9. Re-introducing crop genetic diversity in post-war Somalia

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Emergency seed supply

In 1995, 26 countries experienced complex humanitarian emergencies such as natural events (drought, flood, cyclone, earthquakes, etc.), man-made crises (civil war, failing economic, social and political institutions) or a combination of both. An estimated 37 million people, more than half of whom were Africans, were deemed to be in need of aid to avoid starvation (Scowcroft and Scowcroft 1997).

> The FAO Global Plan of Action on Plant Genetic Resources for Food and Agriculture states: "In the modern world and especially in developing countries, people are threatened with and vulnerable to natural disasters, civil strife and war. Such calamities pose huge challenges to the resilience of agricultural systems. Often, adapted crop varieties are lost and cannot be recuperated locally."

Historically, emergency aid organizations have provided large quantities of seed to farmers in emergency situations. However, such seed is most often imported and not adapted to local growing conditions (pests, diseases, cultivation systems and food preferences). Food aid combined with emergency seed assistance supplying poorly adapted seed may result in loss of local crop diversity and have a negative impact on household food production and security in subsequent years (Friis-Hansen and Rohrbach 1993; Richards and Ruivenkamp 1997; Sperling 1997; Friis-Hansen and Kiambi 1998).

Crop diversity, both in terms of number of crops and number of varieties of each crop, plays a crucial role for resource-poor farmers for whom household food security is a major production goal. Crop diversity (1) allows farmers' cropping systems to adapt to local ecological microniches of their particular fields, (2) satisfies household food preferences, and (3) provides tolerance to pathogens. If farmers lose their crop diversity as a result of the combination of catastrophe and poorly adapted emergency aid, their subsequent ability to grow sufficient food may be seriously negatively affected. While addressing an immediate crisis, emergency aid can exacerbate conditions of hunger and undermine food security in the long run.

A number of UN agencies and international agricultural research institutes and NGOs have recently gained experience with restoring locally adapted weed and planting materials following emergencies in Southern Africa, Rwanda, Sierra Leone, Somalia and Cambodia. These experiences show a wide variety in the nature of emergencies and their impact on crop diversity. Further research and analysis of different types of emergencies, the variation in resilience of local seed maintenance systems and how emergency assistance can best be designed in order to address the immediate needs of a community who have undermined its longer term self-sufficiency, is required.

Identification of development requirements and participatory methodology in Somalia

An unnoticed impact of the sociopolitical strife in Somalia was the destruction of the research and conservation facilities in Baidoa/Afgoi in 1992, during which the national germplasm collection was destroyed. The state of civil war continued, leading to the total collapse of state institutions and enormous destruction of modern physical structures. By the mid-1990s, it was clear that the agricultural production system was adversely affected and this had led to loss and/or reduction of genetic diversity *in situ*.

As a response to this grave situation, IPGRI embarked on multiplication and characterization of 284 accessions of sorghum and maize germplasm which were conserved as a duplicate

collection at the National Genebank of Kenya, with the intention of repatriating it to Somalia for use in the agricultural production systems. In order to achieve this goal, a project on "Re-introduction of germplasm for the diversification of Somali agricultural production system" was formulated by IPGRI, in partnership with CINS (an Italian-based NGO), which received funding by the European Community. The project objectives were to (1) sustain and increase the genetic base of Somali agricultural production systems through re-introduction of germplasm, (2) create awareness of plant genetic resources conservation among farmers and scientists in Somalia, and (3) strengthen seed production and distribution capacities through training and development of linkages.

Such an exercise had never been undertaken before and the methodology was developed as the project proceeded. The participatory approach aimed at creating a partnership between the project and farmers, and their legitimate social institutions at the village level.

The project seed centre was attacked by a local militia in November 1997. A Somali guard was killed, several wounded and the Italian NGO staff was kidnapped for three days. The project seed centre was totally destroyed, including the *ex situ* conserved varieties and all records. The project was subsequently discontinued and this chapter will therefore be limited to a discussion of the participatory methodologies used, as it is not possible to discuss the impact of the project on farming communities.

Dialogue between farming communities and scientists

Initial meetings were held with village elders during which the project objectives and planned activities were explained. The farmers responded positively and offered advice and information on the prevailing socioeconomic and crop production constraints. Then followed a series of group meetings in three villages, during which farmers discussed the project among themselves. Farmers were also requested to raise additional issues to be addressed. These dialogue meetings included the village chairmen, respect-ed village elders and men and women who were skilled in managing local crop varieties.

The dialogue meetings started with a session during which the group of village elders discussed the major elements of their farming systems that included land tenure, labour market and effects of the civil war on their livelihood. After gaining initial knowledge about the general social and agricultural context, discussions were guided toward the indigenous plant genetic resource management practices, including selection, storage, exchange and use of crop varieties (Fig. 9.1). A smaller group of farmers, including women, thereafter answered a semi-structured questionnaire designed to obtain farmers' views on agronomic characteristics of each of their local crop varieties. The results of these participatory characteristics of crop species are shown in Table 9.1.

Assessment of farmers' post-war socioeconomic situation and germplasm needs

In order to gain an understanding about the social differentiation within each village, a participatory wealth ranking exercise was carried out. A small group of knowledgeable farmers was asked to agree on a number of qualitative criteria for differentiating farmers within the village into three wealth categories. In all the villages, these key informants were able to agree on a common set of criteria with only minor disagreements. The criteria varied from village to village and the wealth categories are therefore relative to the local context. Table 9.2 shows an example of locally formulated wealth ranking criteria.

Two-thirds of the families in Casirmaal village are permanently food insecure. Following two years without any food relief, some people in this group were so weak that they were unable to do hard work in the field. As farmers in this group work for others to survive, they are not likely to be able to break out of their poverty trap without targeted outside assistance. Only the wealthiest (10% of the farmers) are food and seed secure. These few families do not

Fig. 9.1. Village elders discuss their seed requirements with scientists from IPGRI.

Table 9.1. Farmers' assessment of available maize varieties in Kongo and Shameento villages †

	Name of maize variety			
Characteristic	**Local I**	**Local II**	**Samtux**	**ICRC**
Special character	up to 23 rows of seed per cob	up to 18 rows of seed per cob	national research programme	emergency seed distribution
Grain yield	high	high	medium	low
Grain yield potential	average	average	high	?
Grain size	large flat	small round	small	large flat
Head size	medium	large	medium	medium
Drought tolerance	average	average	poor	good
Time to maturity	90-100 days	90-100 days	110-120 days	70-80 days
Water requirement	3 periods of irrigation	3 periods of irrigation	4 periods of irrigation	?
Non-grain yield	average	average	good	low
Stem quality	good fodder	good fodder	poor fodder	?
Disease resistance	average	average	?	poor
Insect resistance	average	average	poor	poor
Threshing ease	difficult	easy	easy	easy
Grain taste	good	good	good	good
Grain storage	good	good	poor	poor
Demand for fertilizer	average	average	high	high

† Information is based on farmers' knowledge and perception. The column headings are farmers' own names for existing maize varieties.

have sufficient surplus during periods of crop failure to share with other families. Their grain pits are buried at secret locations and only opened in privacy during the night.

While the participatory dialogue and wealth ranking had generated much knowledge, a clear need for a quantitative assessment of the situation emerged. A socioeconomic and farming systems baseline household questionnaire survey was conducted as a response to this need, covering 266 households in nine villages. On the basis of the initial dialogues with farmers, along with project documents, a literature review and NGO consultations, a draft questionnaire was developed, tested and reviewed with farmers in Somalia.

Because of the security situation in Somalia, the baseline survey was carried out by a Somali agronomist employed by the project. The following procedures were followed to select which farmers should participate in the survey. First, an inventory of all adults living in each of the villages was conducted, either on the basis of a pre-civil war list, or on the memory of the village chairman and elders. Second, 30 farmers were chosen at random from the inventory list to participate in the socioeconomic and farming system baseline survey. Wealth-ranking criteria were applied on the selected farmers, grouping them into three wealth categories.

The questionnaires were entered into two SPSS databases (on a household basis and on a field basis). The data were converted from local units (*taab* and *jibal*) to hectares. A code book was generated and statistical analyses on a household and a field basis were carried out. District and village profiles were developed based on information on the village-based checklists. Data on characterization of all local sorghum and maize varieties based on farmers' perceptions were compiled. A hard copy of the entire socioeconomic and farming systems baseline database was compiled.

Transfer, testing and selection of germplasm

The National Genebank of Kenya played a crucial role in the initial phase of the project through multiplication, characterization and testing the viability of the genetic materials, and assistance in packaging and procurement of the phytosanitary certificates. The Genebank is also conserving a duplicate set of the accessions for safety.

The germplasm previously stored at the Kenya National Genebank was air-freighted by a chartered aircraft to the CINS seed centre located in Decalay village in Balaad district, Middle Shaabel, Somalia. The material weight about 0.5 tons and the total number of accessions was 165 (151 sorghum and 14 maize accessions). The genetic materials were subdivided into four parts. Some were stored in freezers run by a generator with another generator as back-up; some were distributed for on-farm trials; some were distributed for trials at the Decalay village Seed Centre; while the last part was cultivated under a high-input regime for the purpose of multiplication.

On-farm trials

The set for on-farm trials was subdivided among the nine villages located in the three districts in which the project was being implemented. The villages specialize in growing either maize or sorghum. One village grows both maize and sorghum. Two sorghum-growing villages and one maize-growing village were selected in each district. Ten farmers in each village were selected for participation in the project using the rapid rural appraisal approach. The sorghum villages received 20 accessions each (17 different and 3 accessions common to all). The material chosen represented all seed colour types. The three maize-growing villages received 10 accessions of each. One village received both maize and sorghum accessions. The sorghum farmers received two accessions each while the maize farmers received one accession each (Fig. 9.2).

Ten farmers were selected for on-farm trials in each of the three villages in each of the three districts in which the socioeconomic and Farming Systems baseline survey was carried out. Two to three varieties were given to each of the 90 farmers to cultivate during the 1997 *gu*

Table 9.2. Results of participatory wealth ranking in a Casrimaal village †

Low (65%)	No sorghum grain stored in grain pit Less than 1 ha cultivated with sorghum No long-term storage of seed No livestock Members of household work as casual labourers for others
Middle (25%)	Sorghum grain stored in grain pit is insufficient to meet household requirements in case the seasonal rains fail 2-4 ha cultivated with sorghum No long-term storage of seed 1-2 dairy cows 1-3 goats Household members do not work as casual labourers unless they run out of food
High (10%)	Sorghum grain stored in grain pit is sufficient to meet household requirements in case the seasonal rains fail 5-30 ha cultivated with sorghum Long-term storage of sorghum seed 4-5 dairy cows 10-15 other cattle herded by hired herdsman 3-5 goats Employ others as casual labourers

† Information is the result of a participatory wealth ranking based on farmers' own holistic views of social differences within the village.

Fig. 9.2. Somali farmer tests germination of stored seed by planting the seed in moist soil surrounding a clay pot. The seeds are only used if more than 8 out of 10 germinate.

season. The farmers were asked to grow the varieties in a corner of their own field and use their traditional cultural practices. Three household questionnaires were used to record information from the participating farmers during different stages of the 1997 *gu* growing season.

On-station trials

The on-station trials had dual purposes: (1) to characterize all sorghum, maize and sim-sim varieties to complement the characterization carried out by the Kenyan Genebank, and (2) to carry out participatory on-station farmer selection of desired varieties. Each variety of germplasm was grown in a 2 x 2-m area. Adjacent to the on-station trials, larger plots were cultivated for the purpose of multiplying material of which there were sufficient quantities of seed. Agronomic characterization of all varieties was carried out by CINS staff and standard protocols for agronomic characterization were applied. The protocols for the participatory characterization were developed in consultation with participating farmers. It was planned that 15 farmers from each of the three districts would be invited to the on-station trial twice, during flowering and harvest, in the 1997 *gu* growing season. An elaborate system had been developed for farmers to select their preferred varieties, based on both individual and group assessments, and on answers from both men and women. Unfortunately, because of an upsurge of intermilitia fighting, farmer's participation in the on-station variety selection was cancelled for security reasons. The experimental plots were severely flooded at the end of the *gu* growing season which resulted in serious crop loss. Because of the resulting low yields, the purpose of seed multiplication was only satisfied to a limited extent.

Multiplication and distribution of selected germplasm

The baseline survey revealed that all farmers are interested in new varieties and most are willing to try out such varieties on a limited scale. The on-farm trials, moreover, showed that there is considerable interest among farmers in adopting the varieties to be produced by IPGRI/CINS. As a response to this, IPGRI developed an appropriate methodology for multiplying and marketing seeds under the current conditions.

Currently, there are no functional state institutions in Somalia, and farmers rely on their own resources, as well as on the private sector and donors for agricultural services. This situation is not likely to change in the immediate future. If provision of a service such as supply of seeds is to be financially and technically sustainable, i.e. to continue after project completion, it must be based on the private sector and local community institutions. The approach of the project, therefore, was to improve and build on existing knowledge about management of plant genetic resources and work with local institutions and individuals. The CINS Seed Centre was planned to provide foundation seed and technical support to the 30 village-based seed farms and to sell seed to farmers through 15 marketing women operating in each of the three district towns.

The CINS Seed Centre was perceived to store all varieties under secure conditions. The village seed farms were planned to be located throughout the three districts and each farm would ideally cover seed requirements of five villages each. A village seed bank was planned to be established in connection with each of the village seed farms with the aim to store small quantities of all varieties cultivated in the area and store adequate quantities of the most popular varieties to serve as a buffer in case of crop failure and widespread loss of seed. The village seed farms would, in theory, become self-sufficient with seed after one season. However, it is likely that if the project resumes when peace has returned to Somalia, there will be a need for periodic supply of high-quality seed of specific varieties.

Conclusion

The attack on the Decalay Village Seed Centre by a rival militia group had a disastrous effect for the outcome of the IPGRI/CINS efforts to re-introduce germplasm to farmers in post-war

Somalia. The Decaley Village Seed Centre with *ex situ* seed and *in situ* conservation was destroyed; the planned and imminent participatory variety selection process was disrupted; the seed multiplication plots were never harvested and planned seed distribution activities were abandoned. This is the inherent risk of seeking to work with development in a volatile post-war but pre-peace situation. As part of the participatory approach, the full diversity of germplasm was tested in 90 on-farm trials at the time of the militia attack. While the results from these trials were never analyzed, the planting material survived in farmers' fields and preferred varieties may spread through community seed exchange.

There are nevertheless important lessons to be learned from this project. First, the participatory approach with a strong social science component used by IPGRI in this project is novel and unique for emergency seed programmes and could serve as inspiration for future programmes. Second, IPGRI's approach to providing access, transferring, multiplying and testing a wide range of *ex situ* stored indigenous varieties, instead of modern varieties from other countries (which is the case of many other emergency seed programmes), was very well received by Somali farmers and should be an element in future emergency seed programmes when possible.

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