

REPUBLIC OF MOZAMBIQUE
MINISTRY OF AGRICULTURE AND FOOD SECURITY
NATIONAL DIRECTORATE OF AGRICULTURAL EXTENSION

DRAFT 2

PROJECT PROPOSAL

**Enhancing Agricultural Technology Transfer System for
Smallholder Farmers in Mozambique**

September, 2016

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1. Project Description

1.1. Project Summary

The objective of the project is to improve production, productivity and competitiveness of smallholder farmers in major agricultural growth corridors of Mozambique through the establishment of a system for innovative promotion and adoption of improved agricultural technologies through improved extension services. The methodology to be followed will be based on the strengthening of extension and research systems as well as the establishment of a regulatory framework for R&E so as to introduce additional coordination mechanisms and create local capacity for extension and research services to engage small scale farmers in commercial agriculture in order to improve productivity and livelihoods. The target group will be the farmers who will benefit from the learning of new and integrated technologies in a value chain approach. The extension and research services will also benefit from the establishment of this Training Center as many of them have never seen or practiced the theories that bring from formal education schools. Main activities will include the establishment a Training Center, the dissemination of agriculture technologies and establishment of linkages between farmers and market.

1.2. Background and justification

Mozambique is a coastal country in southern Africa with a total surface area of 799.380 km². It has a border line of 4,330 km with six countries (Malawi, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe), of which four are landlocked - Malawi, Swaziland, Zambia and Zimbabwe. The shoreline is 2.400 km with three main ports - Maputo, Beira and Nacala that are important for the country and its neighbors.

About 35% of Mozambique's population lives in urban areas with a growth rate of approximately 4% per annum. With this growth rate it is estimated that urban population may attain 45% in 2019 (INE, 2014), which will result in considerable increase in demand for food over the next 10 years. To address this situation, agriculture development is critical since large food imports continue to play an important role in the national economy.

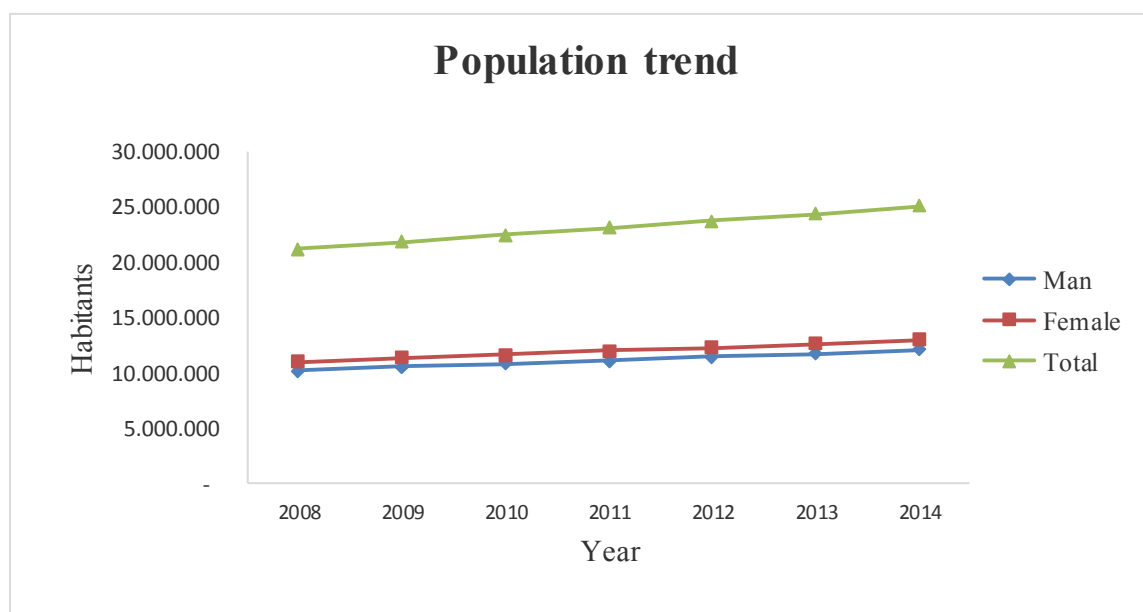


Figure 1. Population trend and sex ratio from 2007 – 2014 (**Source:** INE, 2014).

Agricultural producers include smallholders (98.93%), medium-scale (1.07%) and a few large-scale farmers (0.01%). Most farms experience low productivity due to the lack of use of modern technologies. Apart from this, low performance of the agricultural sector is also a result of interactions between adverse weather, biological constraints (pests and diseases), socio-economic and institutional constraints (e.g. limited extension services, input availability, weak infrastructure, poor institutions and risk aversion), cultural constraints, and deficiencies in farmers' management practices.

Most farmers cultivate less than 5 hectares of land (Figure 2) using hand labor as source of energy. This, apart from the poor quality of field operations impedes them to realize economies of scale.

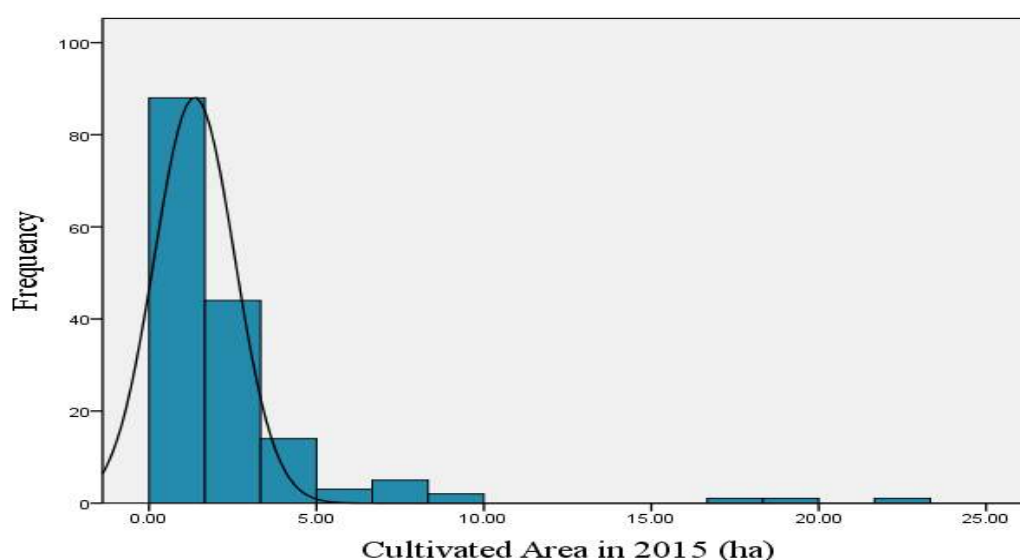


Figure 2. Cultivated area per household in 2015. **Source:** Findings from the field survey, September, 2016.

The Strategic Plan for the Agricultural Sector Development (PEDSA, 2011-2020), recognizes the fragilities of national institutions (both public and private) that need to be tackled in order to get an efficient performance and contribute to a more prosperous and competitive agricultural sector.

Among the challenges, the institutional capacity for the collection and analysis of information on production and productivity, sustainable management of natural resources and the promotion of agricultural technologies are recognized as paramount for the advancement of agriculture sector. Another important limitation is related to weak coordination between institutions, farmer's associations and private sector.

PEDSA advocates transformation of the Mozambican subsistence agriculture into a more market oriented production system that is competitive. This is to be achieved by the adoption of deliberate measures such as policy interventions that can permit famers to access agricultural inputs including quality seeds, fertilizers and crop protection products.

The challenge of PEDSA is to double the annual production in 10 years through increased agricultural productivity at a rate of 7.25% per annum. This is to be achieved through the expansion of the inputs distribution network and the increase in number of farmers with knowledge and skills on productivity enhancing technologies including post-harvest and commercialization. The strategy will be based on the strengthening of extension and research systems as well as the establishment of a regulatory framework for R&E sector among others (PEDSA, 2011).

As stated in the Strategic Plan for Agricultural Sector Development, the Government of Mozambique has major interest in developing an agricultural sector, that is viable (profitable and sustainable), productive and responsive to the food security and income needs of the country.

1.3. Objectives

The general objective of this project is to identify and address the factors affecting the performance of smallholder farmers in Mozambique. The specific objectives are:

- i. Identify critical problems affecting smallholder farmers to access factors of production (land, equipment, water, financial resources, political, legal and logistical requirements);
- ii. Improve agricultural extension services capacity to provide technical assistance and facilitate linkage of farmers and markets under the perspective of value chain; and
- iii. Formulate a strategic framework to address identified bottlenecks.

Detailed guidelines provided by DNEA in collaboration with the KREI through KAPEX are presented in attachment 1.

1.4. Approach

The methodology to achieve the desired objectives consists of two main pillars:

- a) To invest in a nationally-driven platform/network for knowledge-sharing in agriculture and food security to improve policy dialogue among stakeholders. In this regard, there is a need to advocate for the exemption of tariff and non tariff taxes (VAT) on the importation of agricultural inputs, equipment and spare parts. Lobby is also needed to establish safeguards (quota, reference prices, subsidies) to promote and incentivize the priority commodities (rice, cassava, beans, vegetables, fruits, poultry and cattle) in line with Mozambique major priorities including the construction or rehabilitation and maintenance of access roads to facilitate rural markets in the six agricultural growth corridors (Maputo, Limpopo, Beira, Zambezi Valley, Nacala and Pemba-Metuge). Advocacy for construction of dams and reservoirs for irrigation and other uses as well as lobbying for friendly access of finance services in rural areas will be an important undertaking.
- b) To establish Agricultural Training Centers with the necessary infrastructures and equipment for training, demonstration and technology transfer and link them with other anchor programs and establish a mutually reinforcing coordinating body among key actors for shared and regular communication, both horizontally and vertically.

2. Overview of past and present status of agricultural extension in Mozambique

2.1. General overview

Mozambique has a consistent set of policies and strategies for agriculture and rural development, demonstrating a commitment of Government to improve the enabling environment for the promotion of food security and poverty alleviation. The two policies and strategy documents that provide the Government's overarching policy framework for agriculture and rural development¹ include: 1) the rolling Government's Five Year Programs (PQG) after each cycle of general elections; and 2) the Action Plan for the Reduction of Poverty (PARP).

The primary objective of the PQG is to reduce poverty by improving the living conditions of Mozambicans in peace, harmony and tranquility. The program calls for the promotion of rapid, inclusive, and sustainable economic growth.

The PARP (in its fourth phase: 2015-2019) is the Government's Medium Term Strategy for the eradication of poverty. It sets the goals for poverty reduction and emphasizes inclusive and broad-based growth by increasing agricultural production and productivity,

¹ As cited in the PNISA.

promoting employment through the development of Small and Medium Enterprises (SMEs) and investing in human and social development.

The principles embedded in the Comprehensive Africa Agriculture Development Program (CAADP Compact, 2011) are reflected in the Government's planning and budgeting process, and made fully explicit through the Strategic Plan for Agricultural Sector Development. Approved by the Council of Ministers in 2011, the PEDSA provides a guiding framework for promoting the sector's targeted annual growth rate of 7 percent². It also aims to expand cultivated areas of food crops by 25 percent by 2020, and strengthen cooperation with the private sector across various value chains, in six priority corridors for agricultural development and expansion.

Mozambique's National Investment Plan for the Agricultural Sector (PNISA) sets out a comprehensive roadmap for investment in agriculture by implementing the PEDSA. With a few exceptions where crops are the responsibility of semi-autonomous agencies overseen by MASA (e.g. cotton, sugar, cashews), the plan aims to link and exploit synergies across value chains to build capacities in the sector. For example, agricultural extension services are linked with research, post-harvest management, marketing, and institutional strengthening³. The PNISA is composed of 5 components that correspond to the 4 pillars of the PEDSA and food and nutritional security. The fifth component incorporates the Multi-Sectoral Action Plan for the reduction of chronic malnutrition in Mozambique (PRDC 2011-2014).

Most recently, the Operational Plan for Agricultural Development (PODA, 2015-2019) was approved by the Government in order to streamline the priorities of PEDSA. In this regard, 15 commodities were selected as strategic intervention areas for public investment namely: maize, rice, wheat, potato, banana, beans, cassava, sesame, soybean, cotton, cashew nut, sugar, vegetables, poultry and cattle. Out of these intervention areas, 7 commodities were selected (Rice, Cassava, Beans, Vegetables⁴, Fruits, Poultry and Beef) as top priorities where the Government intends to concentrate investments including the creation of a package of policy incentives in order to increase productivity and production for the next 10 years.

² Derived from Mozambique's Vision 2025.

³ As cited in World Bank Project Document, P 129489, IDA Project in the Amount of USD 50 Million, (AGDPO-1), April 2013.

⁴ Cabbage, tomato and onion.

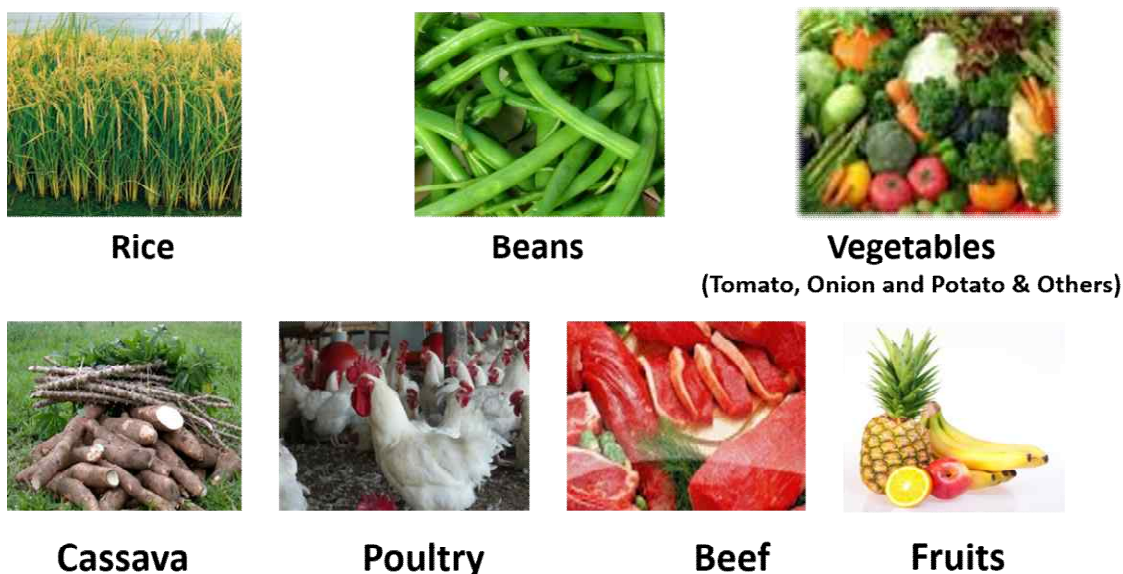


Figure 3. The seven priority commodities among the 15 strategic (PODA, 2015-2019).

2.2. Food balance of agricultural products

In the last 10 years, Mozambique moved from net recipient of international food aid to an exporter of agricultural products (PQG, 2009- 2014)⁵; effectively, the country is self-sufficient in products such as maize, sugar, cassava and beans. Mozambique exports not only the traditional products (cashew nut, cotton, timber) but also some emergent crops like sunflower, sesame, beans, piri-piri, baby corn and banana.

The commercial balance⁶ grew from 164.6 million USD in 2010 to 499.1 million USD in 2012 (Table 1), and expected to grow to 628,2 million USD in 2013 and 650 million USD in 2014, an average growth rate of 36,6% per annum.

In the same period, the export of agricultural products moved from 368.5 million USD in 2010 to 791.6 million USD in 2012 with expectation to achieve about 950 million USD in 2013, representing an average annual growth rate of 20,9%; in contrast, the imports of agricultural products grew at an average of 5.3% per annum equivalent to 203.9 million USD in 2010 and 292.5 million USD in 2012. It is worth to mention that more than 80% of imports were on cereals namely wheat and rice.

⁵ Five Year Government Program

⁶ Difference between export and import (1-2)

Table 1. Commercial Balance in Agriculture (Million USD).

	2007	2008	2009	2010	2011	2012	Mean
1. Exports	209,3	323,8	337,9	368,5	744,2	791,6	462,6
Pilled cashew nut	8,9	15,2	15,3	10,8	28,3	25,9	17,4
Raw cashew nut	10,8	15,0	13,2	14,9	53,7	47,0	25,8
Cotton	42,0	48,0	26,8	29,1	38,7	47,7	38,7
Sugar	61,8	71,3	58,3	87,5	87,9	139,1	84,3
Tobacco	51,8	132,1	180,6	152,6	179,5	183,3	146,7
Timber	31,9	38,9	38,1	65,6	125,6	123,3	70,6
Wheat					21,9	24,5	23,2
Maize flower					29,5	33,2	31,4
Banana					169,7	155,6	162,7
Others a)	2,1	3,3	5,6	8,0	9,4	12,0	
Global exports	2.412,1	2.653,3	2.150,2	2.333,2	3.118,3	3.470,6	
Excluding Big Projects	568,6	802,2	839,5	665,1	1.103,1	1.276,1	
Big Projects	1.843,5	1.851,1	1.310,7	1.668,1	2.015,2	2.194,5	
2. Imports	187,7	244,2	275,6	203,9	317,3	292,5	253,5
Cereals	176,0	222,0	250,5	183,0	280,2	258,1	228,3
Sugar	1,1	7,8	6,0	3,6	21,8	16,6	9,5
Vegetables	10,6	14,4	19,1	17,3	15,3	17,8	15,8
Tomato							
Onion							
Cabbage							
Kale							
Others	10,6	14,4	19,1	17,3	15,3	17,8	15,8
Commercial balance (1-2)	21,6	79,6	62,3	164,6	426,9	499,1	
							Mean
Export. Agriculture/Export Excluding Big Project	36,8%	40,4%	40,3%	55,4%	67,5%	62,0%	50,4%
Export. Agriculture/Export global	8,7%	12,2%	15,7%	15,8%	23,9%	22,8%	16,5%
Growth rates							
Exports		35,4%	4,2%	8,3%	50,5%	6,0%	20,9%
Imports		23,1%	11,4%	-35,2%	35,7%	-8,5%	5,3%
Commercial balance		72,9%	-27,8%	62,2%	61,4%	14,5%	36,6%

a) Includes beans, sesame, piri-piri and others

Source: PQG, 2009-2014.

In order to counteract the current situation of commercial balance and burden on imports, the Operational Agricultural Development Plan (PODA, 2015-2019), seeks to eliminate the deficit of onion and poultry by 2017; and tomato by 2019 and significantly reduce the deficit for rice (-39% in 2015 to -3% in 2019), potato (-40 in 2015 to -15 in 2019) and beef (-70% in 2015 to -58% in 2019) as indicated in Table 2. **Food balance for priority**

commodities. through a set of strategic framework that can help smallholder farmers to access a package of incentives including factors of production (land, equipment, water, financial resources, political, legal and logistical requirements) and quality agricultural extension services that provide technical assistance and facilitate linkage of farmers and markets under a perspective of value chain approach.

Table 2. Food balance for priority commodities.

Rice (Milled)	Years				
	2015	2016	2017	2018	2019
A. Total Available	350	286	485	562	648
B. Demand	576	598	621	643	667
Deficit (-); Surplus (+); (A-B)	-226	-312	-135	-81	-19
Deficit/Surplus (%)	-39%	-52%	-22%	-13%	-3%

Tomato	Years				
	2015	2016	2017	2018	2019
A. Total Available	396	424	487	556	602
B. Demand	500	516	540	564	592
Deficit (-); Surplus (+); (A-B)	-104	-93	-53	-8	10
Deficit/Surplus (%)	-21%	-18%	-10%	-1%	2%

Onion	Years				
	2015	2016	2017	2018	2019
A. Total Available	154	164	201	267	382
B. Demand	165	168	173	179	184
Deficit (-); Surplus (+); (A-B)	-11	-4	28	88	198
Deficit/Surplus (%)	-7%	-2%	16%	49%	108%

Potato	Years				
	2015	2016	2017	2018	2019
A. Total Available	238	263	295	327	364
B. Demand	399	405	411	418	428
Deficit (-); Surplus (+); (A-B)	-162	-142	-116	-91	-65
Deficit/Surplus (%)	-40%	-35%	-28%	-22%	-15%

Poultry	Years				
	2015	2016	2017	2018	2019
A. Total Available	66	79	91	110	145
B. Demand	79	83	89	93	98
Deficit (-); Surplus (+); (A-B)	-13	-4	3	17	47
Deficit/Surplus (%)	-16%	-5%	3%	18%	48%

Beef	Years				
	2015	2016	2017	2018	2019
A. Total Available	13	15	16	18	20
B. Demand	43	44	45	46	47
Deficit (-); Surplus (+); (A-B)	-30	-29	-28	-28	-27
Deficit/Surplus (%)	-70%	-65%	-63%	-61%	-58%

Source: PODA, 2015.

Moving from the current deficit of -39 to -3% as it appears in 오류! 참조 원본을 찾을 수 없습니다., it is a strong indication that the government of Mozambique is willing to put particular efforts to phase out the deficit of rice and a clear recognition of its role for food security and foreign currency saving.

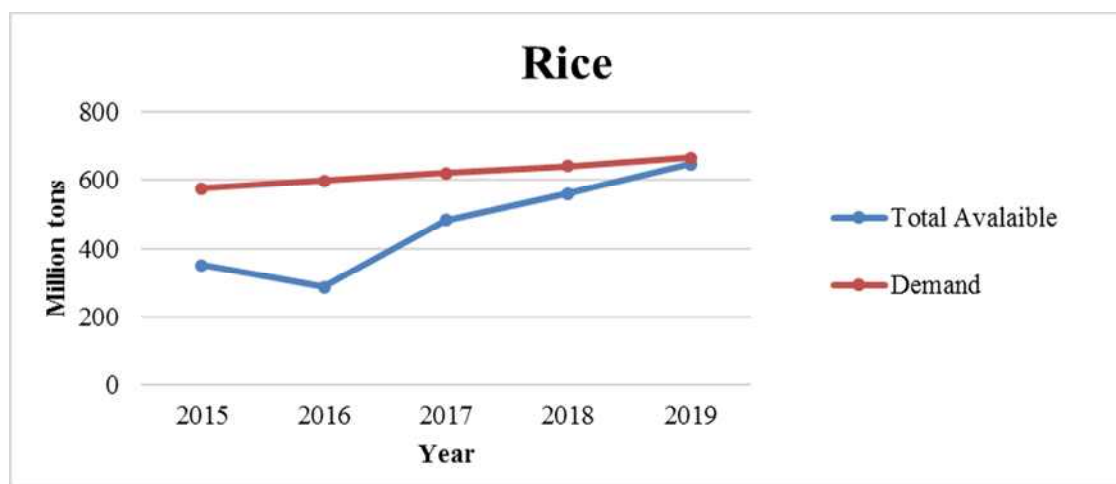


Figure 4. Projection of rice food balance in Mozambique from 2015-2019.

Indeed, according to some studies (MINAG, 2012; USDA, 2011)⁷ the consumption of rice in Mozambique has shown higher growth rate as compared to its domestic production. Figure 4 illustrates the historical production and consumption of rice in the last 50 years.

⁷ Proposal for the creation of a Regional Centre Leadership for Rice Research in Mozambique.

In order to fill this gap, the Mozambique has to import an annual average of 350,000 ton. This represents a significant challenge taking into consideration that the country has a potential of more than 900 thousand hectares of land suitable for rice production (Zandamela *et al*, 1994).

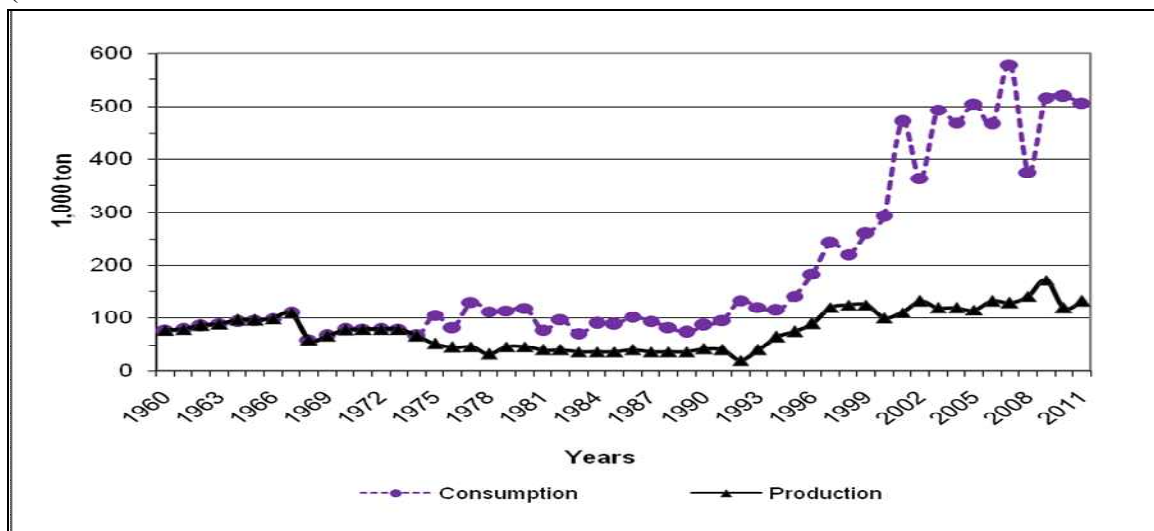


Figure 5. Production versus Consumption of Rice in Mozambique (1961-2011).

One of the most important reasons for the increasing between demand and supply of domestic rice is the low productivity (Figure 6). The analysis for the period 1960 to 2010 show that the yield remained very with slight increase for the period 1996 to 2010, with levels of around 1.0 – 1.2 ton/ha.

The low productivity levels present however, an opportunity for research and extension to contribute with technological solutions to increase rice productivity and for the adoption of policies that encourage the development the rice crop.



Figure 6. Trends in productivity of rice in Mozambique. (Source: USDA, 2011). (Note: milled rice converted into yield from the field, by a yield conversion factor of 1.6).

Figure 5 shows the trend in rice productivity in Mozambique from 1960 to 2010. It can be seen that the rice productivity in Mozambique is extremely low and with a declining trend. However, paying attention to the period 1996 to 2010, it can be observed that the productivity stabilized with tendency to grow at levels of around 1.0 – 1.2 ton/ha.

As can be observed in Figure 7, the gap between supply (via domestic production) and demand for rice has been increasing, resulting in an increasing burden on imports, while several and traditional rice producing countries, especially the South East Asia countries, are adopting measures constraining the free market on agricultural products and rice in particular.

The burden on imports is illustrated in figure 6 which suggests that apart from the volumes imported, the prices tend to increase over time. This reinforces the need of adoption of policies and strategies to reverse the situation through increased production of domestic rice.

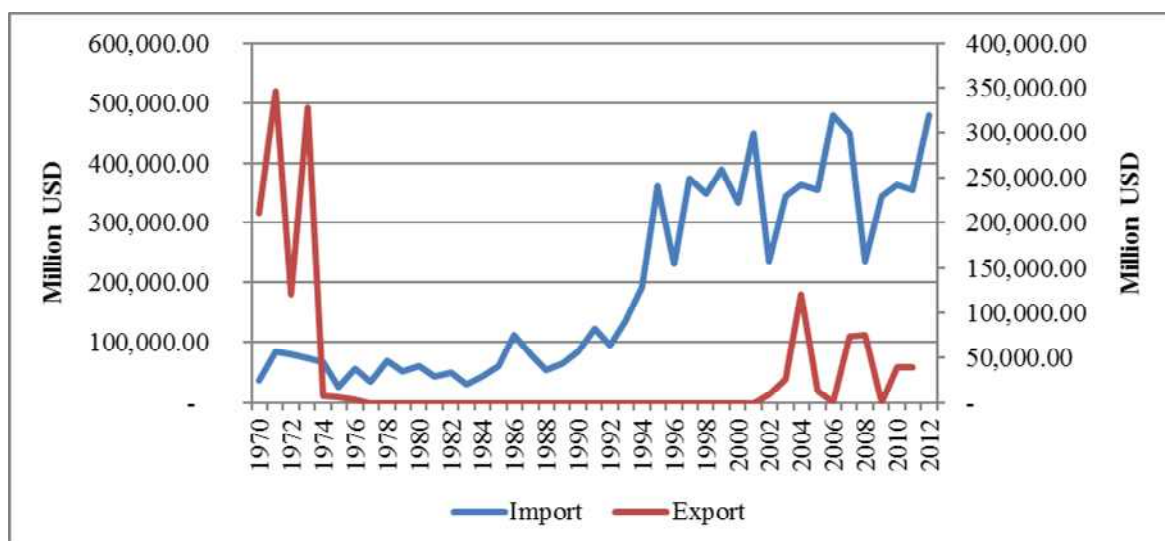


Figure 7. Prices of imported and exported rice in Mozambique (Zandamela, E. 2015 citing FAO).

The low productivity levels present however an opportunity for research to contribute with technological solutions to increase rice productivity and for the adoption of policies that encourage the development rice crop.

2.3. Past and current technology transfer system for smallholder farmers in Mozambique

Before independence in 1975, agricultural extension was entirely facilitated through commercial sector (Extension Master Plan 2007-2016⁸). In the post-independence period, the efforts turned to smallholder farmers and large private farming through the Ministerial Decree 41/87, 1987 creating the National Extension System in 1987 as a result of failure of

⁸ Plano Director de Extensão Agrária 2007-2016 in Portuguese

estate farms and cooperatives. According to the Extension Master Plan, the evolution of agricultural extension can be divided in three main phases:

- i. Establishment phase (1987-1992): first experience in some locations using training and visiting (T&V) methodology;
- ii. Expansion phase (1993-1997): introduction of modified T&V; use of a flexible approach; with strong support from donors in the public extension and NGO's;
- iii. Phase of Master Plans from 1999 and the adoption of multiple provision of extension services.

The Extension Master Plans are operationalized through the implementation of support programs such as the National Agricultural Extension Program (PRONEA, 2007-2014) with the following specific objectives: 1) increase the implementation capacity of extension programs within a pluralistic and participatory framework; 2) improve the technical and managerial capacity of producers with respect to planning, monitoring and evaluation process and the provision of services; and, 3) provide extension services at provincial and district level to promote agricultural and fishery productivity for food and nutritional security, food and the sustainable use of natural resources.

After approximately five years of implementation, the Ministry of Agriculture and partners undertook some review on Agricultural Extension (MADER, 2002, Eicher, 2002, DANIDA, 2002, Finney, 2003, Walker *et al.* 2004) and the overall conclusion was the need to abolish the T&V methodology and establish a proper/domestic model based on three principles: i) de-centralization/concentration, ii) participation and, iii) partnership and outsourcing. These measures aimed at addressing crosscutting issues and increase the impact of extension services in poverty reduction and improve institutional linkages.

The implementation of the Master Plans is based on two pillars i) Unified Extension Service (SUE) and ii) National Agricultural Extension System (SISNE). These two pillars together form the National Agricultural Extension Services where different extension providers (public, NGOs and private) have a role to play. The degree of collaboration and coordination of activities vary from province to province. The Ministry of Agriculture and Food Security through DNEA and the Provincial Services for Rural Extension (SPER), endeavor to create an enabling environment to improve the flow of information and experiences. Most of the NGO's and private organizations participate in the Annual Meetings and Periodical Technology Review (REPETE).

As described in the 2nd Extension Master Plan (2007-2016), the overall objective of Agricultural Extension is to materialize the general objective of the Ministry of Agriculture i.e., *“improve food security for economic development and poverty reduction especially for subsistence farmers both men and women including households headed by vulnerable*

women through the increase in productivity and production as a result of provision of new technologies and institutional innovations and promotion of ownership among farmers”.

The target group of the public extension is the smallholder farmers with a view of their transformation from subsistence into more market oriented system in 152 districts in order to improve their livelihood through the implementation of a value chain approach including crosscutting issues (gender, HIV/AIDS and natural resources management).

For the implementation of the Master Plans, DNEA is the entity responsible for the delivery of extension services in collaboration with partners. DNEA coordinates the extension activities with other Directorates within MASA. The Consultative Council (with regular meetings) and Coordination Council which include external partners meets once a year.

Through a 3-tier organizational structure, DNEA oversees the implementation of the national extension system at central, provincial and district levels. The central level is composed of a National Director, Deputy National Director, Heads of Departments of Technical Assistance, Agricultural Extension and Agricultural Extension Management as well as by Technologies and Climate Change, Training, Farmers Organization, Communication, Planning, M&E, Knowledge Management, Administration and Finance Units. These units are responsible for the overall policy formulation, coordination, supervision and monitoring and evaluation. At provincial level, these units are replicated as Provincial Services for Agricultural Extension (SPER) who responds simultaneously to the Director of DNEA and to the Provincial Director of Agriculture and Food Security in the respective province. This also applies for the district level (designated Extension Network/Team) where the Head of the Extension Services (Supervisor) responds to the District Director of Economic Activities (SDAE) and SPER.

According to PNISA, the 152 districts covered by the public extension corresponds to 88% of the existing 405 Administrative Posts in the country and 13 cities, employing 1335 Field Extension Workers and supervisors in 2015 (including those of the cashew sector). This coverage only reaches 11% of the 4,9 million farming households in the country. The public extension services are complemented by NGOs and private network consisting of about 113 NGOs and 73 agricultural development companies.

3. Critical problems and opportunities for the smallholder farmers in Mozambique

In order to address the critical problems and explore eventual opportunities, 310 interviews took place in Maputo and Gaza provinces covering smallholder farmers, inputs providers, extension supervisors, researchers, planning officers at central and district level (table 3). The interviewees were asked to provide their opinion on the main issues affecting agricultural extension in the country i.e., to: a) identify critical problems affecting smallholder farmers in accessing inputs, b) determine the political, legal and

logistical requirements to facilitate the farming process through linking farmers and markets and, c) identify a strategic framework to address the identified bottlenecks.

Table 3. Total number of interviews.

Interviewees	Total
Farmers	250
Input Providers	6
Field Extension Officer	12
Extension Supervisors	22
Officer Technologies	7
Researchers	4
Policy Makers	9
Total	310

3.1. Critical problems

The results emerging from the survey show that the respondents have different perceptions about the agricultural sector in the country. However, the most reported issues are i) poor water management in both irrigation systems and rainfed conditions leading to low yields or to complete crop losses, ii) market failures that create disincentives for commercial farming, associated with non existence of agro-processing for value addition or conservation of farmer products, iii) Non use of proper agricultural equipment leading to poor quality of field operations and their untimely completion associated with poor or nonexistent network for inputs distribution system coupled with poor access roads in rural areas and, iv) weak farmer organizations hampering most of empowerment initiatives for farmers such as training and bargaining capacity (see table 4 and annex 3 for more details).

Table 4. Summary of responses from interviews to extension workers and researchers.

Question	Responses	No.	%
B3. Critical problems affecting smallholder farmers	Mechanization (pre and post-harvest)	6	27
	Poor inputs distribution networks	6	27
	Poor water management	12	55
	Poor market (credit, interest rates, roads, information, training)	8	36
	Poor farmer organization (DUAT)	5	23
B4. Political, legal, logistical needs to facilitate farming process through linking farmers & markets	Lack of agro processing and conservation	8	36
	Poor access roads	6	27

The assessment also found that many of those interviewed perceive the institutional coordination among partners in agricultural extension to be a constraint, due to the multi-sectoral nature of the challenges within the agriculture sector as a whole. For example, the corridor strategy called for in the PEDSA, will require more than just a common agenda and shared vision among collaborating agencies. It will require a coordinating body, mutually reinforcing activities among key actors, shared measurement, and regular communication. This will necessitate building new institutional set up that has the reach (both horizontally and vertically) to serve the landscape corridor level with an integrated multi-sectoral approach.

The interviews indicated also that the quality of data used for policy making is poor and rarely sets targets and indicators to monitor the progress of their programs. Expenditures are not tracked against investments and outcomes, so it is difficult to gauge efficiency.

Most of the interviewed staff said there is a great need to develop a stronger results orientation across institutions to improve country's system and to raise the bar for the quality and quantity of data. They also mentioned that work plans are used by their institutions, but they often do not include indicators and targets, making it difficult to monitor and report progress effectively.

Apart from the problems indicated by interviewees the research team found that the lack of adequate technologies, extension services and reference centers constitute critical constraints. Therefore, the existence of Agricultural Training Center for technology adaptation, demonstration and transfer as site where the farmers, extension officers, policy makers, decision makers, service providers and development partners can interact and share technical, social, environmental and economic experiences and knowledge based on evidences on order to improve the adoption of appropriate technologies by smallholder farmers. The Agricultural Training Center (ATC) is an adequate place to implement short, medium and long term experiments and demonstrations of technologies.

3.2. Policy implementation

There are a number of guiding policies and strategic documents in Mozambique but their implementation has been slow. Some of the main reasons for the slow pace of policy implementation include: limited human resource capacity; limited absorptive capacity which includes the need to improve public financial management and to strengthen the extension system for monitoring and evaluation coupled with strong and well defined indicators and targets for monitoring and evaluation in order to learn from and improve upon existing policies.

3.3. Decentralization

Decentralization creates constraints in coordination when it comes to linking national-level policy setting with implementing agencies at the provincial and district levels and farmers who are the ultimate implementers. This has bearing on service delivery as well as resource allocation. The Corridor strategy is expected to introduce significant additional coordination challenges. At the local level, extension services lack capacity in terms of numbers of extension workers, knowhow and skills and logistical conditions. This makes it difficult to engage small scale farmers in commercial agriculture in order to improve their productivity and livelihoods. District authorities under the Ministry of State Administration are implementing the local development programs of small loans for economic activities, which include agriculture projects.

With decentralization, the organization and structure of local administration has changed and the local representations of some ministries have been restructured through a combination of some district directorates into one (e.g. agriculture, industry and commerce became District Activities and Economic Services (SDAE). But the corresponding ministries at the central level have remained unchanged. In addition, provincial and district administrations often lack the human resource capacity to efficiently address local challenges. Agriculture service delivery is the responsibility of the district level services for economic activities (SDAE). SDAE's core services such as agricultural extension is often supported by donor-funded projects and implemented by public extension, private sector and NGOs.

There are also sequencing and timing issues suggesting some incompatibility of the government's budget cycle, with the agriculture cycle (main crop season). As a result, funds may not be available during the most active agricultural period, from January to April. Apart from this, there are complaints of considerable delays in the disbursement of both internal and external funds which sometimes come in November or December.

At the same time there are big projects such as irrigation projects financed "off budget" with their own accounting system out of MASA's control that have no link to the national agriculture budget. These projects are expected to continue in parallel to the PNISA. There are also adaptive challenges that require changes in behavior and attitude. Key informants said that many managers in the agricultural sector still consider accounting solely as a book keeping function, rather than a tool for financial control and monitoring project activities.

3.4. Opportunities

At policy level, as indicated in section 1 (introduction), the Government of Mozambique has a set of guiding documents (PQG, PARP, PEDSA, PNISA and PODA) that together with DNEA's internal documents such as the Extension Master Plan constitute the basis and institutional framework for the implementation of the proposed Project.

Apart from these, there is a potential for forging synergies with some projects that are in progress within MASA, such as the Integrated Program for Agricultural Technology Transfer (PITTA) established in 2011 operating throughout the country whose approach is to facilitate extension workers to develop 1 hectare of a selected commodity and raising 2,000 chickens as ways of demonstrating technologies to farmers; the (PROSUL), established in 2014 with activities in Maputo, Gaza and Inhambane provinces, emphasizes the establishment of vegetables, cassava and beef production. The National Extension Program (PRONEA, 2013) is mostly dealing with the establishment of farmer field schools (FFS) in 42 districts of the country.

At operational level, the six Agricultural Growth Corridors are well serviced by the IIAM Research Centers⁹. Each of these Zonal Centers is serviced by a network of Research Stations that have developed a number of technologies, some of them ready to use. Apart from the research network, the extension services are present in all districts of the country. It is also anticipated that the collaboration with Korea Rural Economic Institute (KREI) and other partners can significantly contribute for strengthening of agricultural extension and aid in alleviating the current bottlenecks.

In the civil society there are some fora (e.g.: The Confederation of Private Sector Associations (CTA), Seed and Fertilizer Platforms, Farmer's Union, Research and Extension Innovation Platforms) that the proposed project can use and liaise to advocate and influence policy changes in order to achieve its objectives.

4. Project Description

This Project proposal is founded on the problems described in section 3 and the goal is to identify and address the factors affecting the performance of smallholder farmers in Mozambique. The Project is to be implemented for a period of five (5) years from 2017 to 2022. The objectives of the proposed project are as follows:

4.1. General objective

The general objective is to improve production, productivity and competitiveness of smallholder farmers in major production areas of Southern part of Mozambique through the establishment of a system for innovative promotion and adoption of improved agricultural technologies through improved extension services.

⁹ Pemba-Lichinga Corridor: North West Zonal Research Centre; Nacala Corridor: North East Zonal Research Centre; Zambeze Valley and Beira Corridors: Central Zonal Research Centre; Limpopo and Maputo Corridors: Southern Zonal Research Centre.

4.2. Specific objectives

- 1) Establishment of Agriculture Training Center for farmers, community leaders and extension agents;
- 2) Establishment of clusters for crop intensification in the southern provinces of Mozambique;
- 3) Training of farmers, extension officers, researchers and establishment of field demonstration of productivity enhancing and climate smart agriculture technologies;
- 4) Dissemination of appropriate technologies.

4.3. Expected results

- 1) One Agricultural Training Center established and operating (infrastructures and equipment) including agro-processing facilities for each vegetables, fruits, cereals and livestock established and operating;
- 2) A planning and dialogue platform for extension services established;
- 3) Amount of commercialized commodities increased;
- 4) Implementation capacity of DNEA strengthened.

4.4. Activities

1) Specific objective 1 (Establishment of Agricultural Training Center)

- a) Site selection and land acquisition;
- b) Construction and/or rehabilitation of facilities;
- c) Equipping the ATC facilities (classrooms, dormitories, kitchen and dining hall);
- d) Acquisition of field equipment for crops and livestock training and demonstrations.

2) Specific objective 2 (Establishment of clusters for crop intensification)

- a) Training of extension agents and leader farmers in rice and other cereals production;
- b) Training of extension agents and leader farmers in vegetables production;

- c) Training of extension agents and leader farmers in livestock production (poultry and others).
- d) Liaise with government authorities, banks and partner agencies in order to aid guarantee funds to support out grower farming scheme through the processing industries.

3) Specific objective 3 (Training and field demonstration)

- a) Farmers organization by clusters (priority and objectives);
- b) Capacity building of public and private extension services (PPP);
- c) Training on business plans and agribusiness (including youth incubation programs);
- d) Training on processing, packaging and labeling and marketing;
- e) Development of Monitoring tool and align the budget with performance indicators;
- f) Conduct strategic/thematic case studies (evidence-based impact and priority setting).

4) Specific objective 4 (Dissemination of appropriate technologies)

- a) Create awareness about the Agricultural Training Center;
- b) Promote field days, agricultural exhibitions and fairs and internships of agricultural students and scholars;
- c) Experience exchange and study visits;
- d) Promote innovation and dialogue platforms, workshops and conferences;
- e) Establish intranet (interactive website);
- f) Production and distribution of extension and communication materials.

4.5. Project Implementing Organization

- 1) Implementing agency: National Directorate of Agricultural Extension (DNEA) through private sector;
- 2) Other organizations which will be involved in the project implementation and technical assistance include the Institute for Agricultural Research of Mozambique (IIAM) and Korean experts in the areas of specific expertise as well as service providers concerned in the different value chains along the target areas;
- 3) Undertakings of the Host Country: The host country will ensure land for project implementation and the national counterparts.

4.6. Project site

The criteria for project site selection include:

- i. Accessibility;
- ii. Production potential of the selected commodities;

- iii. Access to inputs and output markets;
- iv. Distance to main domestic and international harbor and airport.

Apart from these criteria, the research team took into consideration the initial investment with support of MAFRA and MASA at Marracuene ATC in Maputo province that needs to be completed particularly training facilities in crop husbandry and processing (rice and vegetables) and livestock in order to make this a national reference center of excellence. Therefore, the proposed project site is Marracuene ATC, which is located about 30 km northern part of Maputo City (Capital of Mozambique).

4.7. Target group

The target group will be resource poor smallholder farmers in the southern region of Mozambique (Maputo, Gaza and Inhambane provinces) who will benefit from the learning of new and integrated technologies in a value chain approach in the Agricultural Training Center as well as through demonstration plots, learning by doing from different service providers who will be invited as lecturers including researchers and extension agents. The extension services will also benefit from the establishment of this Center as many of them have never seen or practiced the theories that bring from formal education schools.

5. Project cost and financing

The estimated budget is 5 million USD for the five year project duration (2017 - 2022) to cover all the activities described in the Table 5.

Table 5. Summary of activities and indicative budget.

Description of Activities	Project calendar					Budget in US\$
	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Specific objective 1: Establishment of Agricultural Training Center						3000,000
1. Site selection and land acquisition	X					
2. Construction of facilities	X	X				
3. Equipping the ATC facilities	X	X				
4. Acquisition of field equipment	X	X				
5. Technical Assistance	X	X	X	X	X	
6. Seed Fund for ATC Sustainability	X					
Specific objective 2: Establishment of clusters for crop intensification						600,000
7. Training in rice production		X	X	X	X	
8. Training in vegetables production		X	X	X	X	
9. Training livestock production		X	X	X	X	
10. Guarantee funds for outgrower schemes	X	X	X	X	X	

Specific objective 3: Training and field demonstration						900,000
11. Farmers organization by clusters	X	X	X			
12. Capacity building extension services	X	X	X	X	X	
13. Training on business plans	X	X	X			
14. Training processing and marketing		X	X	X		
15. Development of Monitoring tools	X					
16. Conduct case studies	X		X		X	
Specific objective 4: Dissemination of appropriate technologies						500,000
17. Awareness about ATC	X	X	X	X	X	
18. Field days, fairs and internships			X	X	X	
19. Experience exchange			X	X	X	
20. Promote platforms and workshops			X	X	X	
21. Establish intranet			X			
22. Communication materials	X		X	X	X	
Grand Total						5,000,000

One of the most constraints to close the gaps in the value chain is the inability of commercialization institutions to timely purchase the outputs from farmer's produce. Therefore, the provision of guarantee funds will encourage banks and other stakeholders in the value chain to close the prevailing gaps in the value chain such as credit for land preparation, seed and fertilizers that farmers can pay back after harvesting. The guarantee funds will also help to create economies of scale for inputs acquisition and for the commercialization of farmer's outputs and certainly increase the number of rural participating farmers and stakeholders involved will definitely build a long term relation and thus assure project sustainability and viability. For more information please refer to annex 3.

In this regard, ATC through the private sector will provide credit for inputs to small scale farmers and farmers associations; assure that credit in kind provided by ATC farmers/associations is paid back; this include provision of technical assistance and extension services to small scale farmers and associations.

6. Timing and organization of the project

Timing: The project is scheduled to implement project in 5 years (from 2017 to 2022).

In the first year the activities will be concentrated in the identification of location for the construction of Training Center; The Center will be led by Director. The Director will be appointed by the Minister who oversees the area of Agriculture. The Director will liaise for the nomination of national and overseas technical staff; training on aspects related to a) management and governance of the Training Center and, b) research and dissemination of improved/selected value chains per targeted provinces.

The project management will have to look into the aspects of establishment of the Project Management Unit (PMU) and the establishment of institutional organization of the Training Center, taking into account that the Training Center is income-generating administrative agency. This Center is directly under DNEA supervision. Its functions are research, training, education, production, and extension of selected value chains in the three provinces of southern Mozambique.

7. Project Sustainability

The sustainability of this project will be ensured, among others, through the following:

- a) Service provision (machinery, rice milling and vegetable processing and conservation);
- b) Seed fund (Term deposit and the interest transferred to ATC current account)
- c) Co-participation of government;
- d) Income revenue from sale of rice, vegetables and livestock;
- e) Income from warehouse and cold storage conservation fees;
- f) Consulting and technical assistance fee;
- g) Rent of ATC facilities (classroom, dormitory and dining hall).

All the above strategies or mechanisms will help to make the training (ATC) accessible to the trainees paying a symbolic fee.

8. ANNEXES

Annex 1. Questionnaire administrated.

Interviewee	Questions		
	B3. Critical problems affecting smallholder farmers	B4. Political, legal, logistical needs to facilitate farming process through linking farmers & markets	B5. Strategic framework to address bottlenecks
1 ¹	1. Lack of equipment and implements 2. Credit 3. Cost of inputs	1. Lack of agro processing 2. Lack of conservation facilities	1. Need mechanization 2. Irrigation
2 ¹⁰	1. Climate change 2. Political instability 3. Lack of information 4. Lack of friendly credit 5. Poor access roads 6. Lack of irrigation	1. Lack of agro processing 2. Lack of electricity	1. Subsidy 2. Training 3. Improved seed 4. Build irrigation systems
3	1. No clear policies 2. Lack of incentives	1. Identify markets 2. Improve access roads	1. Improve policies
4 ¹¹	1. Lack of equipment 2. Lack of irrigation 3. High interest rate on credit	1. Promote small scale equipment 2. Use electricity as opposed to fuel 3. Promote agro processing, conservation and storage	1. Strengthen training (farmers, extension agents) 2. Improve linkages R&E
5 ¹²	1. Lack of irrigation 2. Lac of equipment	1. Need credit for small scale farmers	1. Promote agro industry 2. Provide more inputs to farmers
6	1. Lack of finance 2. Lack of information 3. Low level of training	1. Need policies for commercialization 2. Improve access roads 3. Need agro-processing	1. Ensure balanced value chain

¹⁰ Researcher

¹¹ Extension Supervisor for 8 years

¹² Planning unit/SDAE for 2 years

	4. Difficulty to procure inputs in rural areas		
7	1. Lack of irrigation 2. Lack of leveling 3. Poor choice of equipment 4. Lack of power for irrigation	1. Poor credit for agriculture 2. Conflict of politics with technical issues	1. Improve inputs and output market
8 ¹³	1. Lack of DUAT 2. Lack of credit	1. Lack of access roads	1. Facilitate credit
9 ¹⁴	1. Lack of irrigation 2. Lack of market 3. Lack of agro processing and storage	1. Improve access roads 2. Need to finance seed and equipment	1. Need for participative design of policies (farmers, extension, researchers)
10 ¹⁵	1. Lack of irrigation 2. Lack of resources for implementation of programs 3. Lack of training on the use of equipment	1. Need subsidies 2. Improve access roads 3. Promote agro processing, conservation and storage	1. Use small scale equipment 2. Work in low/humid lands
11	1. Lack of irrigation 2. Lack of credit 3. Lack of equipment	1. Create conducive policy for market 2. Improve policies for import of inputs 3. Need balanced value chain	1. Training at all levels 2. Improve R&E linkages 3. Provide fund for the implementation of projects and programs 4. Participatory planning
12 ¹⁶	1. Lack of irrigation 2. Lack of credit 3. Lack of equipment	1. Promote agro processing for value addition	1. Training in technical aspects 2. Create DATA Basis 3. Promote improved seed
13	1. Lack of inputs distribution networks 2. Lack of DUATs	1. Improve implementation capacity of policies and programs along the value chain	1. Decentralize resources 2. Participatory implementation of

¹³ Extension agent for 6 years

¹⁴ Technician for 2 months

¹⁵ Extension Supervisor for 5 years

¹⁶ Extension Supervisor for 4 years

	3. Lack of equipment 4. Lack of credit		policies
14 ¹⁷	1. Lack of equipment	1. Training for youth 2. Use value chain approach	1. Provide inputs timely
15 ¹⁸	1. Lack of irrigation 2. Lack of inputs distribution networks 3. Lack of equipment	1. Weak linkage Research, Extension & Farmers 2. Create Training Centers 3. Work with formal education schools	1. Train extension workers 2. Improve M&E
16 ¹⁹	1. Lack of inputs 2. Lack of finance 3. Lack if irrigation 4. Lack of DUAT	1. Need for pilot studies 2. Reduce interest rates 3. Small scale irrigation schemes 4. Need subsidies	
17 ²⁰	1. High cost and unavailability of inputs 2. Many Farmer Organizations without DUAT 3. Lack of equipment and high cost of rental 4. Unfriendly credit system	1. Accelerate decentralization of resources 2. Disseminate policies and strategies at local level 3. Promote local seed production 4. Improve access roads 5. Promote agro processing and conservation	Effective decentralization Improve linkages R&E& Producer
18	1. Lack of DUAT in some communities 2. Lack of irrigation	1. Promote agricultural markets	Promote accountability
19	1. Lack of irrigation	1. Promote agro processing 2. Establish contract farming	1. Balance planning with implementation
20	1. Informal land sales	1. Promote equipment provision 2. Regulate markets	1. Improve M&E
21 ²¹	1. Informal land sales 2. Unfriendly financial system	1. Regulate markets	1. Create fiscal incentives 2. Facilitate DUAT

¹⁷ Extension Supervisor

¹⁸ Extension Supervisor for 3 years

¹⁹ Head Department DPCI/MASA for 10 years

²⁰ Extension Supervisor for 5 years

²¹ Extension Supervisor for 1 year

22	1. Lack of organization of small holder farmers 2. No clear policies to promote agriculture 3. Lack of zoning	1. Create Platforms for intervention and coordination 2. Create policies for promotion of local seed production 3. Promote irrigation systems 4. Encourage use of low land areas	
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ⁱ Extension Supervisor for 5 years

Annex 2. Total interviewees during KAPEX Workshop in Maputo.

Nº	Name	Function	Province	Institution
1	Domingos João Guambe	Officer Technology	Maputo	DPASA-Maputo
2	Candido Maria Bruno	Supervisor	Maputo	SDAE-Boane
3	Manuel Luis Senete	Supervisor	Maputo	SDAE-Marracuene
4	Emilio Luis Sabão	Supervisor	Maputo	SDAE-Moamba
5	Francisco Chavela	Supervisor	Maputo	SDAE-Matola
6	Cornelio Jose Nenengue	Supervisor	Maputo	SDAE-Namaacha
7	Rosario Joao Sandramo	Supervisor	Maputo	SDAE-Matutuine
8	Julião Macie	Supervisor	Maputo	SDAE-Manhiça
9	Fernanda da Gloria Tamele Saia	SPER	Maputo-Cidade	DASA-M. Cidade
10	Cátia Remígio Manuel	Officer Technology	Maputo-Cidade	DASA-M. Cidade
11	Bernardo João Penicela	Officer Technology	Gaza	DPASA-Gaza
12	Sérgio Zauzau	Supervisor	Gaza	SDAE-Chibuto
13	Victorino Gineto Macie	Supervisor	Gaza	SDAE-Xai-Xai
14	Jair Domingos Oliveira	Supervisor	Gaza	SDAE-Bilene
15	Cremildo Ângelo A Nhalungo	Supervisor	Gaza	SDAE-Gaza
16	Valdemar Francisco Deve	Supervisor	Gaza	SDAE-Chókwè
17	Mauro Stélio Eduardo Sumbane	Supervisor	Gaza	Mabalane
18	Crimildo Joaquim	Chefe de SPER	Inhambane	DPASA-I'bane
19	Jaime Foquisso Chambela	Supervisor	Inhambane	Homine
20	Paulo Simone Enoque	Supervisor	Inhambane	Morrumbene
21	Joaquim André Jange	Supervisor	Inhambane	Massinga
22	Juvêncio Silva Feliciano Inguane	Supervisor	Inhambane	Inharrime
23	Ricardina Mujongo	Researcher	Maputo	IIAM
24	Nadia Gonçalves	Researcher	Maputo	IIAM
25	Rogério Sitole	Researcher	Maputo	IIAM
26	Sérgio Estevao Mugadui Mabasso	Officer Technology	Maputo	DNEA-DAT
27	Joaquim Alexandre dos Santos	Officer Technology	Maputo	DNEA-DAT
28	Jurdina Aida Miranda	Ofic. of Training Programs	Maputo	DNEA-DAT
29	Beatriz Bata	Officer Technology	Maputo	DNEA-DAT
30	Celestino Pene	Communication Manager	Maputo	DNEA
31	Filomena Nhantumbo	Head of Human Resources	Maputo	DNEA
32	Carlos Zandamela	Team Leader of Joint Research	Maputo	IIAM

Annex 3. Additional information from the field survey.

