Republic of Mozambique

MINISTRY OF AGRICULTURE

CONCEPT, PRINCIPLES AND STRATEGY OF THE GREEN REVOLUTION IN MOZAMBIQUE
INDEX

1. CONSIDERATIONS ON THE GREEN REVOLUTION IN THE WORLD ............................................. 2
2. CONTEXT OF THE GREEN REVOLUTION IN MOZAMBIQUE .................................................. 4
   2.1. EXPERIENCE OF MOZAMBIQUE IN THE IMPLEMENTATION OF THE GREEN REVOLUTION ........ 4
   2.2. INCORPORATION OF THE GREEN REVOLUTION IN GOVERNMENT POLICY ......................... 5
3. GREEN REVOLUTION IN MOZAMBIQUE: CONCEPT, OBJECTIVE AND PILARS .................. 6
   3.1. CONCEPT .............................................................................................................................................. 6
   3.2. OBJECTIVE AND PRINCIPLES ........................................................................................................... 6
   3.3. MAIN PILARS ......................................................................................................................................... 7
       3.3.1. Natural resources ................................................................................................................................. 7
       3.3.2. Production technologies ...................................................................................................................... 7
       3.3.3. Markets and information .................................................................................................................... 8
       3.3.4. Financial services ............................................................................................................................... 8
       3.3.5. Producer associations ......................................................................................................................... 9
4. IMPLEMENTATION STRATEGY ........................................................................................................ 9
5. ROLE OF THE AGENTS ..................................................................................................................... 11
6. NATIONAL PROGRAMS ....................................................................................................................... 16
7. NECESSARY RESOURCES .................................................................................................................. 18
1. Considerations on the Green Revolution in the World

In the developed countries the growth of the industrial sector was followed by the rapid transformation of traditional agriculture into an agriculture of high productivity, called “industrial agriculture” or “programmed agriculture”, with massivo use of machinery, automatization, fertilizers and pesticides.

However, the use of heavy equipment, with the time, resulted in the compacting of soils, making it difficult for water and roots to penetrate, thus reducing productivity. The massive mechanization and automatization of agriculture also resulted in the increase of rural unemployment. To restore soil structure and fertility, various agricultural practices have been necessary such as subsoils treatments, green fertilizers, and the incorporation of organic matter in the soils, whereas unemployed labor was absorbed by industry.

The generalized use of pesticides resulted in the migration of pests and the development of resistance to the treatments. Developed countries tried to avoid the worsening of the situation by turning to Integrated Pest Management (IPM). According to this method, pesticides were applied only in extreme situations and when economically viable.

The application of fertilizers resulted in the accumulation of heavy metals and nitrate in the soil and its transfer to food and water supply systems. To mitigate this, chemical analyses were introduced to detect residues and to prevent problems of public health.

The cattle experience was based on the priority to have rapid growth of the animals and herds, resulting in excess application of growth hormones and antibiotics that remained concentrated in the meat and milk. To mitigate these problems, the production package was revised, using other types of inputs and adopting other precautionary measures.

Although high productivity enhancements were obtained, the intensive use of machinery and agro-chemicals created environmental disequilibria. Therefore, the technological packages of this approach have undergone to frequent revisions, including combining crop rotation with monocropping, the intercropping of fields, and row cropping.

Referring to Asia and Latin America, “Green Revolution” is an expression that was used for the first time in 1968 for Mr. William Gaud, then Director of the USAID, to describe the transformation of agriculture in many developing countries, leading to significant increases in production and productivity during decades of the 1940s and 1960s. This transformation occurred as result of programs of agricultural research and extension, leading led to greater intensification of production, based on the use of high-yielding varieties, irrigation, fertilizers, pesticides and mechanization of agriculture.
In Mexico, in 1960, American and Mexican scientists led by Dr Norman Borlaug developed a breeding program resulting in improved varieties of highly productive wheat (varieties that did not acamavam with the fertilizer application, and allowed two plantings per year). The Mexican Government invested heavily in infrastructure and the adoption of the new varieties was overwhelming. In few years, the country became self-sufficient and started exporting wheat. As corollary of the efforts of the two governments, CIMMYT (International Center of Improvement of Maize and Wheat) was created with support of the Ford and Rockefeller Foundations.

The second country involved in the Green Revolution was India. The Indian Government, using to advantage the experience of the two Foundations related above, and in partnership with them, imported large quantities of rice and wheat seed to initiate the Green Revolution. In addition to the improved seed, the program involved the development of irrigation and financing of agro-chemicals. By the end of decade of 1970, rice yields went up by 30%, alleviating the hunger that devastated the country since the 1940s.

In 1960, in the Phillipines, the Ford and Rockfeller Foundations created the International Rice Research Institute (IRRI), whose high-yielding varieties extended to Indonesia, Pakistan, Sri Lanka and some countries in Latin America and North Africa. In 1969, the Dr Norman Borlaug, plant breeder, was honored with the Nobel Peace prize in recognition for his work in the improvement of varieties of wheat and for his role in the development and expansion of new technologies of agricultural production that had culminated in the Green Revolution in Mexico, India and Asian other countries.

Subsequently, various countries have had their own experiences within their economies and stage of the agricultural sector, with positive results.

In spite of these successes, the Green Revolution in Asia has its problems, of which we highlight three:

a) Excessive use of very expensive pesticides (of the Pyrethroid type), have resulted in the resistance to the treatments and surge in other pests. Scientists seek to mitigate the situation with Integrated Pest Management (IPM) including rotation of the types of pesticides and the use of new extension methods (Farmer Field Schools).

b) Dependence of hybrid seeds, which can be very expensive and should be bought annually. Farmers seek to resolve the problems through locally producing and storing non-hybrid seeds and storing not hybrid seeds, in Comunity Seed Banks.

c) The hybrid seeds, the fertilizers and the pesticides, are expensive and at times they result in higher indebtedness of producers. In order to reduce the costs, locally produced fertilizers and pesticides have been developed, and with the introduction of cash crops, producers are expected to have higher incomes.
The worldwide experiences that we have summarized above tend to demonstrate that, with the due precaution and the necessary commitment, the Green Revolution can play an important role in combatting hunger in Sub-Saharan Africa, where it is estimated that about 206 million people are malnourished. The current index of malnutrition for the continent threatens reaching the Millennium Development Goal to reduce in half the number of people in food insecurity by 2015.

In the meeting of the World Economic Forum held in June of 2007 in Cape Town, the leaders of the continent forwarded themselves to advance the Green Revolution. Thus, Kofi Annan, former Secretary General of United Nations, launched the Alliance for a Green Revolution in Africa (AGRA), with an ambitious agenda, aimed at mobilizing knowledge, capacities and resources to put an end to misery on the continent.

In 2006, the Alliance started to work with partners in the development of improved seeds for the main crops practiced farmers, and in the preparation (training) of African agricultural specialists. In 2007 it will initiate a program for soil fertility. An initiative for the improvement of farmer irrigation systems is due to start in 2008, and in 2009, non-agricultural and market aspects will be the focus, such as market information systems, storage of agricultural commodities, processing and transport. In parallel, the Alliance will strongly defend policies that support small-scale farmers, rural development, environmental sustainability, and a marketing that is favorable to the poor farmers.

2. Context of the Green Revolution in Mozambique

The Mozambican agricultural sector has the potential for rapid growth, using taking advantage of the positive experiences of the Green Revolution in the world. To that end, the country has about 36 million hectares of arable land, of which 3.3 million is irrigated, associated with high agro-ecological potential for a diversity of crops and vast areas of pastureland that are currently under-utilized.

2.1. Experience of Mozambique in the implementation of the Green Revolution

In the period after independence, the country invested in the intensification and modernization of farming and forest production with the use of fertilizers, pesticides, improved seed, artificial insemination and machinery, carried through the following actions:

1. Creation of state-owned companies for agricultural and livestock production including CAIA, CAIL, CAPEL, Avícola E.E., Gado de Corte e Leite (Beef of Cattle of meat and Milk), IFLOMA and Mecanagro.;
2. Creation of specialized companies for marketing (Agricom, Gapecom, Hortofrutícola, etc.);
3. Promotion of the cooperative movement for agricultural production;
4. Development of the national seed sector (SEMOC);
5. Contracting of foreign technical experts;
6. Sending many students to foreign countries for specialized training (Cuba, the USSR, Bulgaria, Germany among other countries);
7. Reform of curricula for agricultural specialists, oriented to answer to the needs of the agricultural sector;

The lessons learned from the intensification experience are the following ones:

1. Many Mozambican experts had accumulated experience in the use of intensive production technologies;
2. The use of inputs and farming equipment started to give good results with the increase of the production;
3. Unhappily, all this effort was interrupted by the war and changes in the economic system.

2.2. Incorporation of the Green Revolution in government policy

The Government of Mozambique, having learned the lessons of the past, undertook concrete measures to support to the agricultural sector, choosing to focus on the existing potential, in order to transform it into a source of wealth, looking to improve the welfare of the population and the socio-economic development of the country.

Thus, the Quinquenal Program of the Government (PQG) for period 2005-2009 stimulates the population to increase production and productivity of basic food commodities and also encourages the introduction of cash crops, in order to guarantee food security, as well as production surpluses for exportation.

In the scope of the implementation of this Programa (PQG), the Cabinet in its 19th session, which included other experts, whose main theme was “Work and Food”, took a set of decisions to strengthen the capacity of the producers for production and productivity increases (land, labor force, water for irrigation and other factors), through:

a) Greater focus on the familiar sector, with the involvement of other actors, in the development of the agricultural sector;
b) Promotion of associations;
c) Development of markets for inputs and agricultural commodities;
d) Conservation and sustainable use of natural resources.

To speed up the implementation of the objectives of the Quinquenal Program of Government 2005-2009 in this area, guidelines for the implementation of the Green Revolution have been given by his Excellency the President of the Republic to all the provinces visited in his most recent missions under the Open Presidency.
The present document intends to delineate the concept of the Green Revolution which has already begun, and to all consider general lines of a strategy for its implementation in the country.

Details on the form of its implementation and details of the concrete actions in the country, with indices and goals, will consist of a complementary document.

3. Green Revolution in Mozambique: Concept, Objective and Pilars

3.1. Concept
The Green Revolution in Mozambique is a process of brainstorming to increase the levels of agricultural production and productivity, through the use of improved seeds, fertilizers, means of production, production technologies appropriate to local reality, agricultural mechanization, including animal traction, construction and use of dams for irrigation and watering livestock, among other actions. This is a multidimensional strategy to combat hunger and poverty and has as its final goal, the increase of the agricultural production and productivity in a competitive and sustainable way.

The concept of the Green Revolution in Mozambique rests on the following assumptions:

a. The fight against poverty becomes the elimination of one of its manifestations, namely, the lack in basic food and both transitory and permanent food insecurity;
b. the generation of employment and income are crucial for the creation of the necessary conditions to return human dignity to the communities;
c. the experiences of other countries where similar programs have been implemented successfully must be taken in consideration.

3.2. Objective and Principles
The Green Revolution in Mozambique has the principal objective to induce greater production and productivity increases for smallholders to ensure a greater supply of food in a competitive and sustainable way.

To be sustainable, progressive, and irreversible, this objective must observe the following principles:

a) to be endogenous, considering the socio-economic and cultural base of the farmers;
b) to count on the effective Government support capacity;
c) to take into account the local details, specifically the agroecological potential of each region, including the peri-urban zones;
d) to have strong leadership, creativity and maximized use of the local resources so as not to depend exclusively on the State Budget (OE);
e) greater decentralization of capable staff, of human, material and financial resources for the districts;
f) to support basic policies and promotional programs for the associative movement of the producers;
g) to promote and value producers (farmers), discouraging programs of free distribution of material or financial resources and encouraging projects for saving and mutual aid;
h) to implement specific programs, with clear goals and responsible execution; and
i) to integrate primary, secondary and technical-professional schools in its implementation.

3.3. Main Pillars

Taking into account the main drawbacks to development of the agricultural sector, the intervention for the implementation of this Green Revolution must rest in the following basic pillars:

a. Natural resources (land, water, forests and wildlife);
b. Improved technologies;
c. Markets and current information;
d. Financial services;
e. Creating human and social capital.

3.3.1. Natural resources

Efforts will be concentrated in the following:

a. To ensure access to resources and their sustainable use;
b. To use spatial classifications to facilitate the targeting of investments and human habitation;
c. To promote the establishment of plantations for meeting energy and conservation and protection of fragile ecosystems;
d. To promote local industry for processing of forest commodities;
e. To fortify programs of prevention, monitoring and control of fires;
f. To strengthen programs to reduce conflict between animal and man.

3.3.2. Production technologies

The Green Revolution in Mozambique must have as foundation the generalization of the use of improved technologies for agricultural production, with a focus in sustainable technologies for the familiar sector, aiming at the following agreed objectives: (i) increase in cultivated area, (II) increase of agricultural yields per hectare as a key element, (III) increase of the cattle stocks and poultry production, (IV) better use of water resources.

To reach these combined objectives, it will be necessary:
a. To increase the coverage and to improve the quality of research services and agricultural extension, in accordance with the different agroecological zones, including arice and semi-arid regions;
b. To increase the use of irrigation technologies, in particular those adapted to the familiar sector;
c. To improve and to widen the availability of agricultural inputs principally improved seeds and fertilizers;
d. To improve and to expand sanitary and phytosanitary services;
e. To promote initiatives for the production and processing of inputs in the country for expanded access and availability;
f. To revitalize the value chain for the production and processing of improved seeds;
g. To strengthen the institutional capacity of producer associations, including their role as promoters in the availability of agricultural inputs for producers;
h. To train and develop existing human resources, mainly in the districts, under the rubric of decentralization;
i. To develop and to diffuse technologies that allow the sustainable use of natural resources (land, water, forests and wildlife);
j. To facilitate access to agricultural mechanization using animal traction and tractors, where appropriate;
k. To strengthen veterinary services, including the implementation campaigns and use of tick dipping tanks; and,
l. To develop fisheries technologies and to promote its use in an integrated production system.

3.3.3. Markets and information

Associated with some of the factors limiting production increases, key challenges are the weak marketing channels for inputs and agricultural commodities, deficient access routes to production and consumption zones, and limited infrastructure for storage and agro-processing.

To reverse this situation, it will be necessary to do the following:

a. To develop rural infrastructure such as roads, storage infrastructure, and technologies for information and communication;
b. To standardize and control the quality of commodities, in accordance with quality standards at national, regional and international level;
c. To strengthen market information systems for agricultural commodities;
d. To develop agro-processing, to strengthen the linkages between the agricultural and other sectors of economy and to add value and competitiveness to agricultural commodities.

3.3.4. Financial services

a. To create a favorable environment for investments in the agricultural sector;
b. To promote and to enlarge the formal and informal systems of agricultural credit, making farming projects possible;
c. To support private initiatives for finance for the agricultural sector, stimulating the banking sector to have a greater presence in agricultural zones.
d. To establish efficient macro-economic policies (monetary, fiscal, tax, exchange, and credit) that promote the agricultural sector, including:
   1. Initiatives such as the Guarantee Fund, Lines of Credit, Credit Funds, and agricultural insurance as well as ensuring effective functioning on a more commercial base and less than an extension of the government and donors;
   2. Increase of collaboration between programs such as the Development Funds, looking for synergies and common objectives.
   3. Broadening the overall base of resources for financing of agricultural activities, with the involvement of cooperation partners.

3.3.5. Producer associations

For adequate support to development of social capital, the following are important elements:

   a. Consolidation of the politician-legal picture for the development of the associative movement and support to production;
   b. Functional literacy, taking into account that the majority of farmers needs to read and to write better so as the execute their activities better;
   c. Technical support to the associations in the elaboration of business-oriented plans and linkages with the market; and,
   d. Support to access the factors and means of production, including animal traction, as a way to enlarge their areas of production and to improve production indices.

4. Implementation Strategy

For implementation of the Green Revolution, it is critical to have an integrated approach to production and value chains. Therefore there must be the involvement of all the actors of the State in this process, namely the Ministries of the Planning and Development, of Finance, of Industry and Commerce, of Public Works and Housing, of Fisheries, of Health, of Science and Technology, of Education and Culture, of Mineral Resources, and of Labor and State Administration, among others.

MINAG must lead and co-ordinate the process of execution and assure a correct articulation between different agents at the central level and its linkages with provincial and district levels, given the ongoing process of decentralization.
The programs of public interest with the potential to generate economic activity (for example, irrigation systems, infrastructures for selection and conservation of production, silos, etc.) will be implemented through public-private partnerships.

The link between producers and the markets will be ensured through the development and professionalization of economic agents at the second level for the accumulation, selection, storage and placement of production in the market.

Extension networks will have to guide its actions in following directions:

1. In the zones of implementation of the program, to identify partners to serve as connector links between the farmers and companies suppling inputs;
2. To ensure not only that the technical assistance is adequate, competent (specialized technical staff), and guided to covering sufficient numbers of beneficiaries, but more importantly for the improvement of current indices for productivity by unit of area and labor;
3. At the provincial level, to guarantee material and financial resources for the efficient accomplishment of its activities;
4. Whenever it will be applicable, contracts will be signed for services with private corporations;
5. At the central level, to mobilize resources to be allocated to the provinces and districts, as well as technical support and monitoring of activities;
6. To mobilize the private sector to provide services in accordance with its specialty.

Relative to access to the factors and means of production and agro-processing:

1. To promote programs of animal traction, especially in places where they are being carried through efforts of cattle development.
2. Where there are firms dedicated that can be called into service, they will be called into service for land preparation, as well as harvest and post-harvest operations. For this, the Government will have to find ways to mobilize financial resources to stimulate them to participate in these activities. Where these companies (suppliers of services) do not exist, the District Economic Activities Services (SDAEs) will have to identify potential operators in the area for rendering services, whether through existing corporations, or, for example, through the mobilization of young graduates of specialty schools;
3. District Services for Economic Activities should co-ordinate with the private sector to supply agricultural inputs (fertilizers, pesticides, vaccines and anti-tick drugs) in agreed to places and at stated periods with the companies providing these inputs. On the other hand, other types of inputs not conventionally used exist in some regions of the Country (bat guano, diatomites), that may be able to increase yields and incomes of producers, eventually with reduced costs.
4. District Services for Economic Activities must ensure the local production of seeds and monitor the program, in linkage with the private sector and producer associations.
5. Provincial Directorates of Agriculture (DPAs) must identify firms and other agents for the construction, rehabilitation, extension of irrigation systems or
water capturing for agriculture. For this effort, in all provinces the Hydraulics (Hydrological) Centers will have to be revitalized or re-created to give due assistance.

6. To minimize the lack of infrastructure and to allow the longer consumption of surpluses, the Government will need to establish contracts with processing and warehousing agents;

7. District Services for Economic Activities must promote livestock development, through the creation of nuclei of producers, based on producers paying back through young animals, repeating the positive experiences of existing implementation schemes.

8. To establish Contracts Program with financial institutions for the management of Special Development Credit facilities;

9. To promote partnerships between the District Government and the private sector in order to stimulate food production activities, income generation, and to promote employment opportunities in agriculture.

5. Role of the Agents

The implementation of the Green Revolution in Mozambique necessarily involves different agents, each one with a specific role in this process, as summarized in the matrix below:

<table>
<thead>
<tr>
<th>Technologies</th>
<th>Research</th>
<th>Extension</th>
</tr>
</thead>
<tbody>
<tr>
<td>MINAG, MCT, MEC</td>
<td>1. To define policies and methodologies of agricultural research; 2. To promote research for agricultural development; 3. To produce technical guidance for production; 4. To ensure the development of programs for species improvement of livestock and vegetables; 5. To enable the zonal research centers (infrastructure, equipment and training);</td>
<td>1. To define the methodology and programs for extension 2. To define, to co-ordinate and to develop programs of training of extension agents and producers 3. To co-ordinate the diffusion of technologies, to supervise, to monitor and to control the quality of the given services 4. Programs for the dissemination and use of animal traction 5. Guarantee the provision of services for animal and vegetal sanitary assistance.</td>
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<tr>
<td>DPAs and Zonal Centros of Inquiry</td>
<td>1. To develop, to test and to spread appropriate technologies in accordance with the agro-ecological regions and systems of production 2. To assure production of basic seed and vegetative material</td>
<td>1. To assure the transfer and use of appropriate technology. 2. To promote the strengthening of associations for agricultural commodities 3. To participate in feedback to research</td>
</tr>
<tr>
<td>Technologies</td>
<td>Research</td>
<td>Extension</td>
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<tr>
<td>To assure the multiplication of animal genetic material of appropriate quality</td>
<td>4. To develop program of cattle development and animal traction&lt;br&gt;5. To assure the implementation of the provision of basic services for animal and vegetal health</td>
<td></td>
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<tr>
<td>To participate in the definition of the research agenda&lt;br&gt;To participate in the assessment and validation of technologies&lt;br&gt;To identify and to communicate the limiting factors of production&lt;br&gt;To participate in feedback to research</td>
<td>1. To adopt the appropriate technology&lt;br&gt;2. To participate in the process of technology dissemination&lt;br&gt;3. To participate in training programs&lt;br&gt;4. To participate in the organization and development of associations</td>
<td></td>
</tr>
<tr>
<td>Small producer</td>
<td>1. To participate in the process of definition of policies and programs of agricultural research&lt;br&gt;2. To participate in the development, testing and dissemination of appropriate technologies&lt;br&gt;3. To finance agricultural research</td>
<td>1. Adoptar and disseminate appropriate production technology&lt;br&gt;2. To give technical assistance to producers (small and medium scale)</td>
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<tr>
<td>Private sector</td>
<td>To participate in the definition of the research agenda&lt;br&gt;To participate in the assessment and validation of technologies&lt;br&gt;To identify and to transmit the limiting factors to production&lt;br&gt;To participate in feedback to research</td>
<td>To adopt the appropriate technology&lt;br&gt;To participate in the process of technology dissemination&lt;br&gt;To participate in training programs</td>
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<tr>
<td>Associations</td>
<td>To participate in the definition of the research agenda&lt;br&gt;To participate in the assessment and validation of technologies&lt;br&gt;To identify and to transmit the limiting factors to production&lt;br&gt;To participate in feedback to research</td>
<td>To spread appropriate technologies.&lt;br&gt;To promote and strengthen producer associations&lt;br&gt;To participate in feedback to research</td>
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<tr>
<td>ONG’s</td>
<td>To participate in the definition of the research agenda&lt;br&gt;To participate in participative diagnostic assessments&lt;br&gt;To participate in the development, testing and adaptation of appropriate technologies of production</td>
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<tr>
<td>Input and Commodity Markets</td>
<td>To create a favorable environment through the development of agricultural infrastructure (roads, energy, water, communication systems) conducive to agricultural</td>
<td>Adoptar measures for monetary policy that stimulate the banking sector to grant to agricultural credit and similar services</td>
</tr>
<tr>
<td>MINAG, MIC, MF, MOPH, MTC, MISAU, MICOA</td>
<td>Financial Services</td>
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<tr>
<td><strong>Development</strong></td>
<td><strong>To create an attractive package of incentives to the financial system to encourage the extension of financial services to agricultural zones</strong></td>
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<tr>
<td>To develop mechanisms for reducing the costs of agricultural inputs (fertilizers, anti-tick drugs, and pesticides, etc.)</td>
<td>To guide public resources to create financial services adequate for agricultural production</td>
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<tr>
<td>To regulate and control the quality of agricultural inputs (pesticides, drugs, fertilizers) and agricultural commodities</td>
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<td>To assure the integral functioning of the value chain for seed systems</td>
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<td>To promote the production and local processing of agricultural inputs</td>
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<tr>
<td>To assure the provision of anti-tick drugs</td>
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<tr>
<td>To consolidate the system of market information for inputs and commodities.</td>
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<tr>
<th>DPAs, SDAEs, Board</th>
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<tbody>
<tr>
<td><strong>To assure the development of agricultural infrastructure (roads; electrical energy network, dams and irrigation systems, dipping tanks, communication systems) conducive to development of the agricultural sector;</strong></td>
<td><strong>To apply part of the local public resources for creation of credit lines/guarantee funds for small-scale producers</strong></td>
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<tr>
<td><strong>To control and to monitor the quality of agricultural inputs (for example: pesticides, fertilizers) and agricultural commodities;</strong></td>
<td><strong>To facilitate the establishment of financial institutions</strong></td>
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<td><strong>To ensure the local distribution of anti-tick drugs;</strong></td>
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<td><strong>To promote local fairs for inputs and commodities;</strong></td>
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<tr>
<td><strong>To promote the use of locally produced agricultural inputs, based on the available natural resources</strong></td>
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<td><strong>To promote the establishment of Suppliers (PME’s) of agricultural inputs in the agricultural zones;</strong></td>
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<td><strong>To diffuse market information to producers and traders.</strong></td>
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<td></td>
<td>Input and Commodity Markets</td>
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<tr>
<td>Small Producers</td>
<td>To locally produce seeds</td>
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<td>To participate in agricultural production;</td>
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<td></td>
<td>To participate in local fairs of inputs and commodities</td>
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<tr>
<td>Private sector:</td>
<td>To ensure the value chain of provision of inputs (veterinary</td>
</tr>
<tr>
<td>Producers</td>
<td>medicines, pesticides and fertilizers) and services;</td>
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<tr>
<td>(MG’s)</td>
<td>To assure marketing;</td>
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<td>Traders</td>
<td>To assure the development of processing of agricultural</td>
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<td>Board</td>
<td>commodities.</td>
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<tr>
<td>Carriers</td>
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<td>Agro-industrial</td>
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<tr>
<td>Associations</td>
<td>To participate in the value chain of provision of inputs (veterinary medicines, pesticides and fertilizers) and services.</td>
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<td>ONG’s</td>
<td>To participate in the organization of the producers and its</td>
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<td>training;</td>
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### Natural resources

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<tr>
<th></th>
<th>Water</th>
<th>Land</th>
<th>Forests &amp; Fauna</th>
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<tbody>
<tr>
<td>MINAG, MF, MOPH</td>
<td>To construct irrigation infrastructure and</td>
<td>To adopt policy measures for land access and land</td>
<td>To adopt policy measures to guarantee the conservation,</td>
</tr>
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<td></td>
<td>infrastructure to capture water (dams) for agriculture</td>
<td>tenure security in ownership and use rights</td>
<td>protection, and rational and sustainable use of forest and</td>
</tr>
<tr>
<td></td>
<td>To adopt policy measures and regulations that favor</td>
<td>To create zone according to the agricultural potential of the country</td>
<td>wildlife resource</td>
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<td>investment in irrigation infrastructure</td>
<td>To elaborate land use plans</td>
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<td>DPAs, SDAEs</td>
<td>Natural resources</td>
<td>Water</td>
<td>Land</td>
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<td>To construct infrastructures of irrigation and azeberamento of cattle. To assure the sustainable management of water basins</td>
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<td>To assure the creation of tree nurseries in the schools to move towards the Green School concept (each pupil one fruit tree per year). To develop a package to create incentives for reforestation To develop measures to prevent and control uncontrolled fires the active participation of the communities To construct watering holes for supplying water to the population to minimize man-animal conflits</td>
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<td>Small Producers</td>
<td>To participate in the construction, management and maintenance of the small-scale systems of irrigation and livestock watering</td>
<td>To participate in the construction, management and maintenance of the small-scale systems of irrigation and livestock watering</td>
<td>To develop community plantations To actively participate in the prevention and control of uncontrolled fires</td>
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<td>Private sector</td>
<td>To construct and to keep operational small-scale systems of irrigation and watering for livestock</td>
<td>To construct and to keep operational small-scale systems of irrigation and watering for livestock</td>
<td>To develop the reforestation for energy and for conservation To guarantee a sustainable management regime and the production of commodities with greater added value To develop farms of the wild one</td>
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<td>Association s</td>
<td>To participate in the construction, management and maintenance of small-scale systems of irrigation and watering for livestock</td>
<td>To participate in the construction, management and maintenance of small-scale systems of irrigation and watering for livestock</td>
<td>To develop community plantations To actively participate in the prevention and control of uncontrolled fires</td>
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<td>ONG’s</td>
<td>To participate in programs of construction of water sources for agriculture and watering livestock; To carry through programs of training on public health and better use of water resources</td>
<td>To participate in programs of construction of water sources for agriculture and watering livestock; To carry through programs of training on public health and better use of water resources</td>
<td>To develop programs of training for small-scale producers for better management on the use of 20% of the forest management; To support programs of sustainable forest and wildlife management.</td>
</tr>
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</table>
6. National programs

For the implementation of the Green Revolution, the MINAG elaborated national programs, having in consideration existing strategy documents, of which the following ones are of key importance:

- The document of Proagri II (2004);
- The Vision for the Agricultural Sector (2003),

The general features of the proposed programs are the following:

- Focused on producing results;
- The target group is that of small-scale producers (family sector, associations) and medium scale farms);
- They have complementarity with the key functions of MINAG (research, extension, etc);
- Geographic location is based on the agro-ecological potential of each region;
- They aim at medium term objectives, but actions are included based on a vision of the long term.

These programs could be implemented through contract-program mechanisms; production/development contracts and other instruments defined in the document of the Green Revolution Strategy, as well as positive experiences from the local level, in the financing of the productive activity and generation of employment and income in the rural sector.

a. Program for Cereals: maize, rice, sorghum and wheat

**Objectivos:**
To increase the availability in cereals and to reduce the imports;  
To stimulate agro-processing and to rehabilitate the national milling industry.

**Expected findings:**
Increased availability of cereals in next the 3 years  
To supply the national industry with more than one-half of its needs.

b. Pulses: beans, groundnut and soybeans

**Objectives:**
To guarantee supplies of beans and to increase household income with groundnuts and soybeans;
To supply to the national feed ration industry with soybeans for the poultry sector;

**Expected results:**
- Guarante the raw material for at least one-half the needs of the feed ration industry;
- Increase the income of households of producers of groundnuts, soyabean, and beans in at least 50% of the income accumulated in the year.

**c. Roots and Tubers: cassava and potatoes**

**Objectives:**
- To guarantee value added to cassava sector (industrialization for human and animal consumption)
- To guarantee the national potato consumption of large urban centers (sweet and Irish potatoes)

**Expected results:**
- Sales of cassava in foreign markets and as an additive to bread in the national market (at least ¼ of the raw material (wheat) of the bread – to the standards of baking industry);
- Revitalized urban markets for Irish potatoes, with the goal to supply those markets with national production (at least ¾ of the domestic needs of the product)

**d. Horticultural products in the Green Zones of the urban centers:**

**Objectives:**
- To develop a peri-urban agriculture that is sustainable, integrated, and diversified oriented to these high demand markets
- To guarantee an additional income to households of the peri-urban zones for the reduction of the assymetries in food needs

**Expected results:**
- Demand for horticultural products in urban zones is assured – year round – to reduce imports;
- Reduced level of urban unemployment, especially among women (creation of self-employment opportunities for women)

**e. Program for Development of Small and Medium Scale Cattle Husbandry Enterprises:**

**Objectivos:**
- Increase of the stock of cattle for meat and for milk – in the scope of food dietary diversification;
- To improve the competitiveness of the livestock commodities in the regional market (SADC);

**Expected results:** Increase the availability of meat and milk in the market;
- Reduction of exports and improvement of domestic incomes.
f. Integrated Program for the Development of the Poultry Sector in Peri-Urban Zones

Objectives:
Sustainable national production of chickens;
Reduction of the costs of chicken for greater access among consumers;
Greater egg consumption from national production at accessible prices

Expected results
Reduced imports of chicken
Competitive poultry sector at the regional level in the scope of regional integration.

g. Natural resources:

Zoning of the potential use of resources – for better management of areas and uses;
Plantations for energy and conservation uses – protection of dunes and fragile ecosystems;
Improved technologies for the use of firewood – to improve the use of coal with the production of improved ovens and stoves;
Development of small- and medium-scale forestry product companies – to reduce exportations and to stimulate reforestation initiatives;
Control of wildfires – to reduce the extent of uncontrolled wildfires and to improve soils;
Mitigation of the conflict man/animal – to develop community farms for wildlife, thus contributing to the reduction in man/animal conflict.

7. Necessary Resources

To implement the programs of the Green Revolution, it is necessary to take the following actions:

1) To make the Green Revolution programs fit within the budgetary ceilings foreseen in the CDMP (Medium Term Expenditure Scenario);
2) To guarantee that the provision of resources in the Provincial budget translates into greater agricultural investments at the district level (number of extensionistas, material and financial means)
3) To guide greater investments in basic infrastructure in the districts and localities of greatest agricultural and livestock production potential.