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### DEVELOPING SEED SECURITY STRATEGIES AND PROGRAMMES FOR FOOD SECURITY IN DEVELOPING COUNTRIES

Position paper presented to the “International Workshop on Seed  
Security for Food Security”  
Florence, Italy, 30 November-1 December 1997

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# DEVELOPING SEED SECURITY STRATEGIES AND PROGRAMMES FOR FOOD SECURITY IN DEVELOPING COUNTRIES

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## 1. Introduction

There is general agreement among national governments and foreign aid donors that the food security situation in most developing countries is worsening. It is estimated that 800 million people in developing countries lack sufficient food and are undernourished. Millions more suffer from nutritional related deficiencies. In the African region, almost half the population of the Greater Horn of Africa is being considered to be food insecure. Access to an adequate supply of food is the most basic of human needs and rights. Guaranteeing food security is not only the moral obligation of governments, but it is also in their economic and political interest.

To achieve food security, a country must be able to grow sufficient food or have enough foreign exchange to import food for its people. However, due to shortages of foreign exchange, most developing countries rely on their agricultural production for their food security. Therefore, food insecurity in most developing countries is mainly due to deficient agricultural production including low or fluctuating productivity. A main reason for this situation is that seed and planting material of adapted varieties required by farmers are not always available when needed, a situation often referred to as seed insecurity. Therefore, seed security should be accorded high priority at national, regional, and global levels if food security is to be achieved in most of the developing countries.

The intent of this paper is to highlight some of the forces at work and suggest a strategy for a seed security system for food security.

## 2. Seed Security for Food Security

A seed security programme can be defined as a series of activities developed to ensure access by farming households (men and women) to adequate quantities of good quality seeds and plant materials of adapted crop varieties at all times - good or bad. In this definition, **access** implies that the source of these seeds should be within an acceptable distance, in timely manner and at an affordable prices, while **at all times** refers to the availability of appropriate seed stocks each and every growing season regardless of good or bad growing conditions and/or natural or man-made calamities.

Most farmers in the developing countries are still largely self provisioning in terms of local seed and plant material. However, to be productive and have stable agricultural livelihoods, these farmers have to grow a diversity of crops and different varieties of each crop. This system has resulted in the development, through on-farm selection, of varieties adapted to the changing local agro-ecological conditions. Therefore, farmers' ability to save or secure seed stocks of their diverse crop varieties is of a capital importance for food security. It is therefore imperative that, under the prevailing conditions in the developing countries, a seed security strategy first aims at **protecting the crop diversity of the region**, which is the foundation of present and future agricultural systems.

Although protecting locally adapted crop varieties appears to be the first step towards seed security, it can not by itself achieve food security in the developing countries. The quality of these

local seeds needs to be improved and seed production and distribution mechanisms strengthened to achieve food security. Thus, seed security for food security can only be achieved in the developing countries, if strategies and mechanisms are designed **to protect the local crop diversity and improve the seed supply sector**. However, it should be recognized that the seed supply sector has as its foundation the locally adapted crop varieties, therefore it would not make sense to build a strong seed supply sector without first securing its foundation, which is currently unprotected and under stress.

### 3. Seed Security Strategies

Seed security strategies are comprised of a series of mechanisms and activities that are supported by government policies to achieve seed security in a country or region. Based on the prevailing situation in most developing countries, the main components of a seed security programme in such countries should include:

- (i) protection of local crop diversity; and
- (ii) strengthening of seed supply sector.

The most important task, however, is to define activities that would effectively accomplish the above objectives. In this regard, it is first necessary to analyse the risks associated with the loss of locally adapted crop varieties and the constraints to the improvement of the seed supply sector at national and regional levels. Detailed assessments of seed production and improvement programmes in different regions, including Sub-Saharan Africa, Latin America and the Caribbean, the Near East and North Africa, and Asia are being completed by the Plant Production and Protection Division (AGP) of the FAO. More information on the constraints in seed production in the developing countries could be obtained from these sources.

#### 3.1 Protecting local crop diversity

In most developing countries, farmers acquire seed by saving part of their harvest or through farmer to farmer seed exchange networks, which are known as informal seed supply systems. To a lesser extent, the formal seed supply system delivers certified or commercial seed to some farmers. These seed channels, especially the informal seed supply systems, have proven to be very effective and have been able to sustain the livelihoods of rural farming communities for hundreds of generations. However, due to the increased frequency and severity of natural and man-made disasters in recent years, these seed supply systems have become extremely precarious.

Natural disasters including among others, drought, flood, and fire have increased in the past decades and are currently at record levels in the 1990s. For example, in the 1960s only 16 major natural disasters were recorded, but the number rose to 29 in the 1970s and to 70 in the 1980s. According to the United Nations Department of the Humanitarian Affairs (UNDHA), the number of disasters that occurred in the 1990s and which required emergency assistance has almost doubled that of the 1980s. With the El Niño weather phenomenon being felt in different parts of the world, it is clear that the world is facing an ecological disaster that could affect millions of farming communities if appropriate measures are not taken. Furthermore, the frequency of war and civil strife are also on rise this decade. For instance, each of the ten countries in the Greater Horn of Africa has experienced either civil strife, war or drought since 1980. The UN has reported that, 23 countries are either in current states of war and civil strife or have been in one of the two in the 1990s.

These natural disasters, in addition to their devastating effects on the environment, often destroy farmers fields and sources of seeds. War and civil strife prevent farmers from saving seeds, destroy

their external reliance in seed and planting materials, thus making them seed insecure. Long-lasting seed insecurity may have devastating consequences on agricultural systems and the lives of more than a billion people, especially in the developing countries, where the majority of people rely on agricultural production for their food security.

Depending on the magnitude of the calamity, the consequences generated by disasters in the developing countries may indirectly affect the agricultural systems of the developed countries, which often rely on local crop diversity in the developing countries as source of valuable germplasm. Seed security strategies that are appropriate in the developing countries are therefore critical for the sustainability of agriculture production and food security.

### **3.1.1 Capacity to respond to seed shortages**

Most developing countries have experienced, from time to time, seed shortages caused by factors such as deficiency in one component of the seed supply mechanism. However, severe seed shortages are often caused by natural or man-made calamities. In the past, such seed shortages have been dealt with, among others, by emergency seed distribution for planting, and to a lesser extent, by multiplying and distributing seed stock reserves or genebank collections.

#### **A. Emergency Seed Supply**

The common national and international response to calamities has been in form of emergency relief including seed supply for planting to restore agricultural systems in the affected areas. Although seed emergency relief programmes have helped millions of farmers in different developing countries, these programmes have been, in most cases, unable to restore the adapted crop diversity when lost in the region, and often introduce new varieties or only a few of the pre-disasters varieties. This situation was recently observed in Cambodia, Liberia, Rwanda, and Sierra Leone (Sperling, 1997, Longley, 1997). In addition to the risk of bringing new diseases and pests, introducing untested material into a region often results in yield reductions. The negative effects of inappropriate seed introduction may be long-lasting since most farmers in the developing countries traditionally save seed from previous harvests for the following cropping season. More importantly, untested material may pollute germplasm of the remaining local varieties, thus accelerating genetic erosion.

It is clear that emergency seed supply programmes require a substantial amount of technical and management planning to achieve the objective of restoring agricultural systems in regions victim of disaster. Therefore, a mechanism is needed to protect local crop varieties from disasters. The protected crop varieties could then be used as principle sources of seed and planting material for the emergency relief programmes. This would allow emergency relief agencies to distribute varieties that are needed by farmers and minimise technical mistakes for the benefit of both providers and recipients.

#### **B. Seed Stock Reserves**

Seed stock reserves have been experimented with at household, community, national and regional levels against a total loss of seeds after calamities. Seeds kept in emergency reserves within or outside the country are often dispatched to the affected area or country after calamities. In general, seed stocks are often established at the regional levels based on agro-ecological and stability conditions.

However, due to high establishment and management costs, these seed stocks are mostly limited to certified or commercial seed stocks. Therefore, seed stocks are considered not to be of direct advantage to most farmers, who often would like to have their diverse crop varieties protected as well. As a result, some farmers in some ecologically risk-prone areas in the developing countries,

who have recognized the pressing need of protecting their adapted local crop diversity, have developed some innovative traditional seed security practices. For example, in the semi-arid district of Kenya, farmers save at least twice the amount of seed required for planting the next season in case drought or a complete crop failure arise due to unfavourable weather conditions (Muhammed et al., 1985). In Ethiopia, farmers have long-term underground seed stores where seeds can remain viable for many years (Louwaars, 1995).

Although these practices could be effective for short-term seed security programmes, they are less effective for long-term and/or large-scale disturbances. In addition, experience has shown that in case of acute starvation, farmers often end up consuming their seed reserves. Furthermore, even the modern seed stock reserves are also vulnerable to large scale and severe disasters, especially war and civil strife. Although seed stock reserves cover only a few crops and varieties, it is considered to be an expensive approach for most developing countries.

### C. Genebank and On-farm Seed Conservation and Utilisation

In recent years, international and some national agricultural research centres have collected local farmer-developed varieties all over the world, including the developing countries, and placed them in long-term cold storage facilities called genebanks. In addition, farmers have conserved their landraces and traditional varieties in their fields. These collections have been used as the raw material for fashioning new crop varieties by the world's plant breeders. In some occasions, they have been reproduced and distributed to farmers to restore appropriate, indigenous planting materials when lost following disasters.

Actually, only a small quantity of seed is placed in long-term cold storage, which constitute an obstacle to its efficiency for a seed security strategy in the developing countries. In addition, farmer-selected varieties go through constant on-farm selection, which is the basis of their adaptation. Therefore, chances are that germplasm in genebanks may no longer be adapted to the cropping conditions of their origin, as was recently the case with bean varieties in Rwanda (Sperling, 1997). Under these conditions, it may be difficult for the genebanks to be effective in restoring disaster-affected agricultural systems, without appropriate additional interventions.

In regards to on-farm seed conservation, it is clear that since local crop varieties are kept in the field, they are as well vulnerable to all types of disaster. However, for small scale disasters, on-farm collections may play an important role in seed restoration efforts in the affected areas, if disaster occurred in similar agro-ecological zone and where similar crop varieties are used, and if a good seed multiplication and distribution mechanism has been established.

#### 3.1.2 Strategies to protect local crop diversity

The ideal approach should be that seed security programmes take roots at the community level. In other words, farmers should be involved in all strategic activities if seed security is to be achieved and sustained. Furthermore, the prevailing economic situation of most developing countries requires that programmes that require substantial resources from the governments can be considered dead at the start. Therefore, a realistic seed security scheme for a country or region should involve farmers and their communities, and consider the prevailing socio-economic constraints of the country or region.

Based on the prevailing conditions of agricultural systems and seed supply sectors in most developing countries, local crop diversity can be protected if **a mechanism that warns of a potential disaster is established**. This would allow the rescue of seed or plant material of most important crops varieties, which constitute the core of local crop diversity. In addition to a warning mechanism, **an institution that is capable of a rapid response before, during and after disasters**

**should be designed and established.** This organ would be responsible for collecting, transporting to safer areas, reproducing during disaster, and distributing the seeds back to farmers after disaster. However, to facilitate such an operation, the genetic resources to be multiplied should be concentrated in a few locations. Therefore, the existing storage facilities could also be involved in the implementation of such a programme.

The reality is that disasters are not always predictable. In this regard, **traditional or other household and community seed security practices should be strengthened or designed and promoted,** in addition to the above structures.

In brief, a significant amount of local varieties that represent the diversity of crops in developing countries could be protected from calamities only if:

- (i) an early warning system is established;
- (ii) capacities to respond to disaster are established; and
- (iii) household and community seed security activities are promoted.

The implementation of these activities would require a substantial collaboration at community, national, and international levels.

#### A. Establishment of an Early Warning System

An early warning system, to forewarn about imminent problems related to seed security will determine the decision as to whether seed rescue operations are needed in a particular community or country. Early warning systems require technical knowledge, intelligence gathering, and effective collaboration among people, organizations, and nations.

There are three Early Warning Systems already established within the United Nations organisation.

The Humanitarian Early Warning System (HEWS) based in Geneva, which has as its purpose to identify potential crises with humanitarian implications. HEWS provides information on areas of potential war and civil strife. It focuses on country situations where latent or low-level tensions have not yet attracted significant attention, but have the potential to escalate. HEWS also generates background profiles, analytic briefs, and other reports on countries of concern.

The Global Information and Early Warning System (GIEWS) has been developed at the FAO. This system continuously monitors and analyses weather and crop production conditions. In this capacity, GIEWS provides information on potential drought, floods, and other environmental factors which may affect agricultural systems and seed production in most parts of the world.

A second FAO system is the World Information and Early Warning System (WIEWS). This system was designed to monitor the situation of plant genetic resources for food and agriculture. It gives country profiles on structures including institutions, scientists, and list of crops and national programmes related to plant genetic resources. WIEWS provides information on possible genetic erosion in the natural environment and ex-situ collections. WIEWS also provides information on geographical distribution of accessions and relatively safe places for seed multiplication.

One of these already established systems could be given the mandate of protecting local plant diversity. This assignment is presently partially carried out by WIEWS, which would need to be strengthened to effectively accomplish this important responsibility. Collaboration among these early warning systems is essential simply because each system covers specific information needed for the

protection of local crop germplasm. Collaboration is also needed with a number of national and international institutions that are concerned with seed and plant genetic resources.

Early warning networks should be coordinated at the regional level. Once established, the system could also serve as a repository of information on the technical, social and economic aspects important to farmers (men and women) relative to their traditional varieties/landraces they grow and any improved varieties that they may have adopted.

Since the decision to intervene in any particular country or region may be solely based on a political or social ground, which is considered to be a sensitive issue by many governments, one would anticipate problems that could affect the implementation and efficiency of an early warning system. This situation needs to be clearly addressed at an international conference where appropriate measures can be taken and agreed upon by member countries.

#### B. Building Capacity to Respond to Disasters

Institutions dealing with emergency situations must have the capacity to provide an efficient flow of information, an effective coordination capability and a state of readiness with appropriate mechanisms planned in advance. These types of institutions should have the following characteristics:

- (i) a capacity to assess farmers needs before and after disaster in term of varieties and crops appropriate to the agro-ecological growing conditions of the affected region;
- (ii) a capacity to collect seed stocks of appropriate varieties according to the potential magnitude and severity of the disaster, and to maintain these seed stocks when necessary;
- (iii) a capacity to multiply and distribute seeds and planting materials of adapted crop varieties that are needed by farmers in an equitable manner.

A number of UN agencies, international institutions (such as centres of the Consultative Group on International Agricultural Research), and NGOs, have recently been involved in restoring locally adapted seed and planting materials following emergencies. Unfortunately, these efforts have been, in many cases, completely ad hoc and voluntary in nature. There has been no standing capacity to respond appropriately to such disasters; no clear delineation of responsibilities; no coordinating mechanism to bring the various agencies and organisations together for planning and implementation of emergency seed supply efforts during and following disasters. Moreover, in some cases, agencies that supply seeds and planting materials as part of a relief package do so with little awareness or appreciation of the problems that can be caused by supplying inappropriate varieties.

These difficulties were recognized at the 1996 Inter-Governmental Leipzig Conference, which delineated the responsibilities of different agencies at the international level. During this conference, the FAO was given the mandate to coordinate administratively a programme in this field in cooperation with WFP, UNHCR, UNDRO, IPGRI, national and international agricultural research centres, regional plant genetic resources networks, governments of the countries affected, donor countries and NGOs. In this endeavour, the FAO is specifically charged with establishing agreements with such partners for the "rapid acquisition and multiplication, restoration and provision of (planting) materials to countries in need."

It is therefore essential to elaborate this concept into practical schemes which will effectively address the needs of rural farming communities in member countries affected by calamities.

#### C. Promoting Community Level Seed Security Practices

Seed security activities, when carried out at household and community levels, may protect farmers from unpredictable small scale calamities. As already mentioned, there are some strategic seed reserves practised by farmers living in disaster-prone areas. These practices could be promoted in other similar agro-ecological areas with frequent occurrences of severe weather conditions which have not yet adapted similar practices. Other activities, such as in-situ and on-farm plant genetic resources conservation, need to be strengthened and promoted throughout. This will require:

- (i) launching training programmes at national and regional levels for agricultural officers, farmers (men and women) in *in-situ* and on-farm seed conservation of local genetic diversity and in on-farm production of good quality seed; and
- (ii) establishing regional on-farm seed security networks that could facilitate exchange of information within and among countries of the region relative to on-farm seed security strategies and programmes.

### **3.2 Strengthening the seed supply sector for food security**

Seed security strategies for food security programmes are comprised of a combination of tactics that not only protect crop diversity of a region, but also enhances regular flow of seeds of staple food crops to the farmers. In addition, the quality of the protected seed stocks needs to be improved if food security is to be achieved.

#### **3.2.1 Strengthening on-farm seed production systems**

The long-term solution to seed insufficiency, and hence food insecurity, among limited resource farming households lies much less in interventions in the formal sector which does not achieve immediate profitability from producing seeds of traditional food crops, but rather through the strengthening of the informal seed supply sector which has, for generations, been the main source of seeds for the small scale farmer.

The quality of seed used by farmers for growing crops can be enhanced in many ways. Notable among others are:

- (i) by training men and women farmers in the planning, selection, handling and storage techniques necessary to produce good quality seeds crops on their own farms;
- (ii) by encouraging farmers to make their own selection of good quality seeds from their traditional varieties, multiply, properly process and store this seed, and then sell this “improved” seed to other farmers either directly or at local markets; and
- (iii) by developing acceptable improved varieties through participatory national breeding programmes and production of good quality seed for distribution to limited resource farmers.

Limited resource farming households often use their own seeds or resort to neighbours or local markets as their seed source. Strengthening the skills of farmers, men and women, to become seed producers of preferred traditional and adapted improved varieties of major food crops would not only assure the availability of good quality seeds, but also increase household income. Once established as a source of good quality seed whose resultant crop seeds always perform reliably, these farmers producing seed crops would develop reputations within the community as sources for good quality seed and this would strengthen the informal seed supply system.



Several stages in the crop cycle require attention if the crop is to be used for seed. Correct site selection, good crop establishment and management, together with careful harvest, seed handling and storage of the seeds are essential to ensure quality. Seed production management practices also differ from crop to crop. Using participatory rural appraisal techniques would allow for the identification of seed-related problems men and women farmers are aware of in their farming systems. These problems should drive the types of interventions needed to be designed for demand-driven training programmes in on-farm seed and planting material production and management. Demonstrations, field days and farmer-to-farmer site visits to seed producing farms should be promoted.

Seed production is only part of the seed supply system which can be improved. Equally important is seed handling or conditioning, seed storage and seed distribution systems. This is not to say that informal supply systems are not effective in these areas, but that through participatory rural appraisals of farmers' current seed production systems, problems and concerns to be addressed will be identified.

### 3.2.2 Regional seed improvement strategies

It is now recognised that regional policies which facilitate the movement and exchange of seeds across country borders is absolutely essential for effective regional seed security. This was certainly the experience of the member countries of SADC where collaboration among the countries of the region to maintain both seed, and therefore food security, averted the occurrence of a major human tragedy resulting from the 1991/92 drought in southern Africa.

#### A. Conditions enabling regional seed improvement for seed security

A number of issues relative to seed production, storage and movement must be resolved at the regional level to enable a group of countries to come to agreement on how to harmonize seed standards, regulations and the orderly movement of seed (Scowcroft, 1997). These issues include:

- (i) **Certification of varietal purity.** The OECD has established procedures to certify varietal purity of seed that enters international trade.
- (ii) **Standards and procedures for seed testing.** The International Seed Testing Association (ISTA) has established procedures which promote uniformity of seed testing and ISTA also certifies seed testing facilities.
- (iii) **Plant protection and quarantine regulations.** The FAO has established a set of guidelines that are widely adopted. Special provision has to be made for asexually propagated crops such as potato, sweet potato and cassava because of the increased risk of disease transmission from one area to another using vegetatively propagated material.
- (iv) **Plant variety protection.** Plant Variety Rights (PVR) have been adopted by many developed countries which have enacted legislation consistent with the model law and guidelines developed by UPOV (1991).
- (v) **Seed marketing.** The sale of seed is frequently dependent on a form of seed certification and in some countries seed growers and seed sellers must be licensed or registered. Internationally acceptable guidelines have also been developed to provide some degree of uniformity in contractual arrangements for the sale of seed.
- (vi) **Regional strategic seed reserves.** The creation and maintenance of regional strategic seed reserves would be the epitome of regional cooperation to respond to disaster.

Regional reserves ideally would be an extension of national strategic reserves but require explicit agreements and networking among member states.

- (vii) **Regional associations and networking.** Networking is essential as the first step for member countries within a region to develop a regional seed security policy. Regional networks have the advantages of looking within and across their member countries to develop successful approaches and then can make efforts to replicate these successful seed security initiatives in other countries, when needed. These regional associations must be encouraged and supported by the international community if we are to have a chance of achieving seed and food security and reducing the deleterious impact of disaster and complex human emergencies.

There are now a number of associations of developing countries such as WANA, SPAAR, CORAF, SADC, APSA, ASARECA which are based on helping regional development of agriculture, freeing up agricultural trade and maintaining regional food security. Such associations should lead initiatives to establish regional seed security strategies.

#### B. Coordination of Regional Seed Improvement Programmes

The type of coordination structure that is used for regional seed security programmes has much to do with how effective these programmes might be. It is ill advised to look for a group of high level administrators, such as government employees and other such professionals. The closer those responsible to coordinate seed security activities are to those who are most affected by food security problems, the more effective the leadership will most likely be.

At both the regional and national levels, it is much better to form a cooperative network of responsible people who want these programmes to work and to be effective in ensuring that farmers, men and women, have access to good quality seed and planting material for their preferred food crops in sufficient quantities, in a timely manner, and at an affordable price. FAO is well suited to assist member countries in designing appropriate advisory mechanisms for their seed security programs.

#### C. Regional Seed Security Networks

A regional Seed Security Network (SSN) will require a strategic plan to respond to the needs of member countries facing calamities that result in seed shortages and related crises. The precise way the regional seed security system responds to the provision of seed and planting materials will vary from calamity to calamity. It would seem timely for seed security programmes to consider opportunities to share lessons learned about the successes and failures in different member countries faced with seed insecurity.

The network would have for objectives to:

- (i) coordinate regional information exchange needed by the global early warning system on plant genetic resources;
- (ii) develop an information management system (IMS) for National Seed Security Programmes and to use these lessons to improve seed and food security programmes in the region;
- (iii) design regional strategies and programmes aiming at building capacity for countries in the region to respond to calamities; and
- (iv) assist member countries in the design of appropriate seed improvement strategies.

In order to develop a user-friendly IMS, it is judicious to start with a minimum database that is mutually beneficial to the member countries of a given region, such that they see the usefulness in constructing and maintaining such a system (Fiebig, 1997). They must feel that, at the end of the day, the data collection and management responsibilities will help their seed security programmes and projects to develop and to be sustained. The management of the minimum database should, at first, allow seed security programme managers to know what types of actions other seed security programmes are taking, where, what has worked and why, what has not worked and why not, and the results and impacts of those actions.

The regional relational database and analytic capability will enable the storage of a wide variety of data generated by programmes and projects in the region, it will facilitate improved access to data and information and facilitate the analysis by these programmes and projects. More importantly, it will permit a holistic and lateral view and analysis of entire data sets across compartmentalised programmes and projects in the region, both at the national and regional levels. This will strengthen the capacity of individual countries to better assess and analyze seed and food security situations, particularly where problems of food insecurity and related poverty are structural, or when calamities, such as drought or environmental degradation occur.

The success of a regional Seed Security Network depends on the efficiency of national seed security programmes. It is important that countries that are willing to participate in the network to have a number of common components that can be compared across the region. These components are important to characterise and the information is stored in the relational databases of the regional network and the national program's IMS. This will greatly assist the regional SSN to respond to national calamities resulting in their need of seeds and planting material provision programmes. The data and related information that is collected by each national seed security program is gathered using a standardized questionnaire so that these data can be compared across countries. It is essential to start with a minimum dataset that will answer critical questions and allow SSN and national database managers to become more skilled in data management. As these skills are developed, other important aspects of the informal seed sector can be explored and characterised. Examples of two critical areas to understand are social equity and gender issues.

In addition to the information collected for the Early Warning System, the regional Network's and national programmes' IMS should maintain a relational database that would consist initially of the following modules:

- ☞ **Locator data** - on where national seed security programmes are working.
- ☞ **Partner data**- information on who national programmes are working with - NGOs, research, extension, etc.
- ☞ **Problem data** - on types of problems being addressed in the region.
- ☞ **Condition data** - on conditions needed to be established for an enabling environment to assure successful development of sustainable seed security systems.
- ☞ **Intervention data** - on the types of interventions undertaken by national programmes, which segment(s) of the rural population is targeted, and other important information which contributes to national programme ability to decide whether these types of interventions might be appropriate given their particular situation.

- ☞ **Training and education data** - on the types of training and education activities undertaken to strengthen men and women's skills in on-farm seed and planting material production and management. Also included here are data and related information on national programmes in training and education activities for research, extension and NGOs.
- ☞ **Results data** - on the reasons/actions attributable to achievements and/or failures of the interventions.
- ☞ **Impact data** - from results of the interventions.
- ☞ **Financial data** - on the sources and use of obligations supporting the regional Network and national seed security programmes.

#### D. Performance Monitoring and Evaluation

Performance monitoring and evaluation (PM&E) is a management tool which can assist regional SSN and national seed security programme managers to learn what strategies work best for seed security in the region. The relational database of the IMS serves as a repository of information on national seed security strategies that are being used to strengthen seed security programmes in the region. Each national seed security programme will have an identical relational database structured in the same format as the regional Network's database for their own use. Experience has also shown that NGOs working in the seed sector and who are partners in the national programmes also benefit from sharing information on lessons learned by other NGOs working with on-farm seed production programmes.

Another important aspect of the PM&E system is to establish a tracking system to monitor the spread of seed and planting materials in order to assure that there is a fair and equitable approach to the seed distribution program.

Performance monitoring also allows for the evaluation of results and impacts of the seed and planting material distribution system. It will also provide information on the adaptability and acceptability of the seed and planting materials of the chosen food crops.

The PM&E system also allows the SSN managers to evaluate the impacts of their programme and to make the decision of when to stop the seed and planting material provision programmes in areas affected by calamities.

### 3.3 Government commitment

All the technical innovations will come to nothing in the absence of governmental support in the form of coherent policies ensuring that an enabling political environment is established to support seed security initiatives. It is therefore critical that a seed security strategy be included in the major national strategies for agricultural development if food security is to be achieved and sustained in any given developing country and/or region. Given that the agricultural situation varies within and among countries, it is the responsibility of national policy-makers to adapt the suggested seed security scheme to the prevailing conditions of the country for its rapid and effective establishment.

## 4. Concluding Remarks

Food security is a crucial issue for every country, and the availability of seed for crop production or seed security is one of the most important factors which affect this issue. Conservation and utilization of local plant genetic resources is of prime importance for food security, as it permits

small-scale farmers of developing countries to have permanent access to seed and planting material of food crop varieties adapted to their region. Conservation and access to these resources are important, especially in disaster-prone areas, as farmers of these regions often lose most or all of their seed stocks during disasters, which also causes erosion of genetic diversity. Furthermore, in order to ensure food security in these regions, effective strategies and policies are needed to implement seed security programmes that not only protect the local crop diversity, but also strengthen the informal seed supply sector. These challenges facing development planners are immense and can only be addressed in a collaborative international context.

The strategies to achieve seed security for food security presented in this document are based on two main components, which include:

- **The protection of local crop diversity.** In this regard, it is suggested (i) to establish a mechanism in form of an Early Warning System on plant genetic resources capable of forecasting areas of potential disaster occurrence to allow for a rapid intervention in the region; (ii) to build a capacity that would execute the needed rescue operations to multiply and distribute appropriate seed stocks back to farmers after disaster, and (iii) to promote traditional or innovative seed reserve practices, which need to be included in all government seed programmes.
- **Improvement of the seed supply sectors at national and regional levels.** This strategy includes (i) the strengthening of on-farm seed production, which would require that donors and governments implement effective and responsive schemes of on-farm seed production for seed security; (ii) establish regional strategies for seed sector improvement, which can be accomplished by establishing an enabling environment for coordination among concerned organizations and institutions, establishing a seed security network, and initiating a system of monitoring and evaluation.

These strategies can only achieve their goal in a collaborative effort among governments, donors and the international community to support the implementation of such a scheme in term of resources and appropriate policies. Achieving seed security would be a considerable asset in the fight against food insecurity and hunger throughout the developing world.

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