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## AFRICAN SEED AND BIOTECHNOLOGY PROGRAMME

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## THE AFRICAN SEED AND BIOTECHNOLOGY PROGRAMME

### EXECUTIVE SUMMARY

Urgent action is needed to create sustainable food security in Africa for which the development of the seed sector at the continental, regional and national levels is an essential element. Seed is one of the most crucial elements in the livelihoods of agricultural communities. Africa has been unable to take full advantage of the recent advances in seed sector development mainly because of weak seed production and distribution systems, inadequate supply of quality seed, lack of access to improved germplasm, weak entrepreneurial capacity of small- and medium-size seed enterprises, and inadequate implementation of seed policies and international agreements and conventions. As a result of the increasing incidence of emergency situations, an increasing proportion of the assistance allocated to Africa is invested in relief operations and a much smaller and decreasing proportion in seed development work needed to increase seed supply and improve preparedness.

The Ordinary Session of the Assembly of the African Union (AU) in Sirte, Libya, on 5 July 2005, in discussing the importance of improved seeds for increasing agricultural productivity and food security in the continent, recognized that African governments individually cannot confront challenges represented by developments in the international seed industries and by legal and technical issues, which restrict access to genetic resources and biodiversity.

Several factors are affecting advancement within the seed sector in Africa, which include a number of complex obstacles that are individually and collectively, significantly hampering progress. The African Seed and Biotechnology Programme (ASBP) is proposed to provide a strategic approach for the comprehensive development of the seed sector and related biotechnology in Africa, taking into account the different needs of the countries and regions. The programme will focus on germplasm management and development, crop research and variety release, including farmer testing/selection activities, dissemination of varieties, and production and supply of seed and planting materials through informal and formal seed systems.

The programme will also support development of improved disaster preparedness. It will pursue an integrated approach to enhance capacities for seed policy development and implementation, strengthen linkages between informal and formal seed sectors, ensure further adherence to international norms and standards, stimulate transfer of appropriate technologies including biotechnology tools and products applicable to the seed sector and encourage public-private partnerships to promote development of local seed enterprises. Overall, the proposed programme will have a total of 20 components at continental, regional and national levels.

Better coordination and capacity building are needed at the continental, regional and national levels to overcome the constraints related to seed trade through harmonization of seed rules and regulations, which include the International Plant Protection Convention (IPPC). Coordination also at all levels is needed to enhance the collection, conservation and use of important germplasm for Africa to overcome the problem of the progressive loss of germplasm in the process referred to as genetic erosion.

The African Union will provide overall coordination for the implementation of the ASBP given its leading role in the development of Africa within the framework of the New Partnership for Africa's Development (NEPAD). Commitments and partnerships will be essential from the

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among agencies and organizations with interests in agriculture and the seed sector including: national governments, regional economic communities, sub-regional organizations, international organizations, research organizations, seed networks, farmers<sup>1</sup> organizations, and public and private seed and biotechnology organizations and companies, and member of civil society organization, including non-governmental organizations and community-based organization.

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<sup>1</sup> Farmers include both men and women farmers. In Africa, it is recognized that women play a significant role in the seed sector, especially within the informal seed sector

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## AFRICAN SEED AND BIOTECHNOLOGY PROGRAMME

### I BACKGROUND

1. The report of the Comprehensive Africa Agricultural Development Programme (CAADP) states that as of 2001, about 28 million people in Africa have been facing food emergencies due to droughts, floods and strife, of which some 25 million needed emergency food and agricultural assistance. Urgent action is needed to create sustainable food security in Africa for which the development of the seed sector at the continental, regional and national levels is an essential element.
2. Seed is one of the most crucial elements in the livelihoods of agricultural communities. It is the repository of knowledge passed from generation to generation, and the result of continual adaptation and innovation in the face of ever-greater challenges for survival. The potential benefits from the use of good quality seed of adapted varieties by farmers can be enormous, and the availability to farmers of quality seed of a wide-range of varieties and crops to farmers can increase productivity, reduce risks from pest, drought and disease pressure, and increase incomes. Production increases through the use of adapted varieties in a given area can create employment opportunities related to processing, marketing, and other activities generated through quality seed production. Food security is heavily dependent on the seed security of the farming community. Seed sector development is essential to foster agricultural growth.
3. Africa has not been able to take full advantage of the advances in seed sector development, mainly because of weak seed production and distribution systems, inadequate supply of quality seed, lack of access to improved germplasm, weak entrepreneurial capacity of small- and medium-size seed enterprises, and inadequate implementation of seed policies and international agreements and conventions.
4. The Ordinary Session of the Assembly of the African Union (AU) in Sirte, Libya, on 5 July 2005, in discussing the importance of improved seeds for increasing agricultural productivity and food security in the continent, recognized that African governments cannot individually confront challenges represented by developments in the international seed industries and by legal and technical issues which restrict access to genetic resources and biodiversity. The Assembly of AU further stressed Africa's potential for creating its own seed producing industry and requested its commission to consider all aspects in developing a comprehensive programme for the revitalization of the African seed sector in collaboration with the Food and Agriculture Organization of the United Nations (FAO).

### **International Agreements and the Seed Sector Development**

5. Seed sector development and management includes a range of activities including germplasm collection and conservation, varietal improvement and production and distribution of quality seeds to farmers, combined with local seed industry development and compliance with international agreements. The International Treaty on Plant Genetic Resources and the *Global Plan of Action for the Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture (Global Plan of Action)* provide frameworks for linking the conservation and use of plant genetic resources for food and agriculture (PGRFA) with seed

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sector development. Also, the International Plant Protection Convention (IPPC) provides a mechanism by which phytosanitary issues related to seed are dealt with through capacity building, institutional development and harmonization. In addition, the Convention on Biological Diversity and its Cartagena Protocol on Biosafety have provisions that are relevant to seed development. Indeed, all these treaties and conventions have a key role to play in the development of the seed sector of Africa.

### **Informal Seed System**

6. In a local or informal seed system, farmers themselves produce, disseminate and access seed directly from their own harvest or through exchange and barter from within their communities or nearby ones. The seed may be of variable quality and the distinction between seed and grain is not always clear. The local system is rarely monitored or controlled by government policies and regulations. The informal seed system plays a critical role in many African countries, including providing seed for minor and women's crops. However, with changing markets, reduced rainfall and new pests and diseases, farmers need a wider diversity of crops and varieties that are not always available from the informal seed system.

### **Formal Seed System**

7. The formal seed system is a deliberately constructed system normally focused on cash crops (maize, cotton, soybean and rice). The sector is usually subject to national policies and regulations, and involves various stakeholders. A chain of interlinked activities results in seed products that are of well-defined quality in respect of genetic purity and physiological, physical and phytosanitary quality. These activities include research, multiplication, processing, distribution and uptake, transport and storage of seeds. The role of the private sector in a formal seed system is normally concentrated on seed production and marketing with appropriate compliance to quality assurance.

### **Biotechnology for Seed Sector Development**

8. A number of biotechnology applications and approaches are being employed to enhance of agricultural production in many African countries. For example, biotechnology-based tools are used for mass propagation of disease-free plantlets. Other promising biotechnological methods are used to enhance the efficiency of traditional breeding, such as marker-assisted selection, which allows a faster and more targeted development of improved genotypes. Such markers provide new research tools which can assist in the conservation and characterization of biodiversity. Modern biotechnologies applications dramatically increase the potential and efficiency of using genetic resources. For example, genomics enhances the precision in crop improvement.
9. The development and deployment of modern biotechnologies also includes genetically modified organisms (GMOs) obtained through genetic engineering, which should be managed safely. National capacities in practical crop improvement can be strengthened in African countries through effective and efficient integration of biotechnology into the conventional breeding work.
10. Recent and emerging biotechnology applications as well as future applications tools and approaches emerging from biotechnology research are likely to have great potential to assist

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African countries to enhance agricultural production, including providing assistance to small scale resource-poor farmers. For this to be achieved, the application of new technologies and approaches should be as part of an integrated and comprehensive agricultural research programme, which gives priority to the need and problems of small-scale resource-poor farmers.

## II PROGRAMME RATIONALE

11. Several factors are affecting advancement within the seed sector in Africa, which include a number of complex obstacles that are individually and collectively, significantly hampering progress. The African Seed and Biotechnology Programme is aimed at providing a comprehensive and strategic approach to overcome current barriers and obstacles and to further plan development of the seed sector, as a critical element in achieving food security in Africa.

### Inadequate Regional Seed Marketing

12. There is a **lack of collaboration, consultation and harmonization** at the regional and continental levels concerning the development, movement and use of high-yielding vegetatively propagated materials and seed. This has led to unduly restrictive seed certification and variety release requirements, which differ from country to country, and which, together with excessive phytosanitary and foreign currency regulations, function as non-tariff barriers that hamper seed exchange. **Better coordination and capacity building** are needed at the national, regional and continental levels to overcome the constraints related to seed trade through **harmonization of seed rules and improved policies and regulations**, taking into account the International Plant Protection Convention (IPPC).

### Loss of Germplasm

13. Country reports on the state of plant genetic resources for food and agriculture prepared as a contribution to the first *Report on the State of the World's Plant Genetic Resources for Food and Agriculture* (PGRFA) confirmed that losses of diversity have been significantly and that erosion continues. Erosion of **plant genetic resources** for food and agriculture will significantly negatively affect seed production. Of major concern is the irreversible loss of genes, the basic functional unit of inheritance and the primary source of variation in appearance, characteristics and behaviour among plants. In order to overcome this problem, better coordination is needed at the national, regional and continental levels to enhance the collection, conservation and use of important germplasm for Africa.

### Obstacles to the effective use of Plant Genetic Resources

14. Several obstacles limit the effective use of plant genetic resources. These include: the lack of characterization and evaluation data, poor coordination of national policies and poor linkages between the national genebanks and the users of the germplasm. Utilization of plant genetic resources maintained by farmers is limited due to lack of information on their characteristics and lack of availability. International research centres and African national agricultural research systems have developed new improved varieties. However, these varieties often do not reach farmers because of lengthy testing requirements which have to be repeated even in

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countries with similar agro-ecological conditions. For existing and approved varieties, **lack of national capacity to maintain the variety and provide Basic Seed in a timely manner hampers exploitation** of the varieties, and this situation must be addressed.

### **Lack of Access to Seed and Planting Material**

15. Currently, more than 80 per cent of the seed planted by African farmers is produced by the informal seed sector where farmers themselves produce, disseminate and access seed directly from their own harvest or through exchange and barter among members of the local communities. While the informal seed sector is currently the primary source of seed in African, and will remain so for the foreseeable future, improved access to seed from the formal sector would be highly beneficial. Unfortunately, there is limited collaboration between participants in the formal and informal seed sectors. The result is that many farmers dependent on the local seed system often do not have access to early generation seed of new, improved crop varieties, and high value fruit and vegetables that are available from the formal seed sector.
16. Several studies suggest that currently less than 20 per cent of the cropped area in Africa as a whole is planted with high-yielding varieties. There are a number of barriers that are affecting seed distribution and these include:
  - **Poorly developed infrastructure:** Long distances between farmers and seed outlets and poor roads results in high transportations costs and poor storage arrangements impact on seed quality, especially with lengthy transport periods.
  - **Inadequate extension services:** Farmers often need extension service and demonstration programmes to help them understand the expected benefits resulting using improved seed, and to encourage them to use new varieties.
  - **Inadequate policy seed policies:** While in some countries there are adequate seed policies encouraging investments, particularly in seed distribution, in many others, either there are inadequate policies related to the seed sector, or policies are acting as disincentives to further seed development.
  - **Inadequate support for small-scale seed sector entrepreneurs:** Often government support for small scale **seed entrepreneurs** is not adequate to develop the sector. They often have no access to rural credit and marketing opportunities for agricultural products in general, and seed retailing systems in particular are weak. The result is that smallholder farmers cannot access higher quality seed as it is not available in their area, or the seed is too expensive for most farmers to purchase.
17. A strategic approach is essential to address the barriers that are impeding farmer access to higher quality seed seeds. For example, improved linkage between the formal and informal seed sectors in the participating countries will ensure that seed development programmes fully consider farmers needs and the diversity of crops being employed including major, minor and women's crops.



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## **Inadequate use of Available Biotechnology Tools**

18. Biotechnology is an integral feature of modern plant breeding research and practice but is not sufficiently well embedded in practical plant breeding and crop improvement in developing countries where inadequate infrastructure, scarce funding and lack of trained staff represent major obstacles<sup>2</sup>. Furthermore, evidence from developing countries outside Africa suggests that micro-propagation and tissue culturing can be profitably applied to many crops. Countries like Thailand, India and others are producing millions of disease-free plantlets every year for a range of fruit and horticultural crops, such as banana, papaya, grape, tomato, potato and others. The potential of this technology for Africa has not been exploited due to lack of facilities and expertise. Assessment of the potential applications of biotechnology tools is essential, as is capacity building to enhance use of the available technologies, and to implement appropriate biosafety measures.

## **Weak Disaster Management**

19. Disasters (droughts, floods and conflicts) are increasing in frequency in Africa where acute disasters are developing into chronic disasters which lead to food and seed insecurity. However, although it is generally accepted that disasters occur regularly, there is little forward planning or consultation at national or regional levels and African countries currently do not have the necessary capacity to respond to disaster in an effective and sustainable manner. A number of efforts to deal with the impact of disasters such as food aid, food imports by government and supply of seeds as part of relief programmes have had only minimal impact on the overall food situation, and the frequent introduction during disasters of unsuitable varieties erodes biodiversity and leads to loss of valuable local genetic resources. As a result of the **increasing incidence of emergency situations, an increasing proportion of the assistance allocated to Africa is invested in relief operations and a much smaller and decreasing proportion in seed development work** needed to increase sustainable seed supply and improve preparedness. This complex situation must be reviewed and solutions found to ensure adequate investment in seed development.

## **III PROGRAMME GOAL AND DEVELOPMENT OBJECTIVES**

### **Programme Goal:**

20. The overall programme goal is:

**To contribute to increased food security and nutrition and to poverty alleviation in Africa, through the establishment of effective and efficient seed systems and enhanced application of biotechnologies and methodologies within the seed sector.**

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<sup>2</sup> FAO. 2005. The Way Forward to Strengthen National Plant Breeding and Biotechnology Capacity. Summary from a meeting at FAO in February 2005.

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## Programme Objectives:

21. In support of the Programme goal the following objectives will be pursued:

- **Enhanced national capacity for improved seed production, multiplication and distribution to better supply farmers with high quality seed that enables them to respond to changing environmental conditions and market demands.**
- **Improved seed quality assurance procedures in place to ensure sustained production and distribution of high quality seed to farmers.**
- **Strengthened linkages between the formal and informal seed sectors to better understand and respond to farmer needs, including small-scale and women farmers.**
- **Effective seed policies and regulations in place to enable and promote increased seed trade among African nations.**
- **Enhanced capacity for the conservation and sustainable use and development of plant genetic resources for food and agriculture, to ensure adapted crop varieties are available to meet future farmer needs.**
- **Increased capacity to utilize tools of biotechnology to enhance plant breeding and high quality seed production.**
- **Increased capacity to implement biosafety measures in relation to seed production and distribution and plant genetic improvement, to protect human health and the environment.**
- **Establishment of model codes of conduct for seed used in emergency situations.**

## IV PROGRAMME COMPONENTS, OUTPUTS AND ACTIVITIES

22. The programme is based on an interrelated set of components that collectively provide a strategic approach to address the main barriers and challenges to improving the seed sector in Africa. The programme has been designed with a focus on diverse farmer needs across the continent of Africa. It promotes partnerships with international organizations such as FAO, the CGIAR, international and continental-level seed organizations and other concerned stakeholders, which will assist nations to achieve commitments under relevant international conventions, such as the International Treaty on Plant Genetic Resources for Food and Agriculture and the Convention on Biological Diversity, and other international agreements that affect seed sector development.

23. Overall, the programme has a total of **20 interrelated Components**, composed of six Components at continental level, six at the regional level and eight at the national level.

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## CONTINENTAL LEVEL

### **Component 1: To improve strategies for the collection, conservation, utilization and exchange of plant genetic resources, seed and planting materials**

**Output 1.** International conventions and treaties for germplasm conservation and use, plant variety protection, phytosanitary and biosafety requirements implemented, to promote seed sector development

#### **Activities:**

1. Raise awareness concerning international obligations among decision-makers on issues and opportunities through high-level engagement strategies.
2. Coordinate exchange of expertise among African and other organizations to improve understanding of the requirements of international conventions and treaties including biodiversity conservation, sustainable use and phytosanitary and biosafety measures.
3. Establish mechanisms to support national and regional efforts to harmonize phytosanitary and biosafety legislation.
4. Establish mechanisms to support national and regional efforts to harmonize seed legislation and to develop model Material Transfer Agreements for common use.
5. Identify and distribute information on seed-related biotechnology, including the development of capacities to regulate biosafety.

**Output 2.** More efficient management of plant genetic resources for food and agriculture, including improved germplasm collection, characterization, conservation and sustainable use

#### **Activities:**

1. Coordinate efforts to strengthen African networks of genebanks to increase the availability and use of germplasm and associated information.
2. Support development of an African information system to better document strategies for the application of biotechnologies for the conservation, sustainable use and characterization of seed and planting materials.
3. Coordinate efforts to develop continent-wide collection and conservation strategies for major and minor crops, including genetic stocks that are important for food security.
4. Promote the application of technologies (including biotechnology) for conservation, sustainable use and characterization of seed and planting materials.

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5. Promote documentation of the use of indigenous knowledge related to farmers' varieties.

## **Component 2: To develop better variety improvement programmes and crop production technologies**

**Output 1.** Strengthened programmes for variety development and crop production technologies

### **Activities:**

1. Coordinate development of variety improvement strategies at the regional and national levels in collaboration with NARS, the CGIAR centres, private sector and others partners.
2. Promote technology transfer, including proprietary technologies in partnership with technology holders and advanced research institutes.
3. Promote the development and maintenance of information dissemination systems to facilitate technology transfer.
4. Coordinate and support the development of training programme materials on modern technologies, including biotechnologies for variety development.

**Output 2.** Agro-ecological characterization enhanced through the establishment and strengthening of germplasm exchange networks and crop-based networks

### **Activities:**

1. Support the establishment and maintenance of crop-based networks to perform germplasm exchange and multi-locational evaluation.
2. Coordinate capacity building for agro-ecological characterization and interpretation.

## **Component 3: To strengthen seed production systems**

**Output 1.** Analysis of seed production systems, capabilities and comparative advantage conducted and published.

### **Activities:**

1. Coordinate the preparation of reports on the current status of African seed production systems, including the identification and analysis of critical issues based on national and regional studies.
2. Compile case studies on key elements for successful formal and informal seed production systems based on results of national and regional studies, and widely distribute the results.

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**Output 2.** African organizations and institutions and locations for specialized seed and planting material production identified and promoted

**Activities:**

1. Identify capacity building needs and opportunities to further develop or strengthen organizations and institutions for specialized seed/planting materials production.
2. Oversee surveys to identify ecologically suitable areas for seed and planting material production.

**Output 3. Mainstreaming of informal seed sector issues**

**Activities:**

1. Create awareness among regional and national actors and other stakeholders on the contribution of the informal seed sector to food and seed security and issues that need to be addressed to enhance the contribution of this essential seed sector.

**Output 4. University degree programmes developed for seed technology/production**

**Activities:**

1. Expert consultation of seed production and seed technologist conducted to determine needs, review technical components and identify potential universities for seed technology/production degree programme
2. Curricula developed based on guidance from expert consultation.

**Component 4: To enhance development of quality assurance systems with improved stakeholder contributions**

**Output 1.** Strategies and codes of conduct for quality assurance of key African crops developed and being implemented.

**Activities:**

1. Coordinate and oversee development of strategies with relevant partners (OECD, IPPC and ISTA, regional organizations and the private sector) to develop continental-wide models for quality assurance.
2. Prepare a model code of conduct for the use of quality seed in emergency situations, to assist country and regional planning efforts.

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**Output 2.** African seed laws and regulations harmonized.

**Activities:**

1. Compile and disseminate information on legal frameworks to facilitate the development of regional and continental-wide variety catalogues and to harmonize legal frameworks across Africa (seed certification, plant quarantine, variety release, etc.).

**Component 5: To improve continental seed marketing and distribution channels in partnership with the private sector**

**Output 1.** Strategies developed for improved seed marketing and distribution.

**Activities:**

1. Conduct surveys to establish the current status of marketing and distribution strategies.
2. Organize an expert consultation to develop and validate strategies to overcome constraints in continental and inter-regional trade, and widely disseminate the results to the private sector and regional organizations.

**Output 2.** Information on seed trade within Africa significant improved

**Activities:**

1. Establish and maintain a country-based information system for seed trade to assist further development of the seed sector.

**Component 6: To develop improved disaster preparedness and response to seed insecurity**

**Output 1.** Enhanced coordination and collaboration in planning the response to disasters that affect seed security across Africa

**Activities:**

1. Provide guidance at the continental level for disaster preparedness and response, including a range of disaster responses and funding strategies that integrate the different seed systems that farmers use.

**THE REGIONAL LEVEL**

**Component 1: To increase regional collaboration for germplasm collection and conservation and exchange**

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**Output 1.** Regional germplasm collection, safe handling and conservation strategies in place, and genebank networks established for improved germplasm exchange

**Activities:**

1. In consultation with relevant stakeholders, prepare regional priority conservation strategies for germplasm most at risk of being lost, and implement collaborative measures to collect and conserve indigenous varieties and knowledge.
2. Develop country-based regional databases to better track the status of crop varieties of regional interest and concern.
3. Establish regional procedures for the safe movement of plant genetic resources including by, conducting training courses on phytosanitary guidelines and seed and planting materials handling, and quality maintenance practices for safe movement.
4. Establish regional training courses to develop best practices in regional initiatives for germplasm conservation, varietal improvement and exchange.

**Component 2: To strengthen technologies for conservation, varietal improvement and germplasm exchange programmes**

**Output 1.** Measures for the safe movement of plant genetic resources developed and being implemented

**Activities:**

1. Conduct training courses on phytosanitary guidelines and seed and planting materials handling and quality maintenance practices for safe movement.

**Output 2.** Best practices are being applied for germplasm conservation, varietal improvement and exchange

**Activities:**

1. Conduct training course on best practices in regional initiatives for germplasm conservation, varietal improvement and exchange.

**Component 3: To strengthen regional seed production systems**

**Output 1.** Availability of seed at the regional level improved

**Activities:**

1. Undertake inventories of existing regional arrangements for production, exchange and availability of seed.

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2. Assist in the design of the most appropriate mechanisms for regional seed production and exchange.
  3. Assess and publicize a report on the current status of regional seed production systems, including the identification and analysis of critical issues.
  4. Compile regional case studies on key elements for successful formal and informal seed production systems.

#### **Output 2. Increase human resource development in seed technology/production**

##### **Activities:**

1. University degree programmes in seed technology/production developed and implemented in African universities at regional level
2. Competitive scholarships provided to students at regional level to study seed technology/production

#### **Component 4: To enhance development of quality assurance systems with the full participation of stakeholders**

##### **Output 1. Regional seed policies and legal frameworks developed and adopted.**

##### **Activities:**

1. Review existing mechanism for seed production and exchange and design harmonized policies, legal frameworks and procedures.
2. Develop regional variety catalogues.
3. Organize meetings and consultations with international organizations, such as OECD, IPPC and ISTA, regional organizations and the private sector to develop and use model procedures for quality assurance in local seed systems.
4. Develop a model code of conduct for the use of quality seed in emergency situations.

#### **Component 5: To improve regional seed marketing and distribution channels in partnership with the private sector.**

##### **Output 1. Strategies developed for improved marketing and distribution.**

##### **Activities:**

1. Conduct surveys to establish current status of marketing and distribution and develop strategies as basis for an expert consultation.



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2. Organize an expert consultation to develop and validate strategies to overcome constraints in regional trade, and disseminate results to the private sector and regional organizations.

**Output 2.** Information system established and tracking developed for regional seed trade.

**Activities:**

1. Identify sources of information, establish contacts and set up and maintain databases.

**Component 6: To develop improved disaster preparedness and response to seed insecurity**

**Output 1.** Regional and national arrangements formulated and implemented to enhance effective preparedness and response to disasters affecting seed security

**Activities:**

1. Provide guidance at the regional level for disaster preparedness and response, including a range of disaster responses and funding strategies that fully consider the different seed systems that farmers use.
2. Support appropriate regional information systems for seed varieties, including farmer varieties and proven modern varieties.
3. Support regional seed system profiling/database for preparedness.
4. Incorporate seed security assessment into Famine Early Warning Systems.

**NATIONAL LEVEL**

**Component 1: To strengthen capacities in human resources and institutional arrangements for germplasm management, variety improvement and biotechnology applications**

**Output 1.** Human resources and institutional capacities arrangements strengthened in order to develop the necessary expertise to further develop the seed sector.

**Activities:**

1. Assess human resources capacity to implement priority activities of the African Seed and Biotechnology Programme, and implement strategies for required capacity building.
2. Assess research capability and infrastructure necessary to support implementation of priority activities of the African Seed and Biotechnology Programme, and enhance research capacity and infrastructure, as required.

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**Component 2: To improve seed quality and supply of crops of national importance including minor crops**

**Output 1.** National seed policies, systems, and activities analysed, reviewed and endorsed

**Activities:**

1. Prepare national seed compendiums, and review and verify compendium information to support establishment of integrated policies for seed system development, including germplasm conservation, characterization, utilization and improvement, application of biotechnologies, variety release and seed production and distribution.

**Output 2.** National capacity to manage germplasm, release varieties and supply seed increased

**Activities:**

1. Determine best practices for the multiplication and release of, in particular, public varieties, to local and private seed entrepreneurs, including developing best approaches for royalty and maintenance arrangements.

2. Strengthen relevant institutions/organizations (including farmer based organizations) to better meet national requirements, in-line with international norms as applicable.

**Output 3.** Support for emerging seed entrepreneurs increased and strengthened

**Activities:**

1. Provide government support, including the provision of basic seed relevant services, to emerging seed sector entrepreneurs to enable their long-term success.

**Output 4.** National seed market information system developed and strengthened

**Activities:**

1. Develop and strengthen Seed Market Information System.

**Component 3: To develop better regulations for seed quality assurance, in line with regional frameworks and international standards**

**Output 1.** Critical issues affecting national seed quality assurance identified and options to overcome obstacles identified

**Activities:**

1. Review and assess documentation procedures on seed control, certification and quality assurance systems, and draft recommendations to improve the situation.

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**Output 2.** Relevant national laws and regulations for seed quality assurance formulated, adopted and implemented.

**Activities:**

1. Undertake a detailed review at the national level of existing arrangements for seed quality management, and national procedures, and formulate appropriate laws and regulations as required to ensure seed quality assurance procedures.
2. Monitor, widely publicize and enforce national seed quality assurance laws and regulations.
3. Develop national variety catalogues.
4. Develop supporting implementation manuals.

**Component 4: To make available more early-generation seeds for multiplication**

**Output 1.** Multiplication of breeder and basic seed strengthened, particularly in relation to public varieties

**Activities:**

1. Strengthen multiplication and supply of Breeder and Basic Seed institutions and organizations.

**Component 5: To enhance farmer seed security through both the formal and informal seed sectors**

**Output 1.** Improved linkages among representatives and their organizations in the formal and informal seed sectors, and increased opportunities to share experiences.

**Activities:**

1. Characterize existing seed systems (focused on different seed sources) in order to identify opportunities to link the formal and informal seed sectors.
2. Based on identified opportunities, design and implement training courses for seed producers and traders in the informal and formal sectors to increase seed supply, ensure seed quality and improve market efficiency.
3. Design and implement a training course for extension staff (community, governmental, private sector and non-governmental organizations) to increase their involvement in and capability to enhance seed supply and quality at farm level.
4. Undertake capacity building aimed at strengthening linkages and access among researchers and extension service staff with farmers. Approaches include Participatory Plant Breeding (PPB) (linked to varietal development component).

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**Component 6: To support the informal seed system to improve seed quality and increase seed supply**

**Output 1.** The informal seed sector is providing farmers with high quality seed in adequate quantities to meet their production needs.

**Activities:**

1. Carry out seed systems analysis to identify opportunities and constraints, including better understanding of constraints to further develop seed for minor and women's crops.
2. Based on analysis, increase farmer capacity to produce and supply quality seed through Farmer Field Schools (FFS) and other approaches, considering all crops, including minor and women's' crops.
3. Develop lessons learned, scale up, and determine opportunities for stronger linkages between the informal with the formal seed sectors to address seed quality and quantity.

**Component 7: To promote and strengthen small seed enterprises**

**Output 1.** Small scale seed enterprises established or further developed within both the informal and formal seed sectors, to meet local farmer needs, and to support distant market development where feasible.

**Activities:**

1. Establish a policy and regulatory framework to facilitate the establishment of small seed enterprises.
2. Develop and provide technical training to farmer/farmer groups for quality seed production and marketing, including how to gain access to appropriate germplasm, technologies, and information.
3. Organize training courses for farmers/farmer groups concerning establishment and management of small seed businesses, including group formation, access to micro-credit etc.
4. Support the poor and especially women seed entrepreneurs, so that they are empowered and not marginalized.

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## **Component 8: To develop improved disaster preparedness and response to seed insecurity**

**Output 1:** National arrangements formulated and implemented to enhance effective preparedness and response to disasters affecting seed security

### **Activities:**

1. Provide country specific guidance for improved coordination, disaster preparedness, and response, including a range of disaster responses that integrate the different seed systems that farmers are using (including compilation of relevant information and facilitate access to it).
2. Carry out participatory seed system and security assessments (including the seed systems that farmers are using).
3. Design and implement national training programmes to strengthen capacity of all stakeholders in disaster planning and response.
4. Support national disaster planning and response information system for seed varieties including farmer varieties and proven modern varieties.
5. Support seed system profiling/database for disaster planning and response and overall community disaster preparedness.

## **V PROGRAMME COORDINATION AND IMPLEMENTATION**

26. The African Union will coordinate the implementation of the programme based on its leading role in the development of Africa within the framework of the New Partnership for Africa's Development (NEPAD). A coordination unit will be established within African Union Commission headquarters, located in Addis Ababa, Ethiopia to ensure effective communication with AU member countries, and to ensure the Programme builds on existing continental, regional and national networks.
27. The coordination unit will ensure opportunities for the full and effective participation of all relevant stakeholders in the planning and implementation of activities. A full realisation of the Programme will require a serious commitment of member country policy makers, the international donor community, CGIAR centres, African regional networks, farming organizations, seed companies, biotechnology providers and member of civil society organizations. FAO will collaborate with the African Union Commission, providing technical assistance and will facilitating partnerships among the international conventions secretariats that are relevant to the African seed sector.
28. Once the African Seed and Biotechnology Programme is endorsed the coordination unit will collaborate with a wide-range of organizations and interests to develop detailed project proposals and plan the implementation of priorities. Africa experts will continue to be involved in the process. As projects are developed and implemented, a programme monitoring and evaluation process will be established.