shall consider to dispatch the experts in consistent manner for effective technology transfer.

Annex 1 Project Design Matrix (PDM) Version 4

Project Title: Project for Improving Research and Technology Transfer Capacity for Nacala Corridor Agriculture Development, Mozambique
Version: 4
Date : 2015/08/24
Target Area: Nacala Corridor, Northern Area in Mozambique
Target Group: The staff of Northeast and Northwest IIAM Zonal Research Centers and Farmers from pilot units and its surroundings
Duration: 2011.4 - 2016.4

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal Appropriate agricultural technology is adopted in Nacala Corridor.	- Appropriate agricultural technologies validated by IIAM are practiced by more than XX% of farmers in the target areas.	Survey	
Project Purpose Appropriate agricultural technology is developed and transferred in Nacala Corridor.	- Appropriate agricultural technologies are validated by IIAM and transferred to more than 100 extension workers	Final Report of the Project	Relevant projects in Nacala Corridor are implemented and managed on schedule.
Outputs 1. Capacity of IIAM research centers in Northeast and Northwest is strengthened.	- Experimental laboratory and research equipment are repaired, constructed and installed at IIAM CZnd (soil and plant analysis laboratory). - Laboratory construction plan for IIAM CZno is developed. - Record of use and maintenance of research facilities and equipment are kept by IIAM. - Meetings to evaluate experimental plans and results are taken place annually at IIAM. - C/Ps' self-evaluation survey on research and transfer abilities shows advance as compared to baseline survey results. - Guidelines of research center management are accepted by IIAM. - C/Ps present on their research work regarding soil improvement technology and cultivation technology more than a total of-8 times in meetings, seminars, workshops, Annual Meeting on Research Achievements and Planning (IAMRAP), Agriculture Research Meeting – Nacala, symposium between IIAM and university, conference, etc.	- Constructed or repaired laboratory and equipment (and its list) - Progress Reports of the Project - Progress Reports of the Project - Progress Reports of the Project and C/Ps' self-evaluation survey results - Guidelines of research center management - Presentation, records of meetings, seminars, workshops, IAMRAP, Agriculture Research Meeting – Nacala, symposium between IIAM and university, conference, etc.	* Equipment conditions of the research centers do not get worse. * Large-scale weather disaster or abnormal climate does not occur.
2. Natural resources and socio-economic conditions in Nacala Corridor are evaluated.	- Reports and databases on natural resources evaluation in Nacala corridor (soil, vegetation, land use, meteorology, water resources and landscape) are accepted by IIAM. - Reports of socio-economic assessment are accepted by IIAM.	- Reports and databases on natural resources evaluation - Report of socio-economic	
3. Soil improvement technology for Nacala Corridor is developed.	- A soil improvement manual (including fertilization and soil conservation) is accepted by IIAM.	- Soil improvement manual	

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
4. Appropriate cultivation technology for Nacala Corridor is developed.	- A cultivation manual (including crops, varieties, seed production, microorganism, access to water and cropping system) ~~is and a decision support model are~~ accepted by IIAM.	- Cultivation manual	
5. Technology transfer activities for extension workers are implemented on newly developed/validated agricultural technologies	- Technology transfer activities (seminars, field days, training courses, etc.) are held over 15 times. - A decision support model is accepted by IIAM. - Training for extension workers to use the decision support model is taken place.	- Progress Reports of the Project - Progress Reports of the Project - Decision support model (first version) - Final Report of the Project	

Activities

1-1. To make installation / equipment inventory.
1-2. To repair existent installation / equipment.
1-3. To provide new research equipment.
1-4. To construct experimental laboratory in Nampula
1-5. To train research center staff for usage and maintenance of facilities and equipment.
1-6. To advise IIAM Research Centers on management.
1-7. To Increase research capacity of CPs and relevant researchers
1-8. To develop laboratory construction plan for IIAM CZno

2-1. To evaluate soil and vegetation.
2-2. To collect and analyze meteorological data.
2-3. To collect and analyze water resources data.
2-4. To collect and analyze landscape data.
2-5. To suggest appropriate land use plan for agricultural purpose.
2-6. To survey socio-economic conditions.

3-1. To develop soil improvement technology.
3-2. To develop fertilization schemes / recommendation by crops.
3-3. To develop soil conservation technology.

4-1. To select appropriate crops / varieties.
4-2. To implement training course to develop appropriate seed production systems.
4-3. To select appropriate microorganism for leguminous and other crops.
4-4. To develop appropriate methods to enhance the access to water resources for agriculture purposes.
4-5. To develop appropriate cropping systems.

5-1. To organize technology transfer activities (seminars, field days, etc.) for extension workers.
5-2. To support ProSAVANA-PEM to organize training courses for extension workers.
5-3. To develop a Decision Support Model for farmers to select appropriate cropping system.

Inputs

Japanese party
* Long-term experts
- Chief Advisor of Japanese Team
- Liaison Officer
* Short-term experts as necessary
* Tropical agricultural technologies developed in Japan
* Vehicles
* Construction of experimental laboratory
* Installation irrigation facility in the Research Centers
* Provision of equipment
* Cost of seminars / workshops
* Trainings in Japan

Brazilian party
* Brazilian research experts
* Technical experts for the infrastructures needed
* Tropical agricultural technologies developed in Brazil
* Provision of materials for management, monitoring and evaluation assessments
* Provision of technical publications and other editions related to tropical agriculture
* Running expenses related to Brazilian experts
* Trainings of Mozambican personnel in Brazil and Mozambique.

Mozambican party
* Assignment of counterpart personnel (IIAM research centers in Northeast and Northwest)
* Provision of office space for experts
* Provision of demonstration units
* Additional personnel in IIAM research centers
* Running expenses for the Project

* Trained staff of the research centers remain working at the centers.

Pre-conditions

* Farmers nearby agree on cooperation.

Annex 1 Reference 1: PDM version 0 , as per attached to the Triangular Work Plan approved by 1st JTC meeting on August 29th 2011.

Project Title: Project for Improving Research and Technology Transfer Capacity for Nacala Corridor Agriculture Development, Mozambique

Version: PDM0

Target Area: Nacala Corridor, Northern Area in Mozambique

Date : 2010/08/25

Target Group: The staff of Northeast and Northwest IIAM Zonal Research Centers and Farmers from pilot units and its surroundings

Duration: 2011.4 - 2016.4

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal Agriculture production in Nacala Corridor is increased.	- Productivity of technology transferred farms increases X. - Total production of technology transferred farms increase X.	Progress Repot of the Project Questionnaire / Interview	
Project Purpose Appropriate agricultural technology is developed and transferred in Nacala Corridor.	- No. of farmers practicing developed technology increases X. - No. of extension workers transferring developed technology increases X.	Progress Repot of the Project Questionnaire / Interview	
Outputs 1. Capacity of IIAM research centers in Northeast and Northwest is strengthened.	- (Describe concrete facility or equipment here: ex. Soil Analysis Laboratory in Nampula) is renovated. - No. of soil / plant analysis samples achieves X. - No. of items for soil / plant analysis increases X. - Result of evaluation for research center staff about usage and maintenance of equipment and machinery achieves X% in scoring system defined in the beginning of the project. - Result of self evaluation for management staff about management of the Centers achieves X in scoring system defined in the beginning of the project.	Progress Repot of the Project Questionnaire / Interview	* Equipment conditions of the research centers do not get worse. * Large-scale weather disaster or abnormal climate do not occur.
2. Natural resources and socio-economic conditions in Nacala Corridor are evaluated.	- Presence of soil and vegetation data - Presence of meteorological data - Presence of water resources data - Presence of landscape data - Presence of result of potentiality of crop / livestock production assessment - Presence of land use plan for agricultural purpose - Presence of result of socio-economic survey	Progress Repot of the Project	
3. Soil improvement technology for Nacala Corridor is developed.	- Presence of recommendation on soil improvement technology - Presence of recommendation on fertilizer application by crop and by	Progress Repot of the Project	

	soil type - Presence of recommendation on soil conservation technology.		
4. Appropriate cultivation technology for Nacala Corridor is developed.	- Presence of the list of appropriate crops / varieties recommended - Presence of manual for appropriate seed production systems - Presence of the list of appropriate microorganism tested - Presence of appropriate methods to enhance the access to water resources for agriculture purposes - Presence of recommendation on appropriate cropping system.	Progress Repot of the Project	
5. New agricultural technology developed / validated is implemented in the demonstration units.	- No. of participants in seminars of demonstration is X by gender. - No. of participants showing interests in technology demonstrated in seminars is X by gender. - No. of training courses for extension workers is X by gender. - No. of participants in training course for extension is X by gender. - .Presence of the manual for Decision Support Model - Presence of list of validated technology	Progress Repot of the Project Questionnaire / Interview	
Activities	**Inputs**		* Trained staff of the research centers remain working at the centers.
1-1. To make installation / equipment inventory. 1-2. To repair existent installation / equipment. 1-3. To provide new research equipment. 1-4. To construct experimental laboratory in Nampula and Lichinga. 1-5. To train research center staff for usage and maintenance of facilities and equipment. 1-6. To advise IIAM Research Centers on management.	<u>Japanese party</u> * Long-term experts - Chief Advisor of Japanese Team - Liaison Officer * Short-term experts as necessary * Tropical agricultural technologies developed in Japan * Vehicles * Construction of experimental laboratory * Installation irrigation facility in the Research Centers * Provision of equipments * Cost of seminars / workshops * Trainings in Japan		
2-1. To evaluate soil and vegetation. 2-2. To collect and analyze meteorological data. 2-3. To collect and analyze wáter resources data. 2-4. To collect and analyze landscape data. 2-5. To assess the potentiality of crop / livestock production. 2-6. To develop a land use plan for agricultural purpose. 2-7. To survey socio-economic conditions.	<u>Brazilian party</u> * Brazilian research and extension experts * Technical experts for the infrastructures needed (laboratories, pilot projects, seed processing unit, etc.) * Technical experts for developing a seed production system * Technical experts for livestock production * Tropical agricultural technologies developed in Brazil * Provision of materials for management, monitoring and evaluation assessments * Provision of technical publications and other editions related to tropical agriculture * Provision of laboratory equipments * Provision of Brazilian made machinery for small scale farmers, seedlings and seeds * Running expenses related to Brazilian experts		
3-1. To develop soil improvement technology. 3-2. To develop fertilization schemes			

/ recommendation by crops. 3-3. To develop soil conservation technology.	* Trainings of Mozambican personnel in Brazil <u>Mozambican party</u>	
4-1. To select appropriate crops / varieties. 4-2. To develop appropriate seed production systems. 4-3. To select appropriate microorganism for leguminous and other crops. 4-4. To develop appropriate methods to enhance the access to water resources for agriculture purposes. 4-5. To develop appropriate cropping systems.	* Assignment of counterpart personnel (IIAM research centers in Northeast and Northwest) * Provision of office space for experts * Provision of demonstration units * Additional personnel en IIAM research centers * Running expenses for the Project	
5-1. To select pilot farms and to establish demostration units for crop / livestock. 5-2. To organize technology transfer activities (seminars, field days, etc.) on the demonstration units for farmers. 5-3. To organize training courses for extension workers. 5-4. To develop a Decision Support Model for farmers to select appropriate cropping system.		**Pre-conditions** * Farmers nearby agree on cooperation.

Annex 1 Reference 1: PDM version 1

Project Design Matrix (PDM) version 1, to be discussed and approved by 2nd JTC meeting on February 26th 2011.

Project Title: Project for Improving Research and Technology Transfer Capacity for Nacala Corridor Agriculture Development, Mozambique **Version:** PDM1

Target Area: Nacala Corridor, Northern Area in Mozambique **Date** : 2012/02/26

Target Group: The staff of Northeast and Northwest IIAM Zonal Research Centers and Farmers from pilot units and its surroundings

Duration: 2011.4 - 2016.4

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal Agriculture production in Nacala Corridor is increased.	- Annual growth of agricultural sector in Nacala corridor becomes over X%.	- Annual Reports of DPA	
Project Purpose Appropriate agricultural technology is developed and transferred in Nacala Corridor.	- Appropriate agricultural technologies are validated by IIAM and practiced in more than X demonstration units.	- Final Report of the Project	
Outputs 1. Capacity of IIAM research centers in Northeast and Northwest is strengthened.	- Experimental laboratories and research equipment are repaired, constructed and installed at IIAM CZnd (soil and plant analysis laboratory) and IIAM CZno (X laboratory).	- Constructed or repaired laboratories and equipment (and its list)	* Equipment conditions of the research centers do not get worse. * Large-scale weather disaster or abnormal climate does not occur.
	- Record of use and maintenance of research facilities and equipment are kept by IIAM.	- Progress Reports of the Project	
	- Meetings to evaluate experimental plans and results are taken place annually at IIAM.	- Progress Reports of the Project	
	- C/Ps' self-evaluation on research and transfer abilities shows advance as compared to baseline survey results.	- Progress Reports of the Project	
	- A manual of research center management is accepted by IIAM.	- Manual of research center management	
2. Natural resources and socio-economic conditions in Nacala Corridor are evaluated.	- Reports and databases on natural resources evaluation in Nacala corridor (soil, vegetation, land use, meteorology, water resources and landscape) are accepted by IIAM.	- Reports and databases on natural resources evaluation	
	- Draft land use plan for agricultural purpose in Nacala corridor is approved by JTC.	- Draft land use plan for agricultural purpose	
	- A report on potentiality of crop / livestock production in Nacala Corridor is accepted by IIAM.	- Report on potentiality of crop / livestock production	
	- Reports of socio-economic and environmental impact assessment are accepted by IIAM.	- Report of socio-economic and environmental impact	
3. Soil improvement technology for Nacala Corridor is developed.	- A soil improvement manual (including fertilization and soil conservation) is accepted by IIAM.	- Soil improvement manual	
4. Appropriate cultivation technology	- A cultivation manual (including crops,	- Cultivation manual	

for Nacala Corridor is developed.	varieties, seed production, microorganism, access to water and cropping system) is accepted by IIAM.		
5. New agricultural technology developed / validated is implemented in the demonstration units.	- More than X demonstration units are established. - Technology transfer activities (seminars and field days for farmers, training courses for extension workers, etc.) are held over X times. - A decision support model is accepted by IIAM. - Training for extension workers to use the decision support model is taken place.	- Progress Reports of the Project - Progress Reports of the Project - Decision support model - Final Report of the Project	
Activities 1-1. To make installation / equipment inventory. 1-2. To repair existent installation / equipment. 1-3. To provide new research equipment. 1-4. To construct experimental laboratory in Nampula and Lichinga. 1-5. To train research center staff for usage and maintenance of facilities and equipment. 1-6. To advise IIAM Research Centers on management. 2-1. To evaluate soil and vegetation. 2-2. To collect and analyze meteorological data. 2-3. To collect and analyze water resources data. 2-4. To collect and analyze landscape data. 2-5. To assess the potentiality of crop / livestock production. 2-6. To develop a land use plan for agricultural purpose. 2-7. To survey socio-economic conditions. 3-1. To develop soil improvement technology. 3-2. To develop fertilization schemes / recommendation by crops. 3-3. To develop soil conservation technology. 4-1. To select appropriate crops / varieties. 4-2. To develop appropriate seed production systems. 4-3. To select appropriate microorganism for leguminous and other crops. 4-4. To develop appropriate methods to enhance the access to water resources for agriculture	**Inputs** <u>Japanese party</u> * Long-term experts - Chief Advisor of Japanese Team - Liaison Officer * Short-term experts as necessary * Tropical agricultural technologies developed in Japan * Vehicles * Construction of experimental laboratory * Installation irrigation facility in the Research Centers * Provision of equipments * Cost of seminars / workshops * Trainings in Japan <u>Brazilian party</u> * Brazilian research and extension experts * Technical experts for the infrastructures needed (laboratories, pilot projects, seed processing unit, etc.) * Technical experts for developing a seed production system * Technical experts for livestock production * Tropical agricultural technologies developed in Brazil * Provision of materials for management, monitoring and evaluation assessments * Provision of technical publications and other editions related to tropical agriculture * Provision of laboratory equipments * Provision of Brazilian made machinery for small scale farmers, seedlings and seeds * Running expenses related to Brazilian experts * Trainings of Mozambican personnel in Brazil <u>Mozambican party</u> * Assignment of counterpart personnel (IIAM research centers in Northeast and Northwest) * Provision of office space for experts * Provision of demonstration units * Additional personnel en IIAM research centers * Running expenses for the Project	* Trained staff of the research centers remain working at the centers.

purposes. 4-5. To develop appropriate cropping systems.		
5-1. To select pilot farms and to establish demonstration units for crop / livestock. 5-2. To organize technology transfer activities (seminars, field days, etc.) on the demonstration units for farmers. 5-3. To organize training courses for extension workers. 5-4. To develop a Decision Support Model for farmers to select appropriate cropping system.		**Pre-conditions** * Farmers nearby agree on cooperation.

Annex 1 Reference 1: PDM version 2

Project Design Matrix (PDM) version 2, to be discussed and approved by the 3rd JTC meeting on August 16th 2012.

Project Title:	Project for Improving Research and Technology Transfer Capacity for Nacala Corridor Agriculture Development, Mozambique	**Version**: PDM2
Target Area:	Nacala Corridor, Northern Area in Mozambique	**Date** : 2012/08/16
Target Group:	The staff of Northeast and Northwest IIAM Zonal Research Centers and Farmers from pilot units and its surroundings	
Duration:	2011.4 - 2016.4	

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal Agriculture production in Nacala Corridor is increased.	- Annual growth rate of the agricultural sector in Nacala corridor becomes more than the target value of the Mozambican national strategy (PEDSA).	- Annual Reports of DPA	
Project Purpose Appropriate agricultural technology is developed and transferred in Nacala Corridor.	- Appropriate agricultural technologies are validated by IIAM and practiced in more than 10 demonstration units.	- Final Report of the Project	
Outputs 1. Capacity of IIAM research centers in Northeast and Northwest is strengthened.	- Experimental laboratories and research equipment are repaired, constructed and installed at IIAM CZnd (soil and plant analysis laboratory) and IIAM CZno (multi-functional laboratory). - Record of use and maintenance of research facilities and equipment are kept by IIAM. - Meetings to evaluate experimental plans and results are taken place annually at IIAM. - C/Ps' self-evaluation on research and transfer abilities shows advance as compared to baseline survey results. - A manual of research center management is accepted by IIAM.	- Constructed or repaired laboratories and equipment (and its list) - Progress Reports of the Project - Progress Reports of the Project - Progress Reports of the Project - Manual of research center management	* Equipment conditions of the research centers do not get worse. * Large-scale weather disaster or abnormal climate does not occur.
2. Natural resources and socio-economic conditions in Nacala Corridor are evaluated.	- Reports and databases on natural resources evaluation in Nacala corridor (soil, vegetation, land use, meteorology, water resources and landscape) are accepted by IIAM. - Draft land use plan for agricultural purpose in Nacala corridor is approved by JTC. - A report on potentiality of crop /	- Reports and databases on natural resources evaluation - Draft land use plan for agricultural purpose - Report on potentiality of	

	livestock production in Nacala Corridor is accepted by IIAM. - Reports of socio-economic and environmental impact assessment are accepted by IIAM.	crop / livestock production - Report of socio-economic and environmental impact	
3. Soil improvement technology for Nacala Corridor is developed.	- A soil improvement manual (including fertilization and soil conservation) is accepted by IIAM.	- Soil improvement manual	
4. Appropriate cultivation technology for Nacala Corridor is developed.	- A cultivation manual (including crops, varieties, seed production, microorganism, access to water and cropping system) is accepted by IIAM.	- Cultivation manual	
5. New agricultural technology developed / validated is implemented in the demonstration units.	- More than 10 demonstration units are established. - Technology transfer activities (seminars and field days for farmers, training courses for extension workers, etc.) are held over 15 times. - A decision support model is accepted by IIAM. - Training for extension workers to use the decision support model is taken place.	- Progress Reports of the Project - Progress Reports of the Project - Decision support model - Final Report of the Project	
Activities	**Inputs**		
1-1. To make installation / equipment inventory. 1-2. To repair existent installation / equipment. 1-3. To provide new research equipment. 1-4. To construct experimental laboratory in Nampula and Lichinga. 1-5. To train research center staff for usage and maintenance of facilities and equipment. 1-6. To advise IIAM Research Centers on management. 2-1. To evaluate soil and vegetation. 2-2. To collect and analyze meteorological data. 2-3. To collect and analyze water resources data. 2-4. To collect and analyze landscape data. 2-5. To assess the potentiality of crop / livestock production. 2-6. To develop a land use plan for agricultural purpose. 2-7. To survey socio-economic conditions. 3-1. To develop soil improvement technology.	Japanese party * Long-term experts - Chief Advisor of Japanese Team - Liaison Officer * Short-term experts as necessary * Tropical agricultural technologies developed in Japan * Vehicles * Construction of experimental laboratory * Installation irrigation facility in the Research Centers * Provision of equipments * Cost of seminars / workshops * Trainings in Japan Brazilian party * Brazilian research and extension experts * Technical experts for the infrastructures needed (laboratories, pilot projects, seed processing unit, etc.) * Technical experts for developing a seed production system * Technical experts for livestock production * Tropical agricultural technologies developed in Brazil * Provision of materials for management, monitoring and evaluation assessments * Provision of technical publications and other editions related to tropical agriculture * Provision of laboratory equipments * Provision of Brazilian made machinery for small scale farmers, seedlings and seeds	* Trained staff of the research centers remain working at the centers.

3-2. To develop fertilization schemes / recommendation by crops. 3-3. To develop soil conservation technology. 4-1. To select appropriate crops / varieties. 4-2. To develop appropriate seed production systems. 4-3. To select appropriate microorganism for leguminous and other crops. 4-4. To develop appropriate methods to enhance the access to water resources for agriculture purposes. 4-5. To develop appropriate cropping systems. 5-1. To select pilot farms and to establish demonstration units for crop / livestock. 5-2. To organize technology transfer activities (seminars, field days, etc.) on the demonstration units for farmers. 5-3. To organize training courses for extension workers. 5-4. To develop a Decision Support Model for farmers to select appropriate cropping system.	* Running expenses related to Brazilian experts * Trainings of Mozambican personnel in Brazil <u>Mozambican party</u> * Assignment of counterpart personnel (IIAM research centers in Northeast and Northwest) * Provision of office space for experts * Provision of demonstration units * Additional personnel en IIAM research centers * Running expenses for the Project	**Pre-conditions** * Farmers nearby agree on cooperation.

Annex 1 Reference 1: PDM version 3

Project Title: Project for Improving Research and Technology Transfer Capacity for Nacala Corridor Agriculture Development, Mozambique
Target Area: Nacala Corridor, Northern Area in Mozambique
Target Group: The staff of Northeast and Northwest IIAM Zonal Research Centers and Farmers from pilot units and its surroundings
Duration: 2011.4 - 2016.4

Version: PDM3
Date : 2013/10/24

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal Appropriate agricultural technology is adopted in Nacala Corridor.	- Appropriate agricultural technologies validated by IIAM are practiced by more than XXX% of farmers in the target areas.	Survey	
Project Purpose Appropriate agricultural technology is developed and transferred in Nacala Corridor.	- Appropriate agricultural technologies are validated by IIAM and practiced in more than 10 demonstration units.	- Final Report of the Project	Relevant projects in Nacala Corridor are implemented and managed on schedule.
Outputs 1. Capacity of IIAM research centers in Northeast and Northwest is strengthened.	- Experimental laboratories and research equipment are repaired, constructed and installed at IIAM CZnd (soil and plant analysis laboratory) and IIAM CZno (multi-functional laboratory). - Record of use and maintenance of research facilities and equipment are kept by IIAM. - Meetings to evaluate experimental plans and results are taken place annually at IIAM. - C/Ps' self-evaluation survey on research and transfer abilities shows advance as compared to baseline survey results. - Guidelines of research center management are accepted by IIAM. - CPs present on their research work regarding soil improvement technology and cultivation technology more than a total of XXX times in meetings, seminars, workshops, Annual Meeting on Research Achievements and Planning (IAMRAP), Agriculture Research Meeting - Nacala, symposium between IIAM and university, conference, etc.	- Constructed or repaired laboratories and equipment (and its list) - Progress Reports of the Project - Progress Reports of the Project - Progress Reports of the Project and C/Ps' self-evaluation survey results - Guidelines of research center management - Presentation, records of meetings, seminars, workshops, IAMRAP, Agriculture Research Meeting – Nacala, symposium between IIAM and university, conference, etc.	* Equipment conditions of the research centers do not get worse. * Large-scale weather disaster or abnormal climate does not occur.
2. Natural resources and socio-economic conditions in Nacala Corridor are evaluated.	- Reports and databases on natural resources evaluation in Nacala corridor (soil, vegetation, land use, meteorology, water resources and landscape) are accepted by IIAM. - Draft land use plan for agricultural purpose in Nacala corridor is approved by JTC. - A report on potentiality of crop / livestock production in Nacala Corridor is accepted by IIAM. - Reports of socio-economic and environmental impact assessment are accepted by IIAM.	- Reports and databases on natural resources evaluation - Draft land use plan for agricultural purpose - Report on potentiality of crop / livestock production - Report of socio-economic and environmental impact	
3. Soil improvement technology for Nacala Corridor is developed.	- A soil improvement manual (including fertilization and soil conservation) is accepted by IIAM.	- Soil improvement manual	
4. Appropriate cultivation technology for Nacala Corridor is developed.	- A cultivation manual (including crops, varieties, seed production, microorganism, access to water and cropping system) is accepted by IIAM.	- Cultivation manual	
5. New agricultural technology developed / validated is implemented in the demonstration units.	- More than 10 demonstration units are established. - Technology transfer activities (seminars and field days for farmers, training courses for extension workers, etc.) are held over 15 times. - A decision support model is accepted by IIAM. - Training for extension workers to use the decision support model is taken place.	- Progress Reports of the Project - Progress Reports of the Project - Decision support model (first version) - Final Report of the Project	

Activities	Inputs	
1-1. To make installation / equipment inventory. 1-2. To repair existent installation / equipment. 1-3. To provide new research equipment. 1-4. To construct experimental laboratory in Nampula and Lichinga. 1-5. To train research center staff for usage and maintenance of facilities and equipment. 1-6. To advise IIAM Research Centers on management. 1-7.To Increase research capacity of CPs and relevant researchers	Japanese party * Long-term experts - Chief Advisor of Japanese Team - Liaison Officer * Short-term experts as necessary * Tropical agricultural technologies developed in Japan * Vehicles * Construction of experimental laboratory	* Trained staff of the research centers remain working at the centers.

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
2-1. To evaluate soil and vegetation. 2-2. To collect and analyze meteorological data. 2-3. To collect and analyze water resources data. 2-4. To collect and analyze landscape data. 2-5. To assess the potentiality of crop / livestock production. 2-6. To suggest appropriate land use plan for agricultural purpose. 2-7. To survey socio-economic conditions. 3-1. To develop soil improvement technology. 3-2. To develop fertilization schemes / recommendation by crops. 3-3. To develop soil conservation technology. 4-1. To select appropriate crops / varieties. 4-2. To develop appropriate seed production systems. 4-3. To select appropriate microorganism for leguminous and other crops. 4-4. To develop appropriate methods to enhance the access to water resources for agriculture purposes. 4-5. To develop appropriate cropping systems. 5-1. To select pilot farms and to establish demonstration units for crop / livestock. 5-2. To organize technology transfer activities (seminars, field days, etc.) on the demonstration units for farmers. 5-3. To support ProSAVANA-PEM to organize training courses for extension workers. 5-4. To develop a Decision Support Model for farmers to select appropriate cropping system.	* Installation irrigation facility in the Research Centers * Provision of equipment * Cost of seminars / workshops * Trainings in Japan Brazilian party * Brazilian research and extension experts * Technical experts for the infrastructures needed (laboratories, pilot projects, seed processing unit, etc.) * Technical experts for developing a seed production system * Technical experts for livestock production * Tropical agricultural technologies developed in Brazil * Provision of materials for management, monitoring and evaluation assessments * Provision of technical publications and other editions related to tropical agriculture * Provision of laboratory equipment * Provision of Brazilian made machinery for small scale farmers, seedlings and seeds * Running expenses related to Brazilian experts * Trainings of Mozambican personnel in Brazil Mozambican party * Assignment of counterpart personnel (IIAM research centers in Northeast and Northwest) * Provision of office space for experts * Provision of demonstration units * Additional personnel in IIAM research centers * Running expenses for the Project	**Pre-conditions** * Farmers nearby agree on cooperation.

Annex 1 Reference 2: Major changes of PDMs (versions 0 to 4)

<table>
<tr><th>Ver. No.</th><th>Major Changes</th></tr>
<tr><td>Ver.0</td><td>PDM Version 1 was the same as the PDM of R/D and it was approved at 1st JTC on 29 August 2011.</td></tr>
<tr><td>Ver.1</td><td>Version 1 was approved at 2nd JCC on 26 February 2012. All indicators were revised to concrete and appropriate expressions considering real situations of the Project but figures (X %, X times, etc.) of some indicators were not agreed. Some changes of important indicators are listed below.
<table>
<tr><th rowspan="2">Item</th><th colspan="2">Indicator</th></tr>
<tr><th>Before</th><th>After</th></tr>
<tr><td>Overall Goal</td><td>- Productivity of technology transferred farms increases X
- Total production of technology transferred farms increase X</td><td>- Annual growth of agriculture sector in Nacala corridor becomes over X %.</td></tr>
<tr><td>Project Purpose</td><td>- No. of farmers practicing developed technology increases X
- No. of extension workers transferring developed technology increases X</td><td>- Appropriate agricultural technologies are validated by IIAM and practiced in more than X demonstration units.</td></tr>
<tr><td>Output 1</td><td>- (Describe concrete facility or equipment here: ex. Soil Analysis Laboratory in Nampula) is renovated.</td><td>- Experimental laboratories and research equipment are repaired、 constructed and installed at IIAM CZnd (soil and plant analysis laboratory) and IIAM CZno (X).</td></tr>
<tr><td>Output 5</td><td>- No. of participants in seminars of demonstration is X by gender
- No. of participants showing interests in technology demonstrated in seminars is X by gender
- No. of training courses for extension workers is X by gender
- No. of participants in training course for extension is X by gender</td><td>- More than X demonstration units are established.
- Technology transfer activities (seminars and field days for farmers、 training courses for extension workers、 etc.) are held X times.</td></tr>
</table></td></tr>
<tr><td>Ver.2</td><td>Version 2 was approved at 3rd JCC on 16 August 2012. Figures of indicators of Overall Goal, Project Purpose and Output 5 were defined. Function of Lichinga Laboratory was also defined.
<table>
<tr><th rowspan="2">Item</th><th colspan="2">Indicator</th></tr>
<tr><th>Before</th><th>After</th></tr>
<tr><td>Overall Goal</td><td>- Annual growth of agriculture sector in Nacala corridor becomes over X %.</td><td>- Annual growth of agriculture sector in Nacala corridor becomes <u>more than the target value of the Mozambican national strategy (PEDSA)</u>. (= 7%)</td></tr>
<tr><td>Project Purpose</td><td>- Appropriate agricultural technologies are validated by IIAM and practiced in more than X demonstration units.</td><td>- Appropriate agricultural technologies are validated by IIAM and practiced in more than <u>10</u> demonstration units.</td></tr>
<tr><td>Output 1</td><td>- Experimental laboratories and research equipment are repaired、 constructed and installed at IIAM CZnd (soil and plant analysis laboratory) and IIAM CZno (X).</td><td>- Experimental laboratories and research equipment are repaired、 constructed and installed at IIAM CZnd (soil and plant analysis laboratory) and IIAM CZno (<u>multi-functional laboratory</u>).</td></tr>
<tr><td>Output 5</td><td>- More than X demonstration units are established.
- Technology transfer activities (seminars and field days for farmers、 training courses for extension workers、 etc.) are held X times.</td><td>- More than <u>10</u> demonstration units are established.
- Technology transfer activities (seminars and field days for farmers、 training courses for extension workers、 etc.) are held <u>15</u> times.</td></tr>
</table></td></tr>
<tr><td>Ver.3</td><td>Version 3 was approved at the meeting for PDM review in the Mid-term Evaluation on 23 October 2013. Some indicators were corrected to more directly linked expressions to outcomes of the Project (Overall Goal, Output 1) and an expression to clearly explain the linkage with PEM was added in one of activities of Output 5.
<table>
<tr><th rowspan="2">Item</th><th colspan="2">Indicator</th></tr>
<tr><th>Before</th><th>After</th></tr>
<tr><td>Overall Goal</td><td>- Annual growth of agriculture sector in Nacala corridor becomes more than the target value of the Mozambican national strategy (PEDSA).</td><td>- Appropriate agricultural technologies validated by IIAM are practiced by more than XX% of farmers in the target areas.</td></tr>
<tr><td rowspan="2">Output 1</td><td>- A manual of research center management is accepted by IIAM.</td><td>- <u>Guidelines</u> of research center management are accepted by IIAM.</td></tr>
<tr><td>None</td><td>- CPs present on their research work regarding soil improvement technology and cultivation technology more than a total of XXX times in meetings, seminars, workshops, Annual Meeting on Research Achievements and Planning (IAMRAP), Agriculture Research Meeting – Nacala, symposium between IIAM and university, conference, etc.</td></tr>
<tr><th>Item</th><th colspan="2">Activity</th></tr>
<tr><td>Output 5</td><td>- 5-3 To organize training courses for extension workers.</td><td>- 5-3 <u>To support ProSAVANA-PEM</u> to organize training courses for extension workers.</td></tr>
</table></td></tr>
</table>

Ver. No.	Major Changes
Ver.4	Version 4 was approved at 6th JTC on 24 August 2015.

Item		Before	After
Project Purpose	Indicator	Appropriate agricultural technologies are validated by IIAM and practiced in more than 10 demonstration units.	Appropriate agricultural technologies are validated by IIAM and **transferred to more than 100 extension workers.**
Output 1	Indicator	- Experimental laboratory and research equipment are repaired, constructed and installed at IIAM CZnd (soil and plant analysis laboratory) and IIAM CZno (multi- functional laboratory).	- Experimental laboratory and research equipment are repaired, constructed and installed at IIAM CZnd (soil and plant analysis laboratory). - **Laboratory construction plan for IIAM CZno is developed.**
	Activity	- 1-4. To construct experimental laboratory in Nampula and Lichinga	- 1-4. To construct experimental laboratory in Nampula - **1-8. To develop laboratory construction plan for IIAM CZno**
Output 2	Indicator	- Draft land use plan for agricultural purpose in Nacala corridor is approved by JTC. - A report on potentiality of crop / livestock production in Nacala Corridor is accepted by IIAM - Reports of socio-economic and environmental impact assessment are accepted by IIAM.	-Delete (This is because the land use plan of Nacala corridor was changed to the plan of research stations) - Delete - Reports of socio-economic assessment are accepted by IIAM.
	Activity	- 2-5. To assess the potentiality of crop / livestock production	- Delete
Output 4	Activity	- 4-2. To develop appropriate seed production systems.	- 4-2. **To implement training course** to develop appropriate seed production systems.
Output 5		5. New agricultural technology developed / validated is implemented in the demonstration units.	5. Technology transfer activities for extension workers are implemented on newly developed/validated agricultural technologies
	Indicator	- More than 10 demonstration units are established.	- Delete
	Activity	- 5-1. To select pilot farms and to establish demonstration units for crop / livestock. - 5-2. To organize technology transfer activities (seminars, field days, etc.) on the demonstration units for farmers.	- Delete - 5-1. To organize technology transfer activities (seminars, field days, etc.) **for extension workers**.
Input	Brazilian party	- Provision of Brazilian made machinery for small scale farmers, seedlings and seeds	- Delete

Annex 2 Plan of Operation (Output 1)

Activities as per PDM Ver.4		Expected results		2011	2012	2013	2014	2015	2016	Persons in charge		
										NTC/JIRCAS	EMBRAPA	IIAM
Output 1. Capacity of IIAM research centers in Northeast and Northwest is strengthened.												
1-1.	To make installation / equipment inventory.	Inventory of CZnd, CZno prepared	Plan							Anyoji Tobita	Alex Silva	Albino Silva Lodovico
			Actual									
1-2.	To repair existent installation / equipment.	Repairs done according to the inventory results	Plan							Narumi Tobita	Alex Silva	Albino Silva
			Actual									
1-3.	To provide new research equipment.	Equipment provided according to the inventory results	Plan							Narumi Naruo	Alex Silva	Albino Silva
			Actual									
1-4.	To construct experimental laboratory in Nampula											
	1-4-1. To agree upon function, basic design and cost sharing of new laboratories among 3 parties.	Basic design and cost sharing agreed upon by 3 parties	Plan							Anyoji Nishikawa	Alessandro Silva	Constantino Cuambe Carolino Martinho
			Actual									
	1-4-2. To prepare detailed design and cost estimate.	Detailed design and cost estimate prepared	Plan							Kondo Shemsu	-	Constantino Cuambe
			Actual									
	1-4-3. To select contractor based on approved tender document.	Tender document approved; Contractor selected	Plan							Kawabata Shemsu	-	Constantino Cuambe
			Actual									
	1-4-4. To supervise the construction and hand over the completed laboratory.	Soil and plant analysis laboratory handed over	Plan							Ishihara	-	Constantino Cuambe
			Actual									
1-5.	To train research center staff for usage and maintenance of facilities and equipment.											
	1-5-1. To train CZnd staff for usage and maintenance of fixed equipment	Record of usage and maintenance of equipment kept	Plan							Naruo Nakamura	Alessandro Silva	Constantino Cuambe Boina
			Actual									
1-6.	To advise IIAM Research Centers on management.											
	1-6-1. To identify weak points of current management systems of CZnd and CZno.	Weak points identified and described in progress reports	Plan							Anyoji	Cesar Miranda	Constantino Cuambe Carolino Martinho
			Actual									
	1-6-2. To implement a management training course with agricultural research institutes of Brazil	Reports by participants submitted	Plan							-	Cesar Miranda	Constantino Cuambe Carolino Martinho
			Actual									
	1-6-3. To implement soil diagnosis training course in Japan	Reports by participants submitted	Plan							Narumi	-	Constantino Cuambe Carolino Martinho
			Actual									
	1-6-4. To prepare a guideline of research center management.	Guidelinel of research center management accepted by IIAM	Plan							Kuwahara Naruo	Cesar Miranda	Constantino Cuambe Carolino Martinho
			Actual									
1-7.	To Increase research capacity of CPs and relevant researchers											
	1-7-1. To organize research planning and evaluation meetings	Materials and records of meetings shared by all relevant actors	Plan							Kuwahara Tobita	Cesar Miranda	Constantino Cuambe Carolino Martinho
			Actual									
	1-7-2. To conduct baseline survey and annual self-evaluation of C/P staff's research capacity.	Advance of C/P staff's research capacity monitored annually	Plan							Kuwahara Tobita	Cesar Miranda	Constantino Cuambe Carolino Martinho
			Actual									
1-8.	To develop laboratory construction plan for IIAM CZno											
			Plan							-	Alessandro Silva	Carolino Martinho
			Actual									

Annex 2 Plan of Operation (for Outputs 2 and 3)

Activities as per PDM Ver.4	Expected results		2011	2012	2013	2014	2015	2016	Persons in charge: NTCI/JIRCAS	EMBRAPA	IIAM
Output 2. Natural resources and socio-economic conditions in Nacala Corridor are evaluated.											
2-1. To evaluate soil and vegetation.											
2-1-1. To collect existent soil information and conduct additional survey, sampling and analysis.	Soil database and reports elaborated	Plan							Oya Naruo	Skorupa	Momade
		Actual									
2-1-2. To collect existent vegetation information and conduct additional survey.	Vegetation database and reports elaborated	Plan							Oya Mori	Skorupa	*to be determined*
		Actual									
2-2. To collect and analyze meteorological data.											
2-2-1. To install weather stations at field trial sites, provide training, and keep observation.	Weather stations installed and operational	Plan							Tsujimoto Tobita	Skorupa	*to be determined*
		Actual									
2-2-2. To collect and analyze existent meteorological information	Meteorology database and reports elaborated	Plan							-	Skorupa	*to be determined*
		Actual									
2-3. To collect and analyze water resources data.	Water resources database and reports elaborated	Plan							-	Skorupa	*to be determined*
		Actual									
2-4. To collect and analyze landscape data.	Landscape database and reports elaborated	Plan							-	Skorupa	*to be determined*
		Actual									
2-5. To develop a land use plan for agricultural purpose.											
2-5-1. To integrate existing land-use plans or zoning results around the Nacala Corridor	Existing land-use plans or zoning results integrated	Plan							Mori	Skorupa Coelho	Ragu Chichongue
		Actual									
2-5-2. To develop land-use plans of PAN and EAL	Land-use plans of PAN and EAL developed	Plan							Egami	-	Ragu Chichongue
		Actual									
2-6. To survey socio-economic conditions.											
2-6-1. To survey basic characteristics of farm households.	Types of farm households classified	Plan							Yamada	Skorupa	Salegua / Amancio Cassamo
		Actual									
2-6-2. To survey socio-economic conditions of soybean production areas.	Factors of soybean introduction and development clarified	Plan							Yamada	Skorupa	Salegua / Amancio Cassamo
		Actual									
2-6-3. To evaluate farm economy of cash crop growers' households.	Cost and profit of cash crops evaluated	Plan							Yamada	Skorupa	Salegua / Amancio Cassamo
		Actual									
Output 3. Soil improvement technology for Nacala Corridor is developed.											
3-1. To develop soil improvement technology.											
3-1-1. To identify main problems on soil improvement	Plan of activity made based on identified main problems	Plan							Kobayashi	Coelho	Baltazar
		Actual									
3-1-2. To implement field trial of soil improvement by subsoiler and/or deep-rooted crops	Results reported and soil improvement manual drafted	Plan							Kobayashi	Coelho	Baltazar
		Actual									
3-1-3. To implement field trial of soil improvement by crop residue application.	Results reported and soil improvement manual drafted	Plan							Kobayashi	Coelho	Baltazar
		Actual									
3-2. To develop fertilization schemes / recommendation by crops.											
3-2-1. To implement long term trial on essential elements necessity in different agro-environments.	Results reported and soil improvement manual drafted	Plan							Oya Naruo	Araujo Filho Denardim	Momade/Clarinda Chichongue/Seninho
		Actual									
3-2-2. To implement experiment on optimal fertilizer dose for several crops.	Results reported and soil improvement manual drafted	Plan							Oya Naruo	Araujo Filho Denardim	Momade/Clarinda Chichongue/Seninho
		Actual									
3-3. To develop soil conservation technology.											
3-3-1. To indentify main problems on soil conservation.	Plan of activity made based on identified main problems	Plan							Naruo	*to be determined*	Uatemua/Chichonge/ Sualei
		Actual									
3-3-2. To implement field trial of soil conservation technologies using water and sediment trap	Results reported and soil improvement manual drafted	Plan							Naruo	*to be determined*	Uatemua/Chichonge/ Sualei
		Actual									
3-3-3. To establish demonstration farm for agroforestry with *Feidherbia Albida*	Demonstration farm for agroforestry with *Feidherbia*	Plan							Naruo	*to be determined*	Ivete/Sualei
		Actual									

Annex 2 Plan of Operation (for Output 4)

Activities as per PDM Ver.4	Expected results		2011	2012	2013	2014	2015	2016	Persons in charge: NTCI/JIRCAS	EMBRAPA	IAM
Output 4. Appropriate cultivation technologyfor Nacala Corridor is developed.											
4-1. To select appropriate crops / varieties.											
4-1-1. To implement multi-location trial of important crops / varieties.	Results reported and crop measurement manual drafted	Plan							Tsujimoto	Didonet	Colial
		Actual							Tobita	Machado	Boina
4-1-2. To prepare and revise crop cultivation manuals	Crop cultivation manuals elaborated	Plan							Oya	Denardin/Cesar	Colial
		Actual							Tobita	Miranda	
4-1-3. To determine recommendable crops and varieties for Nacala Corridor.	Selected crops and varieties described in cultivation manual	Plan								Denardin/Cesar	
		Actual								Miranda	
4-1-4. To implement field trial to evaluate adaptability of edible soybean cultivars.	Results reported and fed back into decision-support model	Plan							Naruo	-	Colial
		Actual									
4-2. To implement training course to develop appropriate seed production systems.	Training course to develop appropriateSeed production systems implemented	Plan							-	Cesar Miranda	
		Actual									
4-3. To select appropriate microorganism for leguminous and other crops.											
4-3-1. To collect soybean nodules in fields and analyze molecular biological diversity.	Results reported and nodule observation manual drafted	Plan							Tobita	Denardim	Colial
		Actual								Didonet	Boina
4-3-2. To analyze the effect of intercropping on nodulation in soybean plants.	Results reported and nodule observation manual drafted	Plan							Tobita	Denardim	Colial
		Actual							Ito	Didonet	Boina
4-3-3. To analyze the presence and infection of mycorrizal fungi in field crops.	Results reported and research plan / protocols prepared	Plan							Tobita	Denardim	Colial
		Actual							Ito	Didonet	Boina
4-3-4. To implement field trials of introduction and inoculation of useful microorganisms.	Results reported and fed back into cultivation manual	Plan							Tobita	Cesar Miranda	Colial
		Actual									Boina
4-4. To develop appropriate methods to enhance the access to water resources for agriculture purposes.											
4-4-1. To investigate available water potential for agricultural activity in the project area.	Water potential reported	Plan							Shemsu	*to be determined*	Ragu
		Actual									
4-4-2. To make planning and design of model irrigation system in CZnd	Model irrigation system planned and designed	Plan							Shemsu	*to be determined*	Ragu
		Actual									
4-4-3. To implement model irrigation system in CZnd.	Model irrigation system implemented	Plan							Shemsu	*to be determined*	Ragu
		Actual							Kobayashi		
4-5. To develop appropriate cropping systems.											
4-5-1. To implement 1st multi-location trial.	Results reported and crop measurement manual drafted	Plan							Tsujimoto	Didonet	Colial
		Actual							Tobita	Machado	
4-5-2. To implement 2nd multi-location trial.	Results reported and "estimation of N use / fixation manual" drafted	Plan							Tsujimoto	Didonet	Colial
		Actual							Tobita	Machado	Boina
4-5-3. To implement 3rd multi-location trial.	Results reported and "soil respiration and organic mater measurement manual" drafted	Plan							Tsujimoto	Didonet	Colial
		Actual							Tobita	Machado	Boina
4-5-4. To implement 4th multi-location trial.	Results reported	Plan							Tsujimoto	Didonet	Colial
		Actual							Tobita	Machado	Boina
4-5-5 To summarize the multi-location trials along years	Results reported and dataset fed back into decision-support model	Plan							Tsujimoto	Didonet	Colial
		Actual							Tobita	Machado	Boina

Annex 2 Plan of Operation (for Output 5)

Activities as per PDM Ver.4	Expected results		2011	2012	2013	2014	2015	2016	Persons in charge: NTCI/JIRCAS	Persons in charge: EMBRAPA	Persons in charge: IIAM
Output 5. Technology transfer activities for extension workers are implemented on newly developed/validated agricultural technologies											
5-1. To organize technology transfer activities (seminars, field days, etc.) for extension workers											
5-2-1. Seminars to explain crop/soil technologies developed and validated by PI will be held in pilot sites of	More than 5 seminars held	Plan							Kobayashi		Victor
		Actual							Naruo		Ivete
5-2-2. The technologies will be explained in field day of IIAM.		Plan							Kobayashi		Victor
		Actual							Naruo		Ivete
5-2-3. To invite extension workers to IAMRAP and field days to share technologies developed by ProSAVANA-PI	More than 50 extension workers	Plan							Naruo		Victor
		Actual							Kobayashi		Ivete
5-2. To support ProSAVANA-PEM to organize training courses for extension workers											
5-2-1. To hold training course on crop cultivation technologies in Nampula, Mutuali and Lichinga.		Plan							Oya		Victor
		Actual							Kobayashi		Ivete
5-2-2. To hold training course on soil improvement technologies in Nampula, Mutuali and Lichinga.		Plan							Naruo		Victor
		Actual							Kobayashi		Ivete
5-2-3. To hold training course on utilization of decision support model in Nampula, Mutuali and Lichinga.		Plan							Nakamura / Koide		Victor
		Actual							/ Tsujimoto		Ivete
5-3. To develop a Decision Support Model for farmers to select appropriate cropping system.											
5-4-1. To summarize agricultural environments (soil, weather, socio-economics, etc.) around Nacala Corridor	Agricultural environments around Nacala Corridor summarized	Plan							Tsujimoto		Colial/Boina/Salegua
		Actual							Yamada		/ Amancio/Cassamo
5-4-2. To run sub-models on crop growth/yield and light resources with data collected from multi-location trial		Plan							Nakamura		Colial
		Actual							Tsujimoto		Boina
5-4-3. To try run-models on crop growth/yield and water and nutrients with data collected from multi-location trial		Plan							Nakamura		Colial
		Actual							Tsujimoto		Boina
5-4-4. To try run-models on linear programming with data collected from multi-location trial		Plan							Yamada		Colial
		Actual							Koide		Boina
5-4-5. To develop a decision-support model ver.0	Decision-support model ver.0 developed	Plan							Nakamura / Koide		Colial/Boina/Salegua
		Actual							Yamada / Tsujimoto		/ Amancio/Cassamo
5-4-6. To develop a decision-support model ver.1	Decision-support model ver.1 developed	Plan							Nakamura / Koide		Colial/Boina/Salegua
		Actual							Yamada / Tsujimoto		/ Amancio/Cassamo

Annex 3 Schedule of Terminal Evaluation in Mozamique

Date			JICA Officials (Mr Tojo, Ms Motomura)	Evaluation Consultant (Ms. Kawahara)	Mozambique Member	Brazil Member
15-Nov	Sun			18:30 Depart Tokyo/Narita (SA7139) 22:40 Arrive Hong Kong 23:50 Depart Hong Kong (SA287)		
16-Nov	Mon	AM		7:05 Arrive Johannesburg 9:40 Depart Johannesburg (SA142) 10:40 Arrive Maputo		
		PM		13:00 Meeting with IIAM HQ 15:00 Meeting with ProSAVANA HQ 17:00 Discussion with JICA MZ office **Maputo**		
17-Nov	Tue	AM		07:00 Depart Maputo (TM190) 09:05 Arrive Nampula		
		PM		10:00 Meeting with PI Japanes Experts (JE) 11:00- Interview from PI JE (Kuwahara, Oya, Narumi, Kobayashi, Egami, Nasukawa) **Nampula**		
18-Nov	Wed	AM		8:30- Interview from C/Ps (Constantino Cuambe, Venâncio Salégua, Ida Rina, João Pedro, Maria Clarinda, Uatemua Cássimo, Jaime Baltazar)		
		PM				
19-Nov	Thu	AM	18:30 Depart Tokyo/Narita (SA7139) 22:40 Arrive Hong Kong 23:50 Depart Hong Kong (SA287)	9:45 Depart Nampula (TM190) 10:40 Arrive Lichinga		
		PM		12:00 IIAM Lichinga, Facility introduction 13:00- Interview from Brazilian side & C/Ps (Celso Mutandiua, Carolino Martinho, Alberto Naconha, Fernando Sualei, Oscar Chichongue, Cassamo Sumila) **Lichinga**		
20-Nov	Fri	AM	7:05 Arrive Johannesburg 9:40 Depart Johannesburg (SA142) 10:40 Arrive Maputo **Maputo**	9:00 Lumbi village, interview from trial farmers 10:30 Interview from C/Ps (continue from 19-Nov)		Dr. César Miranda
		PM	13:00 Meeting with IIAM HQ 15:00 Meeting with ProSAVANA HQ 17:00 Discussion with JICA MZ office			
21-Nov	Sat	AM	7:00 Depart Maputo (TM190) 9:05 Arrive Nampula	11:20 Depart Lichinga (TM191) 12:15 Arrive Nampula	Dr. Américo Uaciquete	Dr. César Miranda
		PM	13:00 Internal Discussion 14:00 Meeting with evaluation members and PI JE?		14:00 Same as left	
22-Nov	Sun		Internal Discussion **Nampula**			
23-Nov	Mon		9:00 Field and facility visit 10:00 Presentation from IIAM 11:00 Discussion		Same as left	
24-Nov	Tue	AM	9:45 Depart Nampula (TM190) 10:40 Arrive Lichinga		9:45 from Nampula 10:40 to Lichinga	Mr. Celso Mutadiua
		PM	13:00 Field and facility visit at IIAM Lichinga 14:00 Discussion **Lichinga**		Same as left	
25-Nov	Wed	AM	7:00 Leave from Lichinga 7:30 Meet at IIAM Gurue 8:30-9:30 Interview from trial farmers and IIAM Gurue staff 9:30-11:30 Move from Gurue to Mutuali 11:30-12:00 Field and facility visit at IIAM Mutuali		Same as left	
		PM				
26-Nov	Thu	AM	7:30 Meet at IIAM Gurue 8:30-9:30 Interview from trial farmers and IIAM Gurue staff 9:30-11:30 Move from Gurue to Mutuali 11:30-12:00 Field and facility visit at IIAM Mutuali 12:00 Leave from Mutuali **Nampula**		Same as left	
		PM	12:00 Leave from Mutuali 18:00 Arrive at Nampula			
27-Nov	Fri	AM	9:00 Field visit and interview at Muriaze (Mirutho village, trial farmers) 12:00 Back to Nampula		Same as left	
		PM	Internal meeting, Documentation			
28-Nov	Sat		Internal meeting, Documentation			
29-Nov	Sun	AM	12:55 Depart Nampula (TM191), 15:00 Arrive Maputo			
		PM	Documentation			
30-Nov	Mon		8:00 JICA Mozambique, 15:00 Discussions with IIAM HQ			
1-Dec	Tue		10:00 ProSAVANA HQ, Documentation			
2-Dec	Wed		10:00AM Discussiosns with CZnd and Czno Directors, 13:00 TV meeting with ABC, 14:30 IIAM HQ Discussions, Documentation **Maputo**		From Nampula to Maputo	Mr. João Carlos Soub
3-Dec	Thu		8:00 @ IIAM HQ, Presentation, Discussions and Signing of MM		Same as left	
			Reporting 13:30 JICA Mozambique, 15:00 EoJ			
4-Dec	Fri		11:25 Depart Maputo (SA143) 12:30 Arrive Johannesburg 17:40 Depart Johannesburg (SA286)		Fly from Maputo to Nampula	
5-Dec	Sat		12:35 Arrive Hong Kong 14:25 Depart Hong Kong (SA7134) 19:15 Arrive Tokyo/Haneda			

Annex 4 Assignment of the Japanese Side Experts (by the End of the Project: May 2015)

Name	Field	Assignement		Affiliation
		FY	MM	
Hisao Anyoji	Chief Adviser	2011	5.63	NTCI
		2012	7.03	
		2013	4.90	
Tsuneo Kuwahara	Chief Adviser	2014	4.60	NTCI
		2015	3.67	
Satoshi Tobita	Sub-Adviser/ Crop Cultivation 1	2011	3.53	JIRCAS
		2012	4.37	
		2013	1.80	
		2014	2.97	
Kiyoko Hitsuda	Crop Cultivation 2	2011	7.00	JIRCAS
Tetsuji Oya	Crop Cultivation 2	2012	4.00	JIRCAS
		2013	5.94	
		2014	5.13	
	Sub-Adviser/ Crop Cultivation 1	2015	3.50	
Satoshi Nakamura	Crop Cultivation 4	2014	1.63	JIRCAS
		2015	2.10	
Taku Mori	Land Use Planning	2011	1.40	NTCI
		2012	1.00	
		2013	0.50	
Tomohito Egami	Land Use Planning	2015	3.80	NTCI
Osamu Ito	Soil Microorganism	2011	1.00	JIRCAS
		2012	0.60	
		2013	0.77	
Shemsu Kemal Andeta	Water Resource Utilization	2011	0.50	NTCI
		2012	3.80	
		2013	3.50	
Keiichiro Kobayashi	Soil Improvement	2011	1.20	NTCI
		2012	1.80	
		2013	4.00	
		2014	3.50	
		2015	2.50	
Tadaaki Nishikawa	Archtect	2011	0.53	NTCI
Kozo Kondo	Archtect	2012	1.80	NTCI
Yutaka Kawabata	Bidding support	2013	2.70	NTCI
Hiroei Ishihara	Laboratory construction	2013	2.77	NTCI
		2014	3.22	
Ryuichi Yamada	Socioeconomy 1	2012	4.00	JIRCAS
		2013	3.67	
		2014	1.00	
Junji Koide	Socioeconomy 2	2014	0.83	JIRCAS
		2015	2.50	
Yasuhiro Tsujimoto	Fertilization	2011	1.00	JIRCAS
		2012	3.23	
		2013	2.42	
		2014	1.93	
		2015	1.00	
Kazuhiro Naruo	Soil Conservation / Crop Cultivation 3/ Research Coordination	2011	2.30	NTCI
		2012	7.00	
		2013	6.24	
		2014	4.87	
	Soil Conservation / Crop Cultivation 3	2015	5.00	
Hisashi Nasukawa	Extension Support/ Research Coordination	2015	2.30	NTCI
Keita Hasebe	Interpreter	2011	1.00	NTCI
		Total MM	158.98	

Note: In addition to the above experts, Yukino Narumi, a resident coordinator employed by JICA, has been assigned for five (5) years from 2011 to 2015.

Annex 5 Training in Japan (Organized by JICA)

Name	Duration	Field/Name of the Course	Content	Position
Uatemua Anly Cassimo	6 May-27 July, 2013	Soil diagnosis technology for sustainable agricultural production and environmental conservation	• Soil diagnosis technology Soil and water analysis • Compost production and utilization • Presentation of Activity Plan	Technician (CZnd)
Maria Clarinda	4 May-25 July, 2014	Soil diagnosis technology for sustainable agricultural production and environmental conservation	• Soil diagnosis technology Soil and water analysis • Compost production and utilization • Presentation of Activity Plan	Technician (CZnd)

Annex 6 Seminar and Training Conducted in Mozambique

Year	Name of the Course	Date		No. of Participants	Target Participants	Remarks
		From	To			
2011	Workshop on the 2011 results and 2012 plans (1st IAMRAP)	1 Dec.	1 Dec.	32	27	8 presentations
2012	Evaluation of agricultural environments in Nacala Corridor area.	15 Jun	15 Jun	34	30	4 presentations by Brazilian Team on the Output 2
	Workshop on the 2012 results and 2013 plans (2nd IAMRAP)	17 Aug	17 Aug	38	33	8 presentations
	Workshop on the Production of the Crop Manuals	3 Sep	7 Sep	8	7	Production of 1st draft of the Crop Manual
2013	Use of Spectrophotometer, Flame spectrophotometer, Absorption atomic spectrophotometer	14 May	16 May	7	4	Soil analysis training
	Workshop on the 2013 results and 2014 plans (3rd IAMRAP)	29 Aug	30 Aug	50	40	10 presentations
2014	Agricultural Research Meeting on Nacala Corridor	22 Apr	23 Apr	190	184	13 presentations and field day
	Soil improvement technology seminar for extension workers	4 Dec	4 Dec	37	29	4 presentations
	Workshop on the 2014 results and 2015 plans of soil related trials (4th IAMRAP) in Nampula	11 Dec	11 Dec	10	7	4 presentations
2015	Soil physical property analysis training	30 Mar	14 May	9	7	Soil analysis training
	Workshop on the 2014 results and 2015 plans (5th IAMRAP) in Lichinga	22 Apr	22 Apr	32	30	9 presentations
	Workshop on the 2014 results and 2015 plans of crop related trials (6th IAMRAP) in Nampula	5 May	5 May	40	35	9 presentations
	Soil chemical property analysis training	10 Aug	To be continued	9	7	Soil analysis training
2015	2nd Agricultural Research Meeting on Nacala Corridor	25 Aug	26 Aug	89	82	18 presentations
	Workshop on the 2015 results and 2016 plans of crop and soil related trials (7th IAMRAP) in Lichinga	1 Oct	1 Oct	21	18	6 presentations
	Workshop on the 2015 results and 2016 plans of crop and soil related trials (8th IAMRAP) in Nampula	13 Oct	13 Oct	17	10	6 presentations
	Seminar to Extension Workers on Soil Improvement and Cropping manuals	Nov 24, 27	Nov 24, 27	-	111	Held at CZcd and CZno each

Annex 7 Local Operational Costs Covered by Japan

1) Bearing Costs from JICA Mozambique Office

(Note: Costs borne and managed by JICA directly)

Item	Amount (US$)
1st Year (FY2011/2012)	213,540
Air Ticket	33,680
Travel cost (except Air ticket)	14,860
Local consultant	0
Local contract	7,552
Personnel	3,778
Meeting	760
Local Activities Cost	152,910
2nd Year (FY2012/2013)	333,116
Air Ticket	37,345
Travel cost (except Air ticket)	50,346
Local consultant	0
Local contract	26,048
Personnel	20,861
Meeting	4,739
Local Activities Cost	193,777
3rd Year (FY2013/2014)	313,794
Air Ticket	47,543
Travel cost (except Air ticket)	20,629
Local consultant	0
Local contract	0
Personnel	23,769
Meeting	0
Local Activities Cost	221,853
4th Year (FY2014/2015)	124,190
Air Ticket	12,552
Travel cost (except Air ticket)	2,599
Local consultant	0
Local contract	0
Personnel	19,226
Meeting	0
Local Activities Cost	89,813
5th Year (FY2015/2016, until Sep. 2015)	110,212
Air Ticket	7,768
Travel cost (except Air ticket)	4,863
Local consultant	0
Local contract	0
Personnel	0
Meeting	726
Local Activities Cost	96,856
TOTAL	1,094,852

2) **Bearing Costs from Consultant Team (up to the end of June 2015)**

(Note: Costs included in the contract, and entrusted to manage by the consultant team)

Item	Amount (US$)
1st Year (FY2011/2012)	4,713
Documentation	1,015
Public relations	569
Transportation of equipments from Japan	3,129
2nd Year (FY2011/2012)	61,077
Interpreter	6,684
Consumable goods for soil and plant	15,341
Documentation	138
Local consultant fee	37,444
Transportation of equipments from Japan	1,470
3rd Year (FY2013/2015)	126,811
Personnel	4,381
Consumable	27,582
Travel cost	10
Local consultant fee	93,641
Communication and transportation	441
Documentation	50
Others	706
TOTAL	192,601

Annex 8 Provided Equipment and Tools (by the Japanese Side)

C/J: C: Procured by Consultant, J: Procured by JICA, Current Condition; A : Good, B : Necessary to repair, C : Impossible to repair

Year	No.	C/J	Purpose of Use	Arrival Date	Name of Machinery	Maker	Unit Price (US$)	Q'ty	Amount (US$)	Installation Place	Procurement Place	Current Condition
2011	1	C	Soil analysis	May	pH meter	HORIBA	254	5	1,270	5PAN	PAN	B
	2	C	Soil analysis	May	EC meter	HORIBA	235	5	1,175	5PAN	PAN	A
	3	C	Soil sampling	May	GPS	GARMIN	476	3	1,428	3PAN	PAN	A
	4	C	Observation of meteological data	July	Weather station	Davis	1,879	5	9,395	1PAN, 1EAL, 1Mutuali, 1Gurue,	PAN, EAL, Mutuali, Gurue,	A
	5	C	Observation of meteological data	July	PC link set	Davis	591	5	2,955	1PAN, 1EAL, 1Mutuali, 1Gurue,	PAN, EAL, Mutuali, Gurue,	A
	6	C	Observation of meteological data	July	Solar radiation sensor	Davis	591	5	2,955	1PAN, 1EAL, 1Mutuali, 1Gurue,	PAN, EAL, Mutuali, Gurue,	A
	7	C	Observation of meteological data	July	Extension cable for sensors	Davis	116	5	580	1PAN, 1EAL, 1Mutuali, 1Gurue,	PAN, EAL, Mutuali, Gurue,	A
	8	C	Observation of meteological data	July	Solar panel	Davis	855	5	4,275	1PAN, 1EAL, 1Mutuali, 1Gurue,	PAN, EAL, Mutuali, Gurue,	A
	9	C	Observation of meteological data	July	Long-type photon sensor		4,382	2	8,764	1PAN, 1EAL	PAN, EAL	A
	10	C	Observation of meteological data	July	Data logger		4,921	2	9,842	1PAN, 1EAL	PAN, EAL	A
	11	C	Soil sampling	July	Soil color chart book	Daiki	222	4	888	4PAN	PAN	A
	12	C	Soil sampling	July	Soil sample vessel(100ml)	Daiki	178	100	17,800	90PAN, 10EAL	PAN, EAL	A
	13	C	Soil sampling	July	Soil sampling aid	Daiki	109	2	218	1PAN, 1EAL	PAN, EAL	A
	14	C	Soil sampling	July	Soil test stick (1m)	Daiki	707	2	1,414	1PAN, 1EAL	PAN, EAL	A
	15	C	Soil analysis	July	Digital soil penetrometer with built-in GPS	Daiki	2,708	2	5,416	1PAN, 1EAL	PAN, EAL	A
	16	C	Preparation of land use plan	July	GIS software	Daiki	970	2	1,940	1PAN, 1EAL	PAN, EAL	A
	17	C	Soil analysis	July	Digital actual volumenometer	Daiki	8,706	2	17,412	2PAN	PAN	A
	18	J	Key box	Aug.	CY980	CY	230	1	230	Nampula	Nampula	A
	19	J	Printer	Aug.	Officejet H470	HP	533	1	533	Nampula	Nampula	Consumable
	20	J	Scanner Printer	Aug.	SCX4623	Samsung	422	1	422	Nampula	Nampula	A

Year	No.	C/J	Purpose of Use	Arrival Date	Name of Machinery	Maker	Unit Price (US$)	Q'ty	Amount (US$)	Installation Place	Procurement Place	Current Condition
2011	21	J	Printer	Aug.	Color Laserjet CP1510	HP	608	1	608	Nampula	Nampula	A
	22	J	External HD 1TB	Aug.	Mypassport Esssneital SE	WD	265	2	530	Nampula	Nampula	A
	23	J	Laptop	Aug.	Mini Intel Atom N550	Samsung	517	1	517	Nampula	Nampula	A
	24	J	ArcGIS Software ver10	Oct.	ArcGIS ArcView Software ver.10	Arcview	1,745	1	1,745	Nampula	Nampula	A
	25	J	ArcGIS Spatial Analyst Software	Oct.	ArcGIS Software spatial analyst	Arcview	2,660	1	2,660	Nampula	Nampula	A
	26	J	Digital Camera	Oct.	Digital DSC-S2100 12.1MP	Sony	351	6	2,106	3 Nampula, 1Gurue, 1Mutuali, 1Lichinga	Nampula, Gurue, Mutuali, Lichinga	A
	27	J	Air conditioner	Oct.	Split 24000bites	Samsung	10.983	1	11	Nampula	Nampula	B
	28	J	Meeting desk	Nov.	Reuniao	2626	650	1	650	Nampula	Nampula	A
	29	J	Safe box	Nov.	Mahmari	Mahmari	465	1	465	Nampula	Nampula	A
	30	J	Shelf	Nov.	armario tepo		350	3	1,050	Nampula	Nampula	A
	31	J	Photocopy machine	Nov.	BIZHUB211	Konica Minolta	3,441	1	3,441	Nampula	Nampula	B
	32	J	Digital Camera	Nov.	Digital W330	Sony	298	5	1,490	3 Nampula, 2Lichinga	Nampula,	A
	33	J	Laptop	Nov.	pewsario CQ57-202EI	Compaq	833	5	4,165	2 Nampula, 1Gurue, 1Mutuali, 1Lichinga	Nampula, Gurue, Mutuali, Lichinga	A
	34	J	Scale	Nov.	Balanca Camry 150kg	Camry	460	2	920	1Nampula, 1Lichinga	Nampula, Lichinga	A
	35	J	Desk	Jan.	Type L	Type L	650	1	650	Nampula	Nampula	A
	36	J	Laminator	Jan.	Empleticor AB	Magi	232	1	232	Nampula	Nampula	A
	37	J	Laser Printer	Feb.	CM4370	HP	2,975	1	2,975	Nampula	Nampula	A
	38	J	Laser Printer tonor kit	Feb.	CM4371	HP	2,975	1	2,975	Nampula	Nampula	A
	39	J	Winch	Feb.	84960-VC300	Nissan	2,441	1	2,441	Nampula	Nampula	B
	40	J	Winch plate	Feb.	77777-M6000	Nissan	819	1	819	Nampula	Nampula	B
	41	J	Tyre cover	Feb.	77WP-PSFIT	Nissan	2,306	1	2,306	Nampula	Nampula	B
	42	J	Winch	Feb.	84960-VC300	Nissan	2,441	1	2,441	Nampula	Nampula	B
	43	J	Winch plate	Feb.	77777-M6000	Nissan	819	1	819	Nampula	Nampula	B
	44	J	Tyre cover	Feb.	77WP-PSFIT	Nissan	2,306	1	2,306	Nampula	Nampula	B
	45	J	Tyre	Feb.	F265/75R16-6TD694	Nissan	1,398	1	1,398	Nampula	Nampula	Consumable
2012	1	J	Shelf	Apr.	armario de vidro		350	2	700	Nampula	Nampula	B
	2	J	Signboard	Apr.	Plate for the experimental field		2,198	1	2,198	Lichinga	Lichinga	B

Year	No.	C/J	Purpose of Use	Arriva l Date	Name of Machinery	Maker	Unit Price (US$)	Q'ty	Amount (US$)	Installation Place	Procurement Place	Current Condition
2012	3	J	Fridge	May	Orima	Orima	550	1	550	Nampula	Nampula	A
	4	J	Fridge	May	Panasonic	Panasoni	817	1	817	Nampula	Nampula	A
	5	J	Mobile phone for PC	May	I-phone 4GS	Apple	883	1	883	Nampula	Nampula	B
	6	J	Scanner Printer	Jun.	LasejetM1212nfM FP	HP	532	1	532	Nampula	Nampula	A
	7	J	Desktop	Jul.	Computer	HP	1,447	1	1,447	Nampula	Nampula	Consumable
	8	J	Shredder	Aug.	Paper Shredder 3538	S6	175	1	175	Nampula	Nampula	Consumable
	9	C	Soil erosion control	Oct.	Water	TOA	3,106	1	3,106	PAN	Japan	A
	10	J	Laptop	Jan.	Pavilion g4	HP	917	2	1,834	Nampula, Lichinga	Nampula,	Consumable
	11	J	Digital Camera	Jan.	Cybershot DSC-W610	Sony	258	2	516	Nampula	Nampula	A
2013	1	J	Laptop	Apr.	2000	HP	750	1	750	Lichinga	Lichinga	A
	2	J	Printer	May	LasejetM1212nfM FP	HP	565	1	565	Nampula	Nampula	A
	3	C	Pre treatment of plant sample	May	Willey-type mill	Fujiwara	9,552	1	9,552	PAN	Japan	A
	4	C	Soil erosion control	Aug.	Water	TOA	1,885	1	1,885	EAL	Japan	A
	5	C	Soil and plant analysis	Aug.	Dry shelf	Sanplatec	541	2	1,082	PAN	Japan	A
	6	C	Plant analysis	Sep	Willey-type mill	Fujiwara	7,910	1	7,910	PAN	Japan	A
	7	C	Soil analysis	Sep	Soil infiltration meter	DAIKI	2,464	1	2,464	PAN	Japan	A
	8	C	Drip irrigation trial	Dec	Drip irrigation kit	—	7,795	1	7,795	PAN	Maputo	A
2014	1	C	Soil and plant analysis	Feb	Magnetic stiller	FHM	541	2	1,082	PAN	Maputo	A
	2	C	Soil and plant analysis	Feb	Muffle furnace	Scientific	6,180	1	6,180	PAN	Maputo	A
	3	C	Drip irrigation trial	Mar	Drip irrigation kit	—	111	1	111	PAN	Maputo	A
	4	C	Soil and plant analysis	Mar	Dry shelf	Sanplatec	541	2	1,082	PAN	Japan	A
	5	C	Soil and plant analysis	May	Water Prification s	MERCK	5,396	1	5,396	PAN	Maputo	B
	6	C	Soil and plant analysis	May	Ultrasonic bath cle	Grant	4,088	1	4,088	PAN	Maputo	A
	7	C	Soil and plant analysis	Aug	Decicator cabinet	Nalgene	864	1	864	PAN	Maputo	A
	8	C	Soil and plant analysis	Aug	Ultrasonic bath cle	Grant	3,828	1	3,828	PAN	Maputo	A
2015	1	C	Soil and plant analysis	May	Spectrofotometer	PG Instrumen	6,900	1	6,900	PAN	Maputo	A
	2	C	Soil and plant analysis	May	MP-AES	Agilent	76,041	1	76,041	PAN	South Africa	A
	3	J	Highland Portable Precision	July	HCB302	Adam	503	4	2,012	PAN	PAN	A
	4	J	Analytical balance	July	PW124	Adam	2276	1	2,276	PAN	PAN	A
	5	J	PH Meter Kit	July	C0101P	Consort	954	1	954	PAN	PAN	A

2) List of Equipment Currently Out of Service

Name of Machinery	Starting Date of Operation	Lifetime	Current Condition*	Reason/Period of Non-Operation
pH meter	May 2011	2 years	Not in use	The life time was expired
Printer (HP470)	2011	2years	Broken, Not Repairable	Consumable
Tyre (F265/75R16-6TD694)	2011	1year	Replaced	Consumable
Shredder (Paper Shredder 3538)	2012	1year	Broken, Not Repairable	Consumable
Water purification system	May 2014	1 years	Broken but Repairable	Filter was damaged by muddy water

* "Not broken but not in use," "Broken but Repairable," "Not Repairable," etc.

Annex 9 Inputs from the Brazilian Side

Documents for the Final Evaluation

1. Records of Inputs

Dispatch of Brazilian Experts

Name of the expert	Profession	Institution	FY	Duration of dispatch (days)
José Luiz Bellini Leite	General-Coordinator (Ph.D)	Embrapa	2011	84
			2012	201
			2013	211,8
			2014	60
Sub total				**556,8**
Henoque Ribeiro da Silva	Technical-Coodinator (Ph.D)	Embrapa	2012	321
			2013	201
Sub total				**522**
César Heráclides Behling Miranda	Technical-Coordinator/ General-Coordinator pro tempore (PhD)	Embrapa	2013	66
			2014	330
			2015	300
Sub total				**696**
Adão Neves	Agronomist (Ph.D)	Embrapa	2013	22,1
Adão da Silva	Agronomist (PhD)	Embrapa	2014	12
Alberto Santana	Economist (PhD)	Embrapa	2015	15
Álvaro Resende	Agronomist (PhD)	Embrapa	2014	12
Aroni Barboza	Technical Agronomist	Embrapa	2012	28,8
			2013	12
Beatriz Lorentz	Architect	Embrapa	2012	22,5
Bruno Walter	Forest engineer and agronomist (Ph.D)	Embrapa	2012	15,6
Danielle Torres	Socioeconomy (Ph.D)	Embrapa	2013	15,6
Evandro Lampert	Technical Agronomist	Embrapa	2012	28,8
			2013	32,4
Elizabeth Sabato	Agronomist (Ph.D)	Embrapa	2014	11
Flávio Lima	Biologist (Ph.D)	Unicamp	2012	14,3
Francisco José Farias	Agronomist (Ph.D)	Embrapa	2014	8
Geraldo Lonien	Technical Agronomist	Embrapa	2013	20,4
Gilvan Ferreira	Agronomist (Ph.D)	Embrapa	2012	31,2

			2013	12
			2015	9
Jaison Oliveira	Agronomist (Ph.D)	Embrapa	2012	13,5
João Batista	Agronomist (Ph.D)	UFG	2012	13,5
João Sobrinho	Technical Agronomist	Embrapa	2013	12
João Luis	Agronomist (Ph.D)	Embrapa	2013	13
João Ricardo	Socioeconomy (Ph.D)	Embrapa	2013	15,6
Joel Queiroga	Agronomist (Ph.D)	Embrapa	2012	27,3
			2013	7,8
José Coelho	Agronomist (Ph.D)	Embrapa	2013	7,8
José Cruz	Agronomist (Ph.D)	Embrapa	2013	13
José Denardin	Agronomist (Ph.D)	Embrapa	2012	15,6
José Morais	Technical Agronomist	Embrapa	2013	12
Kathia Sonoda	Biologist (Ph.D)	Embrapa	2012	14,3
Laércio Fadelli	Technical Agronomist	Embrapa	2013	12
Ladislau Skorupa	Forest engineer and agronomist (Ph.D)	Embrapa	2012	15,6
			2013	7,8
Marco Gomes	Agronomist (Ph.D)	Embrapa	2012	27,3
Marcos Antônio Oliveira	Analyst	Embrapa	2013	12
Maria da Conceição	Agronomist (Ph.D)	Embrapa	2013	13
Marta Assis	Biologist (Ph.D)	Embrapa	2012	15,6
Maurisrael Rocha	Agronomist (Ph.D)	Embrapa	2013	13
Norman Neumaier	Agronomist (Ph.D)	Embrapa	2013	13
Norton Benito	Agronomist (Ph.D)	Embrapa	2012	15,6
Osmar Conte	Agronomist (Ph.D)	Embrapa	2014	12
Paulo Melo	Agronomist (Ph.D)	Embrapa	2012	10,4
Pedro Gerhard	Biologist (Ph.D)	Embrapa	2012	32,5
Pedro Moreira	Agronomist (Ph.D)	Embrapa	2012	31,2
			2013	25
Raquel Neves	Agronomist (Ph.D)	Embrapa	2014	11
Raul Porfírio	Agronomist (Ph.D)	Embrapa	2013	13
			2014	12
Ricardo Figueiredo	Agronomist (Ph.D)	Embrapa	2012	27,3
			2013	7,8
Rodolfo Oliveira	Agronomist (M.S)	Embrapa	2012	11,7
		Embrapa	2012	12
Samuel Roggia	Agronomist (Ph.D)	Embrapa	2014	11

Sebastião Pereira	Technical Agronomist	Embrapa	2013	20,4
Sérgio Tosto	Socioeconomy (Ph.D)	Embrapa	2013	15,6
Tarcísio Cobucci	Agronomist (Ph.D)	Embrapa	2013	14,3
			2013	13
Total Period of Dispatch (days) of 46 experts				**2688**

(2) Provision of Equipment

List of Equipment Provided

No.	Arrival	Name of equipment	Model	Maker	Price	Place	Purpose
1	September 2012	Notebook PC	HP ProBook 4530s XU018UT Intel Core	Intel Core	1.794,44	Maputo	Facilitate activities of technical cooperation
2	September 2012	Telephone	Telephone Siemens euroset 5005	Siemens	59,49	Maputo	Facilitate activities of technical cooperation
3	December 2012	Printer	HP Laserjet Pro 100 CLR M175NW MFP	HP	548,84	Maputo	
4	August 2013	Pickup Truck	RHD Hilux Double Cab 6 Seater Turbo Diesel (a/c)	Toyota	49.668,22	Nampula	
5	August 2013	Pickup Truck	RHD Hilux Double Cab 6	Toyota		Lichinga	

			Seater Turbo Diesel (a/c)				
6	November 2013	Planter	Planter 3 Rows Hydraulic and Tractor Powered	Fitarelli	Donated by the company	Nampula	

(3) Implementation of Seminars and Training

1) Embrapa´sTraining

Category	Title	Purpose	Number of participants	Date	Venue
Training course	Management and conservation of plant genetic resources	Collection, characterization, management, conservation and regulation of access to plant genetic resources.	1	7 - 18 may 2012	Embrapa Estudos e Capacitação. Brasília/Brasil
Training course	Conservation Agriculture	Capacity building on agricultural potential of the land and the land use.	2	18 - 29 jun. 2012	Embrapa Estudos e Capacitação. Brasília/Brasil
Training course	Agricultural Experimentation	Data analysis and interpretation of experimental results.	21	24-11 – 02-12 2012	IIAM - Nampula
Training course	Sample Collection and Preservation of Insects	Capacity building on collecting samples of insects and mites.	3	4 – 19 may 2013	Embrapa Recursos Genéticos Brasília/Brasil
Seminar	Evaluation of agricultural environments in Nacala Corridor area.	Presentations by Brazilian Team members on the implication of	30	15 Jun. 2012	IIAM - Nampula

		Output 2			
Seminar	Quality of water and Integrated Impact Assessment in ProSavana-PI.	Presentations of work plan about activities related with quality of water and Integrated Impact Assessment.	15	20 set. 2012	DPA - Nampula
Seminar	Production systems for exportable: focus on conservation agriculture	Presentations on principles, fundaments and concepts of conservation agriculture on which were built the ProSavana-PI.	15	15 oct. 2012	IIAM - Maputo
Seminar	The soybean agribusiness.	To show the main characteristics of soybean agribusiness.	13	22 jan 2013	IIAM - Nampula
Seminar	System of corn production in Brazil.	Introduce the Brazilian system of corn production to IIAM team	13	22 jan. 2013	IIAM - Nampula
Seminar	Management of bean plants to high productivity.	To present the concepts and methods of high productivity on farming bean.	-	22 feb. 2013	IIAM - Lichinga
Seminar	Management of upland rice.	To present the concepts and guidelines about upland rice.	-	22. feb. 2013	IIAM - Lichinga

1.1 Trainings in 2014.

There were no formal training courses offered by ABC/EMBRAPA during 2014. However, several university students from local universities were trained within the experimental work carried in the field, resulting in final dissertations for conclusion of graduation courses, as follows:

a) Aderito da Felicidade Lopes Ernesto. Efeito de aplicação de níveis de adubação fosfatada e potássica no rendimento da cultura do milho cultivar BRS2022 em Muriasse, Província de Nampula. 2014. Final Dissertation for graduation in Agricultural Sciences. Catholic University at Cuamba.

b) Ivotina da Felicidade Lopes Ernesto. Avaliação da adaptabilidade de cinco cultivares de feijão nhemba em três datas de sementeira nas condições agroecológicas de Muriasse, distrito de Nampula. Final Dissertation for graduation in Agricultural Sciences. Catholic University at Cuamba.

c) Lázaro Suede. Avaliação da resposta da cultura de milho (Zea mays) a diferentes níveis de adubação de cobertura nas condições agroecológicas do planalto de Lichinga. 2014. Final Dissertation for graduation in Teaching in Agriculture, with main core in Rural Extension. University Pedagogica of Lichinga.

d) Ergino Damião Henrique Nhanombe. Estudo de pragas da cultura do feijão nhemba (Vigna unguiculata Walp L) variedade BRS Guariba em duas datas de sementeira na fase reprodutiva nas condições agroecológicas do planalto de Lichinga – Província do Niassa. 2014. Final Dissertation for graduation in Teaching in Agriculture, with main core in Rural Extension. University Pedagogica of Lichinga.

e) Edson Ricardo Mambo. Avaliação de adaptabilidade de genótipos de trigo (Triticum Spp.) em diferentes datas de sementeira nas condições agroecológicas do planalto de Lichinga, Província do Niassa. 2014. Final Dissertation for graduation in Teaching in Agriculture, with main core in Rural Extension. University Pedagogica of Lichinga.

f) Sara Paulo Niqueiro Caieva. Avaliação de ocorrência de pragas em três datas de sementeira na cultura de (Zea mayz L), variedade hibrida

(BRS 2022) nas condições agroecológicas de Lichinga. 2014. Final Dissertation for graduation in Teaching in Agriculture, with main core in Rural Extension. University Pedagogica of Lichinga.

g) Marta da Cruz Alfredo Nduvane. Avaliação do rendimento da cultura de trigo (Triticum vulgaris) em diferentes níveis de adubação nitrogenada nas condições agroecológicas do planalto de Lichinga. 2014. Final Dissertation for graduation in Rural Development. University Lurio, Niassa.

h) Geraldo da Celeste Chamusse Chuze. Avaliação da adaptabilidade dos genótipos de soja em diferentes datas de sementeira nas condições agroecológicas do planalto de Lichinga. 2014. Final Dissertation for graduation in Teaching in Agriculture, with main core in Rural Extension. University Pedagogica of Lichinga.

1.2. Trainings in 2015.

Formal trainings:

a) Practical training on the use of "Matraca" (a manual direct seeder commonly used in Brazil, whereas a single farmer may seed 1 ha a day), held in Nampula, January 17th, to technicians, students and field laborers. Attended by 15 people.
b) Practical training on the use of "Matraca", held in Namialo, January 28th, to field laborers and local farmers. Attended by 18 people.
c) Practical usage of soybean grains in human feeding held in the farmers association "Noneketho Makalelo" in Muriaze, September 15th. Attended by 20 family farmers.
d) Interpretation of plant and soil analysis for acidity correction and fertilizer recommendation, held in Nampula, 27th to 30th October. Attended by 28 people, including IIAM technicians and agricultural extensionists.
e) Laboratory management, held in Nampula, 26th October, full day. Attended by 22 lab technicians and students from University Pedagogica

of Nampula.

Further trainings within PI field experimental work that resulted in undergraduate students final work to obtain their academic degrees are as follows:

a) Idalina Celestino Napita. Efeito de datas de sementeira no rendimento de 4 variedades de feijão-nhemba nas condições agroecológicas de Nampula. 2015. Final Dissertation for graduation in Agricultural Sciences. University Mussa Bin Bique, Nampula.

b) Arnaldo Jamal. Efeito de 20 níveis diferentes do PK na cultura do feijão-nhemba variedade Guariba [*Vigna unguiculata* (L.) Walp.] nas condições agroecológicas de Nampula – Muriasse, posto administrativo de Anchilo. 2015. Final Dissertation for graduation in Agricultural Sciences. University Mussa Bin Bique, Nampula.

c) Milton Jorge Low Tovele. Adaptabilidade de quatro variedades de *Brachiaria spp. (Piatã, Xaraés, Tupi, e Ruziziensis*) as condições agroecológicas de Nampula. 2015. Final Dissertation for graduation in Agricultural Sciences. Catholic University at Cuamba.

1) Bearing cost from ABC

Item	Amount (USD)
1st Year (FY2011/2012 – Till June 2012)	
Air Ticket	68,493.60
Travel costs (except air ticket)	40,862.86
Local activities cost	50,169.23
Subtotal	159,525.70
2nd Year (FY2012/2013 – Till June 2013)	
Air Ticket	186,015.36
Travel costs	126,021.34
Local Staff	94,408.06
Local activities cost	81,222.46
Subtotal	487,667.22
3rd Year (FY2013/2014 – Till June 2014)	
Air Ticket	54,714.51
Travel costs	61,154.70
Local Staff	147,431.93
Local activities cost	157,030.18
Subtotal	420.331.32
4th Year (FY2014/2015 – Till June 2015)	
Air Ticket	20,258.30
Travel costs	26,658.53
Local Staff	125,392.03
Subtotal	172,308.86
TOTAL	**1,239,833.10**

2) Bearing cost from Embrapa

Item	Amount (USD)
Period (FY2012/2015 – Till September 2015)	
Technical-hours	**2,150,400.00**
TOTAL	**2,150,400.00**

Annex 10 List of Mozambican C/P (for the Japanese side)

Name, Position	Area of Specialty	Assigned Period from	Name of Expert in Charge
IIAM CZnd			
Fernand Chitio		Before May 2011	Director
Constantino Estevão Cuambe	Cassava	May 2011- May 2016	Director
Pedro Victor Rodrigues	Cashew nut	May 2011	Chief, Technology transfer department
Momade Mamudo Ibraimo	Soil	May 2011	Chief, Soil fertility sector
Anabela da C.Lopes Fonseca	Soil	May 2011	Technician
Ivete Frederico Maluleque	Agroforestry	May 2011	Chief, Research department
Henriques Victor Colial	Legumes	May 2011	Researcher
Venâncio Salégua	Socioeconomy	May 2011	Technician
Amâncio Nhantumbo	Socioeconomy	May 2011	Technician
António do Rosário Ipo	Cereals	May 2011	Technician
Faruque Ragú Ferreira	Irrigation	May 2011	Technician
João António Pedro	Cassava	May 2011	Technician
Rita V. Manjonda	Cassava	May 2011	Technician
Idalina Celestino Napita	Legumes	May 2011	Technician
Maria Clarinda	Soil	May 2011	Technician
Uatemua Anly Cássimo	Soil	May 2011	Technician
Jaime Baltazar	Soil	May 2011	Technician
Ana Paula Nampula	Soil	May 2011	Technician
IIAM CZno			
Carolino Martinho	Potato	May 2011	Director
Jonh Bulassi Kaunda	Legumes	May 2011	Researcher
Guilhermino Boina	Soy bean	May 2011	Researcher
Fernando Joao Sualei	Soil	May 2011	Researcher
Adriano Roda	Agronomist	May 2011	Technician
Oscar Chichongue	Soil	May 2011	Researcher
Muachema Macario	Metrology	May 2011	Technician
Cassamo Sumila	Socioeconomy	May 2011	Technician
Guilhermino Damba	Cassava	May 2011	Researcher
Miguel Murracama		May 2011	Researcher
Seninho Sejuro		May 2011	
Felix Timo		2014	

Annex 11 Costs Shared by the Mozambican Side (CZnd, CZno)

1. Costs Shouldered by CZnd

(Metical)

Year	1st Year 2011/2012	2nd Year 2012/2013	3rd Year 2013/2014	4th Year 2015-August	Sub-Total
Counterpart person involved directly in the project	3,348,306.60	5,042,999.40	5,547,299.34	5,991,083.29	19,929,688.63
Communication	276,000.00	276,000.00	303,600.00	470,000.00	1,325,600.00
Electricity	540,000.00	540,000.00	894,000.00	987,000.00	2,961,000.00
Field operation	60,000.00	90,000.00	299,000.00	421,000.00	870,000.00
Tractors and Implements				20,000,000.00	20,000,000.00
Lab operation	12,000.00	12,000.00	103,200.00	520,000.00	647,200.00
Transport	45,000.00	95,000.00	104,500.00	255,000.00	499,500.00
Office	240,000.00	360,000.00	696,000.00	810,000.00	2,106,000.00
Fuel	12,480.00	24,960.00	207,456.00	384,200.00	629,096.00
Total	**4,533,786.60**	**6,440,959.40**	**8,155,055.34**	**29,838,283.29**	**48,968,084.63**

2. Cost Shouldered by CZno (including stations under Czno)

(Metical)

Year	1st Year 2011/2012	2nd Year 2012/2013	3rd Year 2013/2014	4th Year 2015-August	Sub-Total
Counterpart person involved directly in the project	1,104,710.00	1,173,465.60	1,212,750.00	1,310,976.00	4,801,901.60
Communication	80,000.00	80,000.00	90,000.00	90,456.06	340,456.06
Electricity	120,000.00	120,000.00	120,000.00	120,000.00	480,000.00
Field operation	12,600.00	13,800.00	15,000.00	16,200.00	57,600.00
Tractors and Implements				7,500,000.00	7,500,000.00
Lab operation	0.00	0.00	0.00	0.00	-
Transport	76,000.00	80,000.00	84,000.00	576,000.00	816,000.00
Office	60,000.00	60,000.00	60,000.00	120,000.00	300,000.00
Fuel	20,256.00	20,256.00	182,304.00	243,072.00	465,888.00
Total	**1,473,566.00**	**1,547,521.60**	**1,764,054.00**	**9,976,704.06**	**14,761,845.66**

Annex 12 Technologies Developed by PI on Soil Improvement and Cultivation

Output	Developed technology	Effect	Explanation
3	Crop residue incorporation and Mulching	Increase Maize and Soy bean production twice (quantificar). Maize in PAN: 2.4t/ha→4.5t/ha Maize in Muriaze: 1t/ha→1.7t/ha Soy bean in PAN: 0.6t/ha→0.8t/ha Soybean in Muriaze: 0.3t/ha→0.45t/ha	2.5t/ha of Soy bean residue was incorporated in soil before sowing and 2.5 t/ha of Soy bean residue was used as Mulching material for Maize production 4t/ha of Maize residue was incorporated in soil before sowing and 3t/ha of Sorghum residue was used as Mulching material for Soy bean production
	Fertilization for Maize, Rice, Wheat, Cowpea, Common bean, Soybean Potato, Cotton	Optimal N,P,K application for each crop was determined.	Optimal N application for Wheat and Maize are 100, 178kgN/ha, respectively, Optimal P application for Rice, Wheat, Common bean, Soybean are 35, 180, 140, 140kg/ha of P2O5, respectively. Yield of Maize and Cowpea will not saturate up to 280kg/ha of P2O5 application, For maize, each 1kg of P2O5 will increase yield by 1.45kg. Cotton will not respond to P application. Optimal K application for Rice, Wheat, Common bean, Cotton are 100,50,100, 200kg/ha of K2O application, Yield of Maize and Soybean will not saturate up to 200kg/ha of K2O application, For maize, each 1kg of K2O will increase yield by 2.15kg. Cowpea will not respond to K application.
	Lime application for Maize and Soybean	Optimal Lime application for each crop was determined.	Optimal lime application for wheat is 4.2t/ha. For maize, each 1kg of lime will increase yield by 0.44kg up to 5t lime application.
	Chicken manure application for Maize and Soybean.	Increase P, K, Ca in soil. However to increase crop production, it is necessary to combine N application.	Chicken manure will increase soybean yield in most case. For maize, yield increase will be maximized when NPK fertilizer is applied at the same time.
	Minimum tillage	Decrease 40-91% of soil erosion Reduce production cost Increase net income 500-3000MT/ha	Minimum tillage (Zero tillage) showed same level of yield on Pigeon pea, Maize, Cassava production compared with conventional tillage. Minimum tillage (Zero tillage) can reduce production cost and increase net income because tillage is not necessary.
	Mulching with crop residue	Decrease 50-95 % of soil erosion Mitigate drought effect	Sorghum (3t/ha), Pigeon pea (2t/ha), Maize(4t/ha), Sunflower(4t/ha) residues mulching decreased soil erosion.

Output	Developed technology	Effect	Explanation
		Increase net income 1500-4000MT/ha	Soy bean (4t/ha) residue mulching could not decrease soil erosion because it is fine and easy to incorporate in soil through weeding. However incorporated soy bean residue increased pigeon pea production twice (0.8t/ha→1.7t/ha)
	Vetiver grass hedgerow	Decrease 78-91 % of soil erosion Increase net income 0-800MT/ha	Vetiver grass is planted on contour-line. Pruned Vetiver leaf can be used as mulching material. This system will not increase termites because they do not eat the vetiver leaf.
	Alley cropping with Pigeon pea	Decrease 86 % of soil erosion	Yield of perennial Pigeon pea will reach maximum level at second year and will be decreased from third year. The Pigeon pea is cut a height of 50 cm and intercropped with Maize at the start of third year. The pruned brunch and leaf are used as mulching material. The Pigeon pea can continue to provide mulching material because reproduce brunch and leaf.
4	Appropriate cultivars	Performance of several cultivars (Maize, Rice, Wheat, Cowpea, Common bean, Soybean, Potato, Cotton, and Forages) in Nacala corridor was evaluated.	Cultivar differences of various crops on yield exisit. It may change with different planting dates.
	Rhizobium Inoculation	Rhizobium (SEMIA 5079) significantly increased 40-50 % of soybean production.	Rhizobium (SEMIA 5079, 5080, and 5019) will increase soybean yield. Rhizobium (SEMIA 6462 and 6463) will be effective to get more than 1.5t/ha of cowpea yield without fertilizer.
	Maize- Soybean Intercropping	Mitigate drought effect Increase 20-50 % of land equivalent ratio	Maize-soybean intercropping system increase productivity by 15-49% as indicated by Land Equivalent Ratio. Advantage of this intercropping system was more highlighted under drought prone and low fertility conditions.
	Maize-Soybean crop rotation	Maize-Soybean crop rotation increased 54-59 % of crop production.	Yield of maize cultivated after soybean will be higher than that of maize continuously cultivated. This enhancement will not be observed when soil and fertilizer P are limited, for example, without P fertilizer in Nampula.
	Low pressure drip irrigation	The system can supply uniform amount of water to around of 0.1 ha.	This system was introduced for vegetable production in PAN.