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REPORT OF THE INTERNATIONAL WORKSHOP ON DEVELOPING INSTITUTIONAL AGREEMENTS AND CAPACITY TO ASSIST FARMERS IN DISASTER SITUATION TO RESTORE AGRICULTURAL SYSTEMS AND SEED SECURITY ACTIVITIES

Rome, Italy, 3-5 November 1998

Document CGRFA-8/99/3, para. 19, reports on a meeting on FAO's work in developing appropriate agreements and institutional capacity to provide appropriate planting materials to assist farmers rehabilitate their farming systems after disasters. This document provides for the information of the Commission, the report of the International Workshop held in Rome in November 1998, and mentioned there.

**INTERNATIONAL WORKSHOP ON
DEVELOPING INSTITUTIONAL AGREEMENTS AND CAPACITY TO ASSIST
FARMERS IN DISASTER SITUATIONS TO RESTORE AGRICULTURAL SYSTEMS
AND SEED SECURITY ACTIVITIES
(Project GCP/INT/660/NOR)
Rome, 3-5 November, 1998**

PURPOSE, OBJECTIVE, SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

1. INTRODUCTION

The incidence of man-made and natural disasters has increased in the past decades and had profound effects on rural communities and agricultural production systems, including farmer seed systems. Seed security is defined here as the access by farmers to adequate quantities of good quality seed of locally adapted varieties at the right time. Seed security is a prerequisite for the restoration of agricultural systems in disaster areas and a priority to ensure food security where people have access at all times to enough food to maintain an active and healthy life.

The conservation and sustainable use of plant genetic diversity is of capital importance and is currently the subject of many crucial debates. It must be stressed that crop genetic resources (CGR), which includes locally adapted and improved varieties, is especially endangered in disaster-prone areas and, in some cases, is the only source of CGR for a reasonably quick recovery and development of agricultural productivity by rural communities after disaster. Therefore, in disaster-prone countries and regions, the development and sustainability of agricultural production systems depends on the conservation of crop genetic diversity.

Farmers' access to seeds of locally adapted crop genetic resources is the foundation of present and future agricultural systems in developing countries. Therefore, seed security is a basic component of food security and is recognised as a priority by FAO and many other stakeholders, especially those in disaster-prone regions. This workshop was organised under FAO's mandate to facilitate the implementation of the Global Plan of Action (GPA) for the conservation and sustainable utilisation of crop genetic resources for food and agriculture, adopted by the International Technical Conference on Plant Genetic Resources, held in Leipzig, Germany in June, 1996. This workshop was also the follow-up of the International Workshop on Seed Security for Food Security, held in Florence, Italy, in November-December, 1997, where the importance of developing mechanisms to facilitate the restoration of local crop varieties after disasters was stressed as being critical to the re-establishment of seed supply and agricultural systems.

In this regard, the project GCP/INT/660/NOR, which is supported by the government of Norway, is designed to address the above issues. The mandate of this project includes the organisation of the international workshop during which strategies to assist farmers in disaster-prone countries will be developed.

2. PURPOSE AND OBJECTIVES OF THE WORKSHOP

The purpose of the workshop was to develop strategies and mechanisms that would strengthen seed security in developing countries and regions in disaster-prone areas, thereby enabling a rapid and effective restoration of farmer seed systems to restore domestic food security following disaster. The workshop brought together over 60 participants from the donor community, UN Organisations, CGIAR Centres, policy makers from disaster-prone countries, international organisations such as the ICRC, NGOs and seed relief specialists.

The objectives of the workshop were :

- 2.1. To develop strategies to improve the capacity of disaster-prone countries to better prepare farmer seed systems to minimise the effects of disasters. Through this workshop, mechanisms which enable countries and their rural farming communities to identify, acquire, multiply, and deliver seed of locally adapted varieties before, during, and after disasters will be identified.
- 2.2. To determine mechanisms of collaboration for a continuing partnership among governments and institutions involved in the maintenance or restoration of farmer seed systems, plant genetic resources, and seed security after disaster.

Workshop participants were instructed to recommend necessary follow-up actions requiring the collaboration of development agencies, plant genetic resources (PGR) institutions, emergency seed supply programmes, and the national and regional seed programmes to strengthen farmer seed systems by protecting local crop varieties from disasters as a critical component to restore agricultural systems and seed security.

3. GENERAL DISCUSSION

The workshop included a plenary session with the presentation of case studies and thematic working papers, two working group sessions and a final plenary session for discussion. Each of the presentations given in the initial session was discussed (see section 7) and provided a framework for in-depth discussion of issues in the working groups (see section 8).

Case studies that were presented were:

1. Angola / World Vision International;
2. Afghanistan;
3. Bosnia;
4. Rwanda / Seeds of Hope;

Background papers representing thematic issues were:

1. Characterising disasters;
2. Technical and socio-economic aspects of farmer seed systems;
3. Plant genetic resources and seed relief;
4. Regulatory aspects of seed security;
5. Seed stocks and seed multiplication in emergency situations;
6. Food and seed assistance in the recovery from crisis; and a
7. Synthesis of the background papers.

3.1. General comments

This international workshop marks an important step in approaching the sensitive problem of seed security. Perhaps for the first time, specialists from different regions of the world, in accepting FAO's invitation, are offering the benefit of their practical experience to help poor rural communities that are in need of a rapid response mechanism to save their local adapted crop varieties and to reproduce them in emergencies. This workshop intended, in fact, to provide a forum for exploring possibilities for defining seed security policies and for elaborating strategy guidelines for prompt intervention to be addressed particularly to farming communities in disaster-prone regions.

A seed security programme can be defined as a series of activities developed to ensure access of farming households - men and women - to adequate quantities of quality seeds and plant materials

of adapted crop varieties at all times. In this definition, **access** implies that the source of these seeds should be within an acceptable distance, and supplies delivered in a timely manner and at affordable prices, while **at all times** refers to the availability of the appropriate seed stocks in time for each and every growing season and in rapid response to natural or man-made calamities.

Most farmers in developing countries are still largely self-provisioning in terms of local seed and plant material. Therefore, a seed security strategy should be conceived first in terms of **protecting the local crop diversity**, which is the foundation of present and future agricultural systems. However, the quality of these local seeds often needs also to be improved, and multiplication systems and distribution mechanisms upgraded to achieve food security. Thus, the second priority to guarantee seed security for food security can only be achieved if strategies and mechanisms are designed **to improve seed quality and supply systems**.

Taking action to restore seed security quickly after a disaster is an effective way to help restore national or regional food security. It would be even better if a seed security action plan could be implemented in anticipation of disaster. Therefore, the third priority in conceiving a seed security strategy could be **the development of an appropriate forecasting mechanism and an early warning system**. An alarm system, to forewarn about imminent breach of seed security, will provide an instrument for determining whether a seed rescue operation is needed in a particular community or country. However, it must be underlined that early warning systems require technical knowledge, intelligence-gathering, and effective collaboration among people, organizations, and nations.

Co-operative inter-country programmes and networks to foster a strong and continuing partnership among all the players concerned with maintaining seed security and/or restoring it after disaster as one of the approachable strategies were discussed in the workshop. A co-ordinating mechanism, such as a network, including national agricultural research systems (NARS) and other relevant national government agencies, regional organizations, non-government organizations (NGOs), inter-governmental organizations, (IGOs), private volunteer organizations (PVOs), International Agricultural Research Centers (IARCs), the private and public seed sector, farmers' organizations, communities and their respective associations, and international donors, could be a useful instrument to guide emergency programmes for the rehabilitation of agriculture in regions affected by calamities.

An effective seed security strategy comprises a series of mechanisms and activities that are supported by government policies to achieve seed security in a country or region. During the implementation of a seed security program, it must be recognized that the primary determinants of seed security to farmers, their family and community are economic, cultural and ecological. To people affected by disaster, seed availability, accessibility and timely delivery are the overriding features to restore seed security, and consequently food security, at the household, community, national and regional levels. Thus, any strategy to foster the development of seed security schemes must fit the pragmatic aspects of the strategy to the socio-political framework that exists in the country or region.

3.2 Protection and conservation of crop genetic diversity

Protection and conservation of crop genetic diversity entails action to conserve locally adapted varieties and genetic resources at the farm and local community level, as well as in national and regional gene banks, and expanding stocks of the main varieties of regional food crops to ensure rapid seed multiplication and exchange during disasters. Also important are early warning systems to monitor changes in the status of genetic diversity in locally and regionally adapted crop genetic resources.

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. 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 minimize technical mistakes for the benefit of both providers and recipients.

3.3 Seed supply systems

Robust seed supply systems depend on national and regional seed policies plus government and international support. Practical measures to strengthen seed supply systems include empowering on-farm and community seed production after disaster, farmers and their communities are frequently the lynch-pins in re-establishing local seed supply and seed distribution systems. There is also need for appropriate seed multiplication technology, including low cost, rapid biotechnology-based multiplication methods, strategic cost-effective seed reserves of the important food crops, and "sensible standards" to ensure production of high quality seed.

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; and
- (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 centers 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 organizations 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 which 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 centers, regional plant genetic resources networks, governments of the countries affected, donor countries and NGOs. In this endeavor, 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 of member countries in regions affected by disasters.

3.4 Harmonization of seed rules and regulations

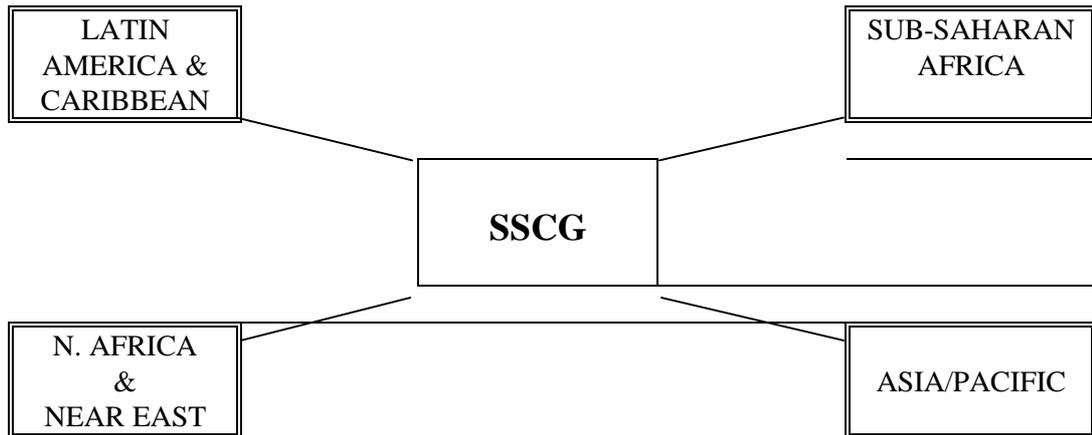
Sound national and regional seed policies are essential. Among measures discussed during the workshop are national plant improvement programmes with focus on locally adapted varieties and land races, a system to facilitate crop variety evaluation, registration and release, and informal, on-farm seed production and rural community distribution systems. At the regional level, policies should facilitate movement and exchange of seed across borders. This calls for regional seed security networks with databases on varieties grown within the region, harmonization of seed standards and regulations, and uniform regulations to encourage fair and equitable trade.

3.5 Seed Security Consultative Group

Finally, the workshop called for the establishment of a global Seed Security Consultative Group (SSCG) which, constituted under the aegis of FAO, would provide policy and technical advice for seed security, particularly in disaster-prone countries and regions.

This Seed Security Consultative Group (SSCG) is addressed to all regions and Member countries which have disaster-prone areas. The SSCG is open to all stakeholders involved in activities related to preparedness before, response during and rehabilitation of seed systems affected by disaster.

The SSCG will function on a voluntary basis and it will consist of networks of governmental and non-governmental organizations, international organizations, public and private organizations involved in the seed industry, international and national research centers, donors and other stakeholders involved in disaster response programmes in these regions (see chart below).



Based on early warning systems information, the SSCG will serve to establish linkages with the above-mentioned field partners to address the necessary activities which have been identified to strengthen farmer seed systems which are faced with disaster, to respond during disasters and to rehabilitate affected seed systems in a sustainable manner to re-establish agricultural production systems. The field structure of the SSCG partners in any given disaster-prone region may vary. It may consist of existing national, regional, inter-regional networks involved with the seed sector, disaster relief and rehabilitation.

The role of the SSCG will be to liaise with its field partners in the region(s) affected by disasters in order to identify needed actions and assess comparative advantages in order to discern which partners will take which action. For example, who will take the lead in the identification of locally adapted CGR and assure its conservation? If needed, who would be responsible for multiplication of CGR needed to be distributed to disaster-affected farmers who need new seed and/or planting materials? Who would manage these distribution systems?

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 in organizations 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. These regional networks should be guided by a Coordinating Board which would be chaired by a Regional Coordinator and include representatives of the various field partners. FAO is well suited to assist member countries in designing appropriate advisory mechanisms for their seed security programs in disaster-prone regions.

4. CONCLUSIONS OF THE WORKSHOP

The workshop concluded that:

- **International efforts to support seed system recovery has sometimes been inconsistent.**
- **Information on CGR, if available, is often not accessible to stakeholders confronted with emergency situations.**
- **Impacts of disasters on farmer seed systems are often complex and varied.**

- **Experience has shown that important CGR can be lost in the wake of a disaster.**
- **Responses to disaster require collaborative and coherent approaches to restore seed systems.**
- Laws affecting seed movements can facilitate or constrain the emergency response efforts to restore seed systems.
- Inappropriate emergency response efforts to restore seed systems can result in further disruption of seed systems.
- Inadequate disaster response has often resulted from lack of preparedness.

5. CHALLENGES AND RECOMMENDATIONS OF THE WORKSHOP

The following specific actions were recommended:

1. **Seed Security Consultative group.**
 - **The FAO should seriously explore the possibility to support the establishment of a mechanism which could take the form of a Seed Security Consultative Group, under the auspices of FAO, with a broad constituency including civil society, research institutions, NGOs, farmers groups and public/private seed sectors.**
 - **This mechanism should optimise the comparative advantages of the various stakeholders to assure seed security in disaster-prone regions.**
2. **Information.**
 - **Inventories of CGR should be gathered and consolidated.**
 - **Existing electronic information management systems on CGR should be made more user friendly and accessible to stakeholders.**
 - **Capacity of the stakeholders to use these information systems should be strengthened.**
3. **Seed security.**
 - **Explore methodologies which assure effective seed security needs assessment by stakeholders involved in emergency response.**
 - **Support gender sensitive diagnosis of seed systems (formal as well farmer based) existing prior to the disaster.**
 - **Establish guidelines and checklists in order to facilitate coherence and comprehensiveness of assessments.**
 - **Ensure that seed system assessment is linked to other sectorial assessments, including food security, etc.**

4. Crop Genetic Resources.

- *Ex situ* genebanks have an essential role to play in preserving CGR and resources for the effective functioning should be available to them.
- CGR stocks should be securely conserved and made available in appropriate quantities, if needed.
- Seed system recovery programmes should make the provision to restore farmer's CGR affected by disaster.

5. Seed networks.

- A mechanism should be promoted to co-ordinate procurement, multiplication and distribution of quality seed of locally adapted varieties at the national and/or regional level. FAO can play an important role here.
- As mentioned in the GPA, activities preventing the breakdown and supporting the re-emergence of all seed supply networks are to be given a high priority.

6. Rules and regulations.

- FAO should explore the possibility to establish a mechanism that will encourage and co-ordinate regional harmonisation of seed rules and regulations. FAO will promote the ideas that all stakeholders be involved in that process.
- Proper attention should be paid to existing UN sanction mechanisms so that seed provision is not hampered.

7. Learn from past experience for appropriate response strategies to emergencies.

- FAO should encourage the assessment of impacts of interventions and dissemination of lessons learned.
- Case studies should be carried out and their results (lessons learned) shared.

8. Preparedness.

- Disaster prevention and preparedness measures should receive proper attention from all stakeholders, especially donors.

6. SYNOPSIS OF CONCLUSIONS AND RECOMMENDATIONS OF THE WORKSHOP

CONCLUSIONS	RECOMMENDATIONS
<p>Conclusion 1.: International efforts to support seed system recovery has sometimes been inconsistent.</p>	<p>Recommendation 1.1.: The FAO should seriously explore the possibility to support the establishment of a mechanism which could take the form of a Seed Security Consultative Group, under the auspices of FAO, with a broad constituency including civil society, research institutions, breeders, farmers groups. Recommendation 1.2.: This mechanism should optimise the comparative advantages of the various stakeholders to assure seed security.</p>
<p>Conclusion 2.: Information on CGR is often not accessible to stakeholders confronted with emergency situations.</p>	<p>Recommendation 2.1.: Inventories of CGR should be continued and consolidated. Recommendation 2.2.: Existing information on CGR should be made more user friendly and accessible to stakeholders. Recommendation 2.3. : Capacity of the stakeholders to use these information systems should be strengthened .</p>
<p>Conclusion 3.: Impacts of disasters on farmer seed systems are often complex and varied.</p>	<p>Recommendation 3.1.: Explore methodologies which assure effective seed security needs assessment by stakeholders involved in emergency response. Recommendation 3.2.: Support gender sensitive diagnosis of seed systems (formal as well farmer based) existing prior to the disaster. Recommendation 3.3. : Establish guidelines and checklists in order to facilitate coherence and comprehensiveness of assessments. Recommendation 3.4. : Ensure that seed system assessment is linked to other sectorial assessments, including food security, etc.</p>
<p>Conclusion 4.: Experience has shown that important CGR can be lost in the wake of a disaster.</p>	<p>Recommendation 4.1.: <i>Ex situ</i> genebanks have an essential role to play in preserving CGR and resources for the effective functioning should be available to them. Recommendation 4.2.: CGR stocks should be securely conserved and made available in appropriate quantities, if needed. Recommendation 4.2.: Seed system recovery programmes should make the provision to restore CGR affected by disaster.</p>
<p>Conclusion 5.: Responses to disaster require collaborative and coherent approaches to restore seed systems.</p>	<p>Recommendation 5.1.: A mechanism should be promoted to co-ordinate procurement, multiplication and distribution of quality seed of locally adapted varieties at the national and/or regional level. FAO can play an important role here. Recommendation 5.2.: As mentioned in the GPA, activities preventing the breakdown and supporting the re-emergence of all seed supply networks are to be given a high priority.</p>
<p>Conclusion 6.: All laws affecting seed movements can facilitate or constrain the emergency response efforts to restore seed systems.</p>	<p>Recommendation 6.1.: FAO should explore the possibility to establish a mechanism that will encourage and co-ordinate regional harmonisation of seed rules and regulations. FAO will promote the ideas that all stakeholders be involved in that process. Recommendation 6.2.: Proper attention should be paid to existing UN sanction mechanisms so that seed provision is not hampered.</p>
<p>Conclusion 7.: Inappropriate emergency response efforts to restore seed systems can result in further disruption of seed systems.</p>	<p>Recommendation 7.1.: FAO should encourage the assessment of impacts of interventions and dissemination of lessons learned. Recommendation 7.2.: Case studies should be carried out and their results (lessons learned) shared.</p>
<p>Conclusion 8.: Inadequate disaster response has often resulted from lack of preparedness.</p>	<p>Recommendation 8.: Disaster prevention and preparedness measures should receive proper attention from all stakeholders, especially donors.</p>

7. SUMMARY OF WORKSHOP PLENARY DEBATE

7.1. Presentation of case studies.

Five case studies were presented based on field experiences in seed relief and seed system rehabilitation in Angola, Afghanistan, Bosnia, with two case studies from Rwanda by FAO/TCOR and the Seeds of Hope project. Based on the analyses of the authors and the discussions of the studies, a consistent set of issues emerged as lessons learned from their experiences. The description of the case studies and some of the main lessons learned are described below.

7.1.1. Angola

World Vision International (WVI) has been working in Angola in the agricultural sector for half a decade. The operation has gone through a series of phases. The first one was based on a standard seed kit involving maize, sorghum, beans and vegetable seeds. Seeds were imported from neighbouring countries. World Vision International, as many other agencies involved in seed and tool distribution programmes, realised the difficulties to work with a standard kit of imported seeds in a highly ecologically diversified country. This led to a series of evolutions of the programme, which encompassed on-station experiments to screen varieties on the basis of their characteristics *vis-à-vis* of drought tolerance, resistance to pests and diseases, etc. Important criteria were also cooking and taste-related characteristics. As part of the challenging “Seed of Freedom project”, WVI entered into a collaborative effort with International Research Centres in order to identify adapted varieties to be included in the distribution list and to retrieve some of the varieties which have been lost in the wake of the three decades of civil war. World Vision International also realised the importance of roots and tubers, often forgotten in the distribution of agricultural inputs. But after the multiplication of this genetic material, the efficiency of the distribution/dissemination mechanisms emerged as a pressing issue. Support to farmer co-operatives, involvement of farmers in the whole research process and capacity building of extension workers and researchers were seen as the most effective tools for these endeavours.

Lessons learned:

- **Identification and availability of appropriate seed stocks of locally adapted varieties is essential to restoring seed systems.** World Vision International in Angola found that the success of helping rural farming communities achieve a certain level of food security depended significantly on which varieties were included in their seed distribution programme. In many cases, seeds of inappropriate varieties had the effect of retarding the pace of agricultural recovery because many of the varieties performed poorly in Angolan environments for which they were not adapted.
- **The distribution of grain as seeds jeopardises the recovery.** The use of grain stocks as seeds can have a negative impact on production by introducing varieties which are not adapted and also lack of quality control.
- **A preliminary assessment identified that the primary need of displaced and returning farmers was for animal traction and hand tools, not necessarily seeds.** They needed help to cultivate larger areas and a sufficient number of tools to allow several members of a family to work in the field simultaneously, while seed stocks of major food crops usually could be obtained locally, one way or another.

7.1.2. Afghanistan

The state of the agricultural sector of Afghanistan after two decades of war is diversified and complex. On the one hand, many areas are reaching near subsistence level. On the other, Afghanistan, which used to export large quantities of grains, is currently receiving important

tonnage of food aid. Some areas are still heavily mined, while others have been diverted from cereals to poppy growing. Yet, there is no image of dramatic famine and the Afghan people have maintained their tradition of hospitality. After the 1988 peace agreement, the early years were marked with donor generosity. This faded away with the civil war continuing. The FAO agricultural programmes have managed to continue albeit on a reduced scale. A series of constraints had to be overcome, such as ongoing fighting preventing access and political games played by local commanders.

Lessons learned:

- **In the emergency relief program, crop seeds and fertilisers were as important to farmers as other goods, such as food and medicines.**
- **The way aid is provided should be chosen on a case by case basis: for instance, when the State is disrupted by the war and not functioning, the recovery is possible only with direct support to farmers/communities.**
- **The focus on specific areas and problems related to seed production and distribution then allowed the support to be effective.**
- **The project was successful because of the holistic approach used, since the farmers do not differentiate among the different phases of emergency relief, rehabilitation and development. The Afghan experience underlined the importance to have the support to the recovery of the food production sector included into the “emergency operation”, rather than in the “rehabilitation agenda”. It has to be perceived as a support to the survival strategy in the midst of the crisis, rather than a set of activities for the more quiet times.**
- **Need for a flexible seed development programme.** Because of the complexity of the socio-political environment, a flexible seed programme of diversification, sustainability and collaboration with other UN agencies was necessary.

7.1.3. Bosnia

Different from the African or Asian systems where farmers normally rely mainly on on-farm saved seeds, agricultural systems in Bosnia prior to the war depended on seeds produced in the main seed production areas of Voivodina, in the rich Danau-Save plain. When the war broke out, these seed supply channels were made dysfunctional by the frontlines and later by the establishment of the new Frontiers of Serbia and Bosnia-Herzegovina. As early as 1994, FAO, UNHCR, ICRC and NGOs have been involved in seed distributions of various types in order to reinforce resilience both at the family level and at the co-operative level. As these programmes were evaluated, two main issues came up: 1) Bosnia was ill equipped in terms of laboratories and equipment; and 2) the fact that the country was so heavily dependent on seed import was seen as implying continued vulnerability. FAO, alongside with its seed distribution programmes, embarked in two challenging directions: to address the quality issue and to tackle the sustainability question.

Lessons learned:

- **Disasters do not affect formal and informal seed systems in the same manner. Efforts to rehabilitate these systems differ in approach and consideration of these system's needs should be defined as soon as the situation allows in disaster-affected areas.** Farmers depended almost entirely on the formal seed sector for their provision of seeds. During and after the war, this supply system was devastated and FAO had to focus on the rehabilitation of seed multiplication and quality control capabilities.
- **Co-ordination issues were paramount.** The sophistication of such a type of programme also implies that the human resource factor be approached in an appropriate way. Co-ordination

with other agencies prevents overlapping of efforts. The building up of national capabilities has to receive special attention.

- **Rapidity of action allowed to accomplish the tasks.** Quick response from FAO for approval or rejection of requests from the field allowed rapid decision making and action.
- **Continued support and follow-up activities are necessary.** It was noted that unfortunately, when the emergency phase is nearing end, it is much more difficult to attract donors attention for sustained support of the still fragile emerging formal seed sector.

7.1.4. Rwanda

After the civil war that affected Rwanda in early 1994, impressive efforts were made to ensure that seeds and tools were distributed to farmers. In order to limit duplication and prevent technical errors, FAO together with the newly established Ministry of Agriculture, set-up a co-ordination mechanism where UN agencies, government institutions, ICRC, NGOs and donors could meet and co-ordinate their activities. FAO's knowledge of the area was crucial in facilitating the elaboration of a set of technical recommendations for seed distribution. Indeed, in view of the complexity of Rwanda's agro-ecosystem, many agencies did not know how to find seeds well suited to farmers needs. It was, for instance, important to recommend the distribution of mixtures of bean seeds rather than pure cultivars. Timeliness of the distributions to fit within the crop calendars and comprehensiveness of the coverage in order to limit the creation of pockets of food insecurity were two crucial outputs of this co-ordination. FAO started a quality declared seed multiplication programme in order to restore the national capacity and pave the way toward more sustainability in the agricultural sector.

An interesting and important feature of the international emergency response for Rwanda is the creation of the "Seeds of Hope" project (CIAT) which based its activities on two main lines : reintroduction of varieties and land-races adapted to the agro-ecological conditions of Rwanda and to provide technical assistance to rebuild seed and crop production capacity in Rwanda. A thorough survey was initially carried out in order to get an up-to-date understanding of what was really the situation of the seed systems in Rwanda and how national and international agricultural research centres could help restore the pre-crisis diversity and local varieties. "Seeds of Hope", as a knowledge based enterprise, permitted significant methodological improvement in the overall approach to rehabilitating seed systems affected by the disaster.

The field research underlines the importance to recognise the existence of both the formal and the informal seed systems. The first one is based on the activities of specialised breeders and seed producers supported by extension and research institutions. The second is farmer-based and largely relies on social networks and small scale trading and bartering mechanisms.

The research carried out by "Seeds of Hope" underlined the difference between "seed security" and "varietal security".

Lessons learned:

- **The informal sector should receive adequate support.** In Rwanda, 90 per cent of the seeds that farmers use comes from the informal sector. Therefore, this important sector should receive proper attention.
- **Disasters do not affect formal and informal seed systems in the same manner, nor do they play the same role in farming system recovery.** Efforts to rehabilitate these systems should be appropriate to the specific needs as early as possible, and should be identified during diagnosis phase linked to need assessment. The "Seeds of Hope" project's reintroduction of local land-races and improved varieties adapted to the agro-ecological conditions of Rwanda and technical assistance to rebuild seed and crop production capabilities led to an awareness of the difference between "seed security" and "variety security". Some farmers had lost their seed

stocks of their preferred local varieties, but seeds were still available of these varieties in the country. In other cases, local varieties of certain crops were totally lost.

- **Effective co-ordination of stakeholder's efforts (donor, UN Agencies, governmental and non-governmental) is critical to rehabilitate seed systems.** FAO's experience in Rwanda clearly showed that a mechanism to co-ordinate UN Agencies, government institutions, NGOs, and other stakeholders in disaster relief activities to restore formal and informal seed systems resulted in effective and efficient interventions in procuring, multiplying and distributing seed stocks of adapted varieties to disaster-affected communities.
- **A diagnosis and needs assessment of the impact of disasters on seed systems should be completed before seed relief programmes are designed and implemented.** In order to avoid an all too common mistake made in emergency responses of purchasing and distributing seed of inappropriate varieties, it is essential to assess the impact of the disaster on affected rural communities. Farmer seed systems can be affected in many ways and not all crops are affected in the same manner.
- **Seed rules and regulations can facilitate or hinder the seed procurement process.** It is important that sound rules and regulations are established. Over-prescriptive regulations can hinder the seed procurement process. On the other hand, the lack of a national policy and effective seed rules and regulations hinder the efforts made by the public and private sectors to re-establish seed supply channels.

7.2. Presentation of thematic working papers.

Six background papers were prepared which addressed the main issues related to disaster situations which affect seed systems, actions needed to provide farmers assistance under these circumstances and efforts required to restore agricultural systems and seed security activities. The following sections were highlight the main aspects to consider in emergency relief and recovery programmes.

7.2.1. Characterising disasters

- **It is important to analyse the time characteristics of disasters.** Indeed, it is important to know not only if a disaster is man-made or a natural one, but also to analyse its time characteristics: if it is rapid or slow, frequent or rare, of short or long duration.
- **It is important to consider the place where the disaster occurs.** The same disaster would have a different impact whether it occurs in a developed country, where farmers are normally buying their seeds from seed companies, or in a landlocked developing area where the prevalent feature is farmers reliance on their own saved seed.
- **The assessment phase is crucial for the success of the relief operations.** It appeared that the quality of the diagnosis of the situation of the farming systems and seed systems prior to the crisis, of the analysis of the disaster itself and of its impact are key factors for appropriate intervention design, planning and implementation.
- **Early warning systems are paramount, but need to be complemented by effective preparedness and followed by prompt action.** The relevance of early warning systems was considered. Experience shows that, in fact, most of the recent disasters were not only predictable, but also predicted. The missing elements were either effective pre-disaster preparedness, or lack of political will to intervene. It is preferable to try to mitigate the effect of a disaster by taking action before it happens.

7.2.2. Farmer seed systems in disaster situations

- **A holistic approach should be used in dealing with farmer seed systems.** This subject was considered from two complementary perspectives: the technical aspects and the socio-economic angle. One assumption is often forgotten: farmer seed systems are, in most instances,

part of the farmer's over-all production system, with part of the harvest saved for future planting. Thus, the impact of disasters on farmer seed systems cannot be analysed outside of the entire farming system.

- **Farmer seed systems are a key point of relief programs.** Since crop and variety diversity play a crucial role in risk minimisation and disaster mitigation, the support to the farmer seed system shall be seen as central to survival mechanisms, recovery dynamic and prevention of recurrence of a disaster.
- **Farmers' access to preferred varieties should be guaranteed.** Varieties matching the actual local needs can be identified only according to farmers' preferences, which are often based on characteristics differing from the technical criteria used by seed specialists.
- **Farmer seed systems are not only very diversified, but they also change over time.** In an emergency period, these changes can even constitute important ways in which farmers respond to a crisis. Farmer seed systems are very resilient and farmer coping strategies and innovative capacity often surprise the “emergency seed suppliers”.
- **Good co-ordination of stakeholders is necessary.** Many stakeholders are involved in supporting the seed sector in disaster and post disaster situations and without co-ordination, their efforts may not effectively achieve desired goals. Institutional collaboration is deemed necessary.

7.2.3. Plant genetic resources and seed relief

- **Put more emphasis on the resilience of farmer seed systems and on the protection of intellectual property rights (IPR).** The interest of plant breeders towards crop genetic diversity is not new. It has nevertheless been more “breeder oriented”, while the new focus of this specific domain of bio-diversity is more on supporting resilience of farming systems as well as protecting farmers' CGR.
- **Linkages are needed (at national, regional and international level) between those involved in provision of seed in disaster situations and those involved in management of genetic resources.**
- **Strengthen regional PGR networks and enhance their capacity to manage information on genetic resources availability in *ex situ* collections for seed relief programmes.**
- **Further investigations, through collaborative studies, are needed to determine how PGR information can best be used, what its strengths and weaknesses are in the context of the activities envisaged and what improved systems could be developed.**

7.2.4. Regulatory aspects of seed security

- **Seed rules and regulations should support seed quality control and the functioning of sound seed systems, not police them.** This relatively provocative statement served as a conclusion of a rather innovative and stimulating presentation on how seed laws can help or hinder relief and recovery activities in times of disasters and post-disaster.
- **Seed regulations which do not match with the actual national seed situation can hamper, or prevent, relief programmes.** If it is normal that countries try to protect themselves against the risks entailed in uncontrolled movements of genetic materials, it is also to be noted that sometimes, even the trade or distribution of seeds from local grain markets is prohibited since these local seeds are rarely registered, much the less certified.
- **The importance of phytosanitary measures and an early involvement of the phytosanitary service were stressed.** The importance of phytosanitary regulations was not questioned. There is little worse than an ill conceived and badly controlled relief operation resulting into the spreading of new diseases or unknown pest, or new weed.
- **Good communication with seed quality control officials avoids certification problems.**

7.2.5. Seed stocks and seed multiplication in emergency situations

- **Preparedness is the key for success.** In order to respond effectively and with cost-effective measures in emergency situations, it is necessary to be prepared and know: 1) what needs to be replaced ; 2) where to get the appropriate seed stocks; 3) how to multiply; and 4) how to distribute the seeds.
- **Danger: the loss of genetic resources.** Erosion of stored plant genetic material depends on the quality of the original material and on the conditions under which the material is maintained and periodically multiplied. Loss of genetic resources may also occur in farmers' fields and in nature. Information management systems for CGR can provide very useful information about the preventive, or remedial actions, to be taken needed to restore these CGR affected by disasters.
- **Early warning system: a must.** An early warning system for CGR is a necessary component in a seed security strategy, to allow rapid action and response.
- **Information about crops matching climatic conditions is available.** There are also a number of tools to predict crop growth responses to existing climatic conditions. These preventive measures would assure that appropriate seed stocks are identified, procured and multiplied to restore seed systems affected by disasters.

7.2.6. Food and seed assistance in recovery

- **Crop seeds and food are strictly connected and should be provided simultaneously.** The loss of access to seeds and food are often interconnected. While seeds are crucial to agricultural recovery, human energy to plough the land is equally important. The international experience on post-disaster recovery shows that instead of looking at the intervention cycle with a food phase and a seed phase, it is often much more efficient to combine both resources as a means to rebuild rural economies and to launch agricultural activities in the aftermath of the disaster. Seed relief is thus viewed as integral part of the emergency package.
- **Farmers realise the vital importance to preserve crop seeds for agriculture.** Many programmes have demonstrated that, if the seeds distributed is not clearly labelled and distinguishable from the food ration, seeds of important land-races and expensive imported seed can be consumed alike, with the farmers often preferring to eat the distributed seeds and to keep their own stocks. Integrated seed and tool provision is therefore not only useful, but often essential for the successful resumption of agricultural cycles, including the rehabilitation of local seed systems.
- **Collaborative efforts between food relief agencies and actors of the agriculture sector should start as early as possible in the planning stage of the response to the disaster.**

8. RESULTS OF WORKING GROUP SESSIONS

Each of two working groups was assigned a topic: the first group had to deal with technical aspects and the second one with institutional aspects related to rehabilitating seed systems affected by disasters.

8.1. Technical Working Group

Topic: Mechanisms which enable countries and their rural farming communities to identify, acquire, multiply and deliver seeds of locally adapted varieties before, during and after disasters.

The group split the issues into five key working points:

Point n°1 : look at the possibilities to develop guidelines / checklists / simple explanation for donors/ relief agency policy makers on “what is variety-sensitive seed relief”;

Point n°2 : analyse how seed regulation can be better adapted to disaster situations;

Point n°3 : identify the ways and means by which a “CGR” system could help stakeholders to cope with disasters;

Point n°4 : identify suitable co-ordination mechanisms to support efforts specifically geared to strengthen farmer seed systems. In that specific mechanism, what would be role of FAO?; and

Point n°5 : how to improve capacity for disaster preparedness and response ? What could be the modalities for funding these proposals?

In order to carry out its work and deliver conclusions and options for recommendations, the working group organised its work in four phases: 1) quick review of all issues; 2) work in smaller settings to be more operational; 3) regrouping and presentation of the work of the sub-working groups; and 4) debate and finalisation for presentation to the Plenary.

Point n°1 :

The working group thought that both dissemination of ideas through a “simple explanation paper for the donors” was very relevant in view of their frequent reluctance to look in a comprehensive manner to seed issues and to consider that beyond simple seed distribution programme, there is the much broader question of the recovery of the seed systems. The group also considered that the drafting of guidelines and checklists would be very useful in order to help stakeholders to avoid mistakes and to facilitate implementation of programmes. However, after an initial look at the time requirements for the elaboration and drafting of the three types of documents, the working group decided to focus on the guideline.

In the discussion about what should be the main points covered in these guidelines, five main issues were outlined:

- Seed systems are encapsulated within social, economic and farming systems. The understanding of the context with all the different factors is paramount;
- This implies that quality diagnosis of the situation prior to the disaster, analysis of the disaster and of its impact on agriculture and food security in general and on seed systems in particular is the first task to carry out;
- This might come with various types of recommendations, including not to touch the seed system or to approach seed security from a non-seed angle (through food distribution for instance);
- If the response is “yes, we need to support the seed system”, then a multi-prong strategy might have to be designed, including appropriate seed relief, support to farmers capacity, involvement of appropriate and competent PGR institutions; and
- There is a need to link short and longer term considerations for seed system rehabilitation and sustainable development in both the formal and informal seed sector.

On this basis, a draft text was prepared by a small sub-working group and discussed. After minor adjustments and precision, it was finalised for distribution at the plenary (see Table 1 below).

The “Guidelines” might be further developed and finalised by the iterative exchange between FAO Secretariat (AGPS) and a network of experts. A smaller group could be given the task to prepare a text for the “small explanation for donors” which could be finalised following the same iterative process.

Point n°2 :

The seed regulatory framework, which may include variety release procedures, seed quality control, phytosanitary certification, International Property Rights (IPR) and access laws, is a complex set of laws and regulations. It should facilitate access to seeds of appropriate varieties and sufficient qualities by farmers in normal or abnormal conditions. This set of rules and regulations should support the development of both the informal and formal (public and private) seed systems in accordance to the national seed policy.

The working group recognised that these laws and regulations often have the tendency to hamper the effectiveness of support to seed systems in disaster situations. They often result in unnecessary hindrance to the development of diverse seed systems and to appropriate responses to emergencies. In the process of the regulatory reform, due attention should be given to the needs of the seed relief and seed systems rehabilitation during and after emergency.

Table 1. Guidelines for Funding "Variety-Sensitive Seed Relief" Activities.

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1. Demand sound analysis of the socio-economic/political/environmental context of the disaster. Include some analysis of the pre- and post- situation.
 2. Conduct a focused needs assessment (qualitative and quantitative) of the kinds of seed systems support which might be needed, if any. Be sure to include analysis of the capacity of informal (local) and formal seed systems in their changing context. This includes analysis of more than seed itself. It should include analysis of the ability of farmers to procure seed, plant and manage their crop, i.e. to carry on successful agricultural production.
 3. Choose varieties of major food crops, which are sufficiently adapted to the agro-ecological and socio-economic conditions of the disaster-affected area.
 4. Ensure that the Implementing Agency has access to technical expertise to procure, evaluate, store and deliver good quality seed in a timely manner.
 5. Strategies for seed systems rehabilitation should be carefully phased. While in the first phase, a focus should be on the provision of seed stocks of "adapted" and "acceptable" varieties may be sufficient, subsequent phases should plan for self-sustaining strategies by which farmers can produce and save/procure seeds of their diverse and preferred varieties.
 6. Each season after disaster relief, the capacity of the formal and informal seed supply channels should be re-assessed. In some cases, creating, rehabilitating or strengthening local seed supply channels may be sufficient.
 7. Efforts should be made to co-ordinate relief activities with complementary agencies and organizations to avoid duplication of efforts. If appropriate, lead agencies should be identified.
 8. Records of all varieties procured and seed distribution of those varieties should be made and carefully managed. Monitoring and evaluation must be programmed on seed performance and variety adaptation within the farming systems in which they are distributed. This quantitative and qualitative information should be geo-referenced and stored in relational databases at the national, regional and global levels.
 9. A transitional strategy to move from the acute emergency response to a more non-dependent and capacity building phase during the rehabilitation of formal and informal seed systems.

These strategies should be components of intervention policy and programmes during the design phase and be based on lessons learned.

The working group identified various points deserving attention:

- International harmonisation of laws, including their interpretation and implementation is important;
- In this respect, special reference should be made to phytosanitary regulations. Indeed in a disaster affected areas, there is no need to introduce further problems with new diseases, new weeds, etc.;
- Transparency of the process and representation of all stakeholders in the response to the disaster is important in order to ensure that these rules and regulations will be respected;
- Avoidance of unnecessary restrictions was seen as crucial, while strengthening seed quality awareness during procurement was seen as a very important tool toward assuring overall seed quality and appropriateness; and
- Any development of IPR and farmer rights should avoid hindrance to seed systems in times of emergency.

Then the group came with a few suggestions:

- The forthcoming Regional Seed Policy and Programmes meetings should address these recommendations of the Workshop in relation to seed rules and regulations; and
- FAO should play an important role in that process by recommending member countries to review their existing seed rules and regulations. A survey of existing systems is recommended to identify the nature and variety of the problems as well as to identify best practices and success stories.

Point n°3 :

A first part of the discussion focused on identifying what were the components of a CGR system.

The two main components of a CGR system in emergency and post-emergency situation could be, but not limited to:

1) Information Management System : It was recognised that in order to locate, and if necessary to replace lost germplasm, information on location, characteristics and agro-ecological and socio-economic profiles of the germplasm would be required. This knowledge would have to be based on inventories and characterisation of CGR grown in the area before the disaster. The meeting recognised that in order to do this, there is a need to develop simple passport data based on a minimum number of important descriptors. All this information could be accumulated within a user-friendly electronic information management system. Mechanisms for the information to be made accessible were deemed essential since the timeliness factor is very important in the context of disaster.

2) Material : Characteristics of possible sources for germplasm recovery for eventual re-multiplication, bulking and distribution of lost varieties were identified. Both CGR *ex situ* and *in situ* conservation can play a role in that matter, although the very small quantities of seeds kept in *ex situ* gene banks does not permit rapid multiplication and distribution.

Point n°4:

The working group identified mechanisms to support efforts specifically geared to strengthen farmer seed systems

- Facilitate dialogue between countries on policy matters related to seed sector development, such as the upcoming FAO regional technical meetings on Seed Policy and Programmes;
- Continuing discussion of issues, development of conceptual framework, technical advice; and
- Providing administrative/operational co-ordination.

The working group came to the conclusion that the recommendation made at the Florence meeting for the establishment of a Seed Security Consultative Group was still relevant. One option would be a core group, to be formally established, and a wider, informal support network. Another option would be to establish a Seed Security Working Group with a very wide and acknowledged constituency where actors from the civil society, technical bodies, NGOs and international agencies would be represented. There would be a need to draw up terms of reference for the core group and network.

Point n°5:

A four-point strategy was prepared to improve disaster preparedness and responses.

1. Increase participation of civil society (build links between technical agents, local NGOs, farmers groups, social movements concerned with land and seed rights, refugees and displaced groups);
2. Disaster victims should be more actively engaged, when and where feasible, in activities directed at securing their seed resources and seed systems. Although there are often many constraints imposed on the access of refugees or IDPs to land, it has been seen that when displaced people come back home, the most difficult thing for them is to rebuild their own CGR and to recover their old varieties.
3. Make information from PGR and CGR data bases and collections more known and user friendly. They should indeed be much more accessible to a range of potential stakeholders. Potential users of this information should be trained.
4. Pay increase attention to risk minimisation in seed recovery and rehabilitating agriculture.

8.2. Institutional Working Group

Topic: Mechanisms to strengthen collaboration for a continuing partnership among governments and institutions involved in the maintenance, restoration of farmer seed systems, plant genetic resources and seed security after disaster.

The first consideration taken by the working group was the level at which the intervention would take place:

- 1) local;
- 2) community/district/province;
- 3) national;
- 4) regional;
- 5) international/global.

For each of those levels the group looked at the stakeholders who would be involved. Some stakeholders go across all levels and others operate only at one, or more. This analysis is summarised in Table 2. That gives a two-dimensional matrix within which to consider the institutional structures that have to be in place. Analysing that matrix, the group identified actions necessary in emergency situations. These actions are performed at different stages: before, during and after the disaster (Table 3).

The most cost-effective effort stakeholder involved in disaster response activities can make, is to focus on preparedness. Identifying sources of seeds for varieties which are grown in disaster-prone areas is essential to identifying varieties which are adapted to the agro-ecological and socio-economic conditions of farming systems facing potential disasters. Making effective use of early warning information is critical to being prepared before the disaster occurs.

At the onset of disasters, a thorough diagnosis and needs assessment of the farming systems affected can identify which responses are most appropriate to mitigate the impacts of the disaster on existing seed systems. If procurement of seed stocks is necessary, knowledge about the existing mechanism for the effective multiplication (if needed) and distribution of these seed stocks to communities in need will lead to more effective responses.

Impact assessments of the efforts to rehabilitate disaster-affected seed systems will lead to the identification of strategies to assure that these seed systems are not left in such a fragile state that once relief efforts end, seed insecurity is still potentially a problem. These assessments should also be documented as lessons learned about what worked to assure seed security and why, but more importantly, what did not work well and why not.

As a consequence, the group came out with a number of recommendations to develop an institutional framework that can help address the issues of emergencies and disasters, particularly in respect of the seed systems (Table 4).

The first recommendation, is that FAO establishes a mechanism that will assemble and manage information on crop genetic resources from the stakeholders involved. This mechanism should facilitate the making of information on crop genetic resources and seed systems readily available to the stakeholders.

The second recommendation is that FAO explores the possibility to support seed security needs assessment by stakeholders involved in the emergency response. In many cases, stakeholders are on the ground when the emergency breaks, including country nationals, NGOs, FAO representatives and members of national international agricultural research centres.

The third recommendation is that FAO establishes a mechanism to encourage and co-ordinate regional harmonisation of seed rules and regulations. Nothing is more important, during an emergency, than to facilitate the sensible movement and distribution of seeds across national borders, if necessary.

The fourth recommendation is that a mechanism is establish to co-ordinate the procurement, the multiplication and the distribution of good quality seeds of adapted varieties at the national and regional levels.

The working group came to the collective decision, based on recent experiences, that the technological know-how to procure, multiply and distribute seeds exists. This knowledge must be disseminated to all stakeholders in a user-friendly format as best practices based on lessons learned.

Finally, the group concluded that as disasters are going to be a continuing problem, mechanisms must allow for continual build-up of information and knowledge, know-how and expertise to improve the speed, rapidity and effectiveness of the response to disaster. Thus, it is necessary to encourage the assessment of the impact of the interventions to restore seed systems after disasters.

Table 2. Stakeholder analysis at different socio-political levels for seed system rehabilitation interventions.

<i>STAKEHOLDER RESOURCE</i>	LEVEL OF ACTIVITY				
	L O C A L	D I S T R I C T	N A T I O N A L	R E G I O N A L	I N T E R N A T I O N A L
1. FARMERS / LOCAL COMMUNITY					
Farmers	*				
Farmer and rural organisations	*	*	*		
Community organisations	*				
Extension agents	*	*			
2. SEED INDUSTRY					
Seed banks	*	*	*	*	
Seed growers	*				
Seed exchange / barter	*	*			
Seed companies / marketers		*	*	*	
Parastatal organisations		*	*		
Seed associations			*	*	*
3. RESEARCH, DEVELOPMENT, EDUCATION					
R & D Institutes					
Education Institutes		*	*		
IARCs		*	*		
Technical co-operation			*	*	
Regional networks			*	*	
Gene banks			*	*	*
4. GOVERNMENT					
Local / district administration	*	*			
National authorities / agencies			*	*	*
Regional associations				*	
International conventions / agreements					*
5. DEVELOPMENT / AID COMMUNITY					
Local NGOs	*	*			
NGOs	*	*	*		
Donors – government / philanthropic			*	*	
UN agencies			*	*	*
6. FINANCIAL RESOURCES					
Local micro-credit	*				
Rural finance institutions	*	*			
National finance institutions			*		
Development banks			*	*	*

Table 3. Proposed strategy to adopt for the restoration of farmer seed systems, plant genetic resources and seed security.

PHASES IN THE DISASTER CYCLE	ACTIONS TO BE CARRIED OUT
Pre - disaster	* Construct crop genetic resources database <ul style="list-style-type: none"> - Variety & land race diversity - Agro-ecological adaptation - Biotic and abiotic constraints - Socio-economic characteristics * Effective use of early warning information
During disaster	* Needs assessment * Procuring * Multiplying * Distributing
Post - disaster	* Impact Assessment / need for further actions

Table 4. Recommendations for the implementation of the proposed strategy for restoration of farmer seed systems, plant genetic resources and seed security.

PHASE	RECOMMENDATION
Pre-disaster	1. Establish a mechanism that will: <ul style="list-style-type: none"> a) obtain input from seed security stakeholders; and b) facilitate making information on CGR and seed systems readily available to stakeholders.
During disaster	2. Prior to seed procurement, in an emergency response, FAO explores possibilities to support seed security needs assessments of stakeholders involved in the emergency response. 3. FAO establishes a mechanism to encourage and co-ordinate regional harmonisation of seed rules and regulations. 4. FAO promotes a mechanism to co-ordinate procurement, multiplication and distribution of quality seed and planting material of adapted varieties at the national and/or regional level and to integrate with local seed distribution systems.
Post-disaster	5. FAO encourages assessment of impact of interventions to rehabilitate agricultural systems after disasters (disseminate lessons learned – what worked well and why; what did not go well and why not).