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Sustainable Seed Systems for Family Farming: Promoting More Inclusive Public Institutions – Lessons Learned from Mesoamerica

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Summary

The "formal" seed systems in Mesoamerica function only for a limited portion of farmers. The systems were designed to respond to large commercial farmers and the businesses that attend them, providing a very limited number of varieties (sometimes hybrids) of a limited number of crops through a limited number of businesses. Over the last fifteen years the "informal" seed sector, that attending to family farmers and local interests, has grown in experience and results, in many cases highlighting the divisions between the two systems and the lack of services and support from the "formal" system to the "informal" system. FAO's Seeds for Development project worked for three years to bridge the gap between the two systems, through a series of discussions and analysis of the national seed systems. The project supported twenty-nine small, local seed businesses attending family farmers, as well as the public seed systems, so that they could better appreciate and respond to the needs of the "informal" sector. As a result, most countries in Mesoamerica are moving towards inclusive public seed institutions, making adjustments in their administrative procedures to better serve local seed businesses, increasing seed security for family farmers. While progress is evident, several key challenges remain for the creation of truly inclusive public seed systems and to achieve sustainable seed systems for family farmers in Mesoamerica.

1. Introduction

Fundamental Role of Seed Security for Food Security

Three crops (maize, beans and rice) play a fundamental role in food and nutrition security in Mesoamerica. The foods of these crops form the basis of the daily diet of the majority of the resource-poor and food-insecure population of Mesoamerica. The vast majority of the production of maize and beans in Mesoamerica comes from family farmers.

There are a number of important constraints to increasing the stable consumption of basic grains and securing food security for the majority of Mesoamerica's food insecure families, but one of the most important is the low productivity of basic grains. This is especially true for common bean (*Phaeseolus vulgaris*), which is almost entirely produced by family farmers, is an essential source of protein in the diets of most resource-poor families, and for which the access to quality seed has been very limited due to the lack of commercial channels of distribution. Most family farmers in Mesoamerica continue to use bean seed that is nothing more than a small stash of the previous year's harvest or what is easily obtainable from family or friends, if no household left-over seed is available at the next planting time. While local provision of this "seed" may provide varieties that are locally desirable, there are often serious problems with the quality of the "seed" planted, due to poor germination as a consequence of inadequate storage conditions (insect-infested, high moisture leading to pathogen growth and lack of viability due to exposure to excessive temperatures) and the potential of seed-borne diseases due to the lack of quality-control procedures. The poorly functioning local seed systems, especially for local beans, are a major impediment to securing food security for many resource-poor families in Mesoamerica. The use of high quality bean seed versus saved grain can produce a large increase in productivity. The increase in productivity can be measured in the increased viability of the seed, the increased ability of seedlings to finally establish and produce a good productive plant, and the increased access to appropriate moisture and temperatures through the correct sowing time.

Some governments in Mesoamerica have sought to overcome the lack of access to quality seed by giving free seed to resource-poor farmers. A number of the governmental programs are large and have continued for years, giving bean and corn seed away to large numbers of resource-poor family farmers. While there may be short-term benefits of such give-away programs, their impact and sustainability have been often questioned and there is no evidence that any such program has led to a sustainable seed sector.

In order to achieve food and nutritional security, resource-poor farmers need to have seed security. That is, they need to have access (physical and economic) to the quantity of seed of the varieties they desire at the right moment for planting to cover their necessities. The sustainable supply of seeds depends on a sustainable seed system, which must: respond to the demand of farmers, prosper over time and be resilient to shocks, and be innovative and able to improve over time.

2. Seed Systems in Mesoamerica

Most countries in Mesoamerica do have well established and functioning seed systems, but they do not function well for small, local seed businesses or resource-poor family farmers as they were designed for and largely continue to function for larger commercial seed businesses. But other seed systems often exist alongside the official systems. The established official systems are often referred to as the "formal" systems, while the other seed systems, not recognized or normally supported by the official system are referred to as "informal."

The "formal" seed systems in Mesoamerica typically have a legal foundation (usually a national seed law), a registration system (for varieties and producers) and an institutional and administrative structure, typically divided between the Ministry of Agriculture and the National Agricultural Research Institute (NARI). This structure oversees the normative aspects of seeds, including the official recognition of crop varieties, authorizes the legal recognition of quality categories, and operates the administrative and technical components of the process leading to the commercial category, called "certified seed."

In Mesoamerica, "certified" seed is seed that has been determined by the competent national authority to have met or exceeded all quality standards of both the final product and the production processes.

This system is in contrast to that used in many other countries, where the responsibility of labelling the seed falls to the producers and quality assurance is made via "truth in labelling" legislation. The perceived quality from the farmer's perspective is largely based on the apparent trustworthiness of the company in the eyes of the consumer. The certified seed systems used in Mesoamerica results in a large technical and administrative burden on the national seed authority.

Some aspects of the formal system are typically managed by NARI and generally include managing germplasm collections, breeding programs, and international germplasm exchange of priority crops. Often these priority crops are those for which large commercial markets do not exist for varietal development or seed sales. These are crops which are either not attractive to larger commercial farmers, or their germplasm is largely in the public domain and are usually self or open pollinating, making intellectual property rights of the germplasm or process difficult. The NARIs also typically maintain the basic seed of registered varieties and produce the registered seed used to produce certified seed. In some cases the NARIs produce the certified seed that is used in government social programs.

The formal systems function well for their original purpose and traditional clients: large seed companies (national or transnational) that produce a limited number of varieties of a limited number of crops. Unfortunately, they function much less well, or not at all, for small, local seed businesses or family farmers.

The barriers faced by smaller seed enterprises are several: the inexperience of the businesses in registering themselves with the national seed authorities, access to Basic or registered seed of the

varieties they would like to produce, the lack of field inspectors to get to the remote fields and supervise the production, the lack of adequate and timely laboratory testing, and the inability of the official system to recognize local landraces, due to over-stringent requirements on genetic uniformity. As the entire technological/administrative structure for quality seed is built around the certification process, any group or business that attempts to produce quality seed outside of the certification scheme is left without access to quality-control infrastructure or technical support.

Finally, small, local seed enterprises typically have no role in the national public seed governance structure. Some countries do have private sector participation in seed policy discussions via representation on national seed committees, but that representation invariably comes from the large private companies, not small, local seed enterprises, leaving them without an effective voice in shaping seed policy and procedures.

Over the last ten years a number of initiatives in Mesoamerica have grown to support the development of "informal" seed producers. A number of these initiatives have focused on promoting the conservation and use of local varieties and on participatory breeding methods to continue to improve the local varieties. Other initiatives have focused on local seed banks and territorial development. In both cases the official national systems have been ill-prepared or without adequate legal, political or administrative support to engage positively with these initiatives.

The initiatives have often been supported by civil society organizations that do not have a strong linkage with the national seed system. The lack of communication or shared vision has led to the development, almost in isolation from the official system, of alternative seed systems. Without much interaction between the two sectors, and in some cases mistrust, the two systems have often appeared to be content with the further development of parallel systems.

3. Seeds for Development Project

In March 2010 the FAO office for Mesoamerica (SLM) began the implementation of the Spanish-funded "Seeds for Development" project with the objective of improving family farmers' access to and use of high quality seed of the priority family agriculture food crops (maize, bean and rice). The project sought to promote sustainable seed systems for family farmers in Mesoamerica by creating or strengthening local seed businesses, while simultaneously working with the official national seed systems to engage with the local seed businesses, to begin a dialogue that could lead to a better understanding of the constraints of the current system and barriers to their incorporation into the "formal" system, ultimately creating more inclusive national seed organizations.

At project inception a series of workshops were held to discuss the national goals of food security and the role of seed security and family farming in that goal. Dialogue was facilitated between the national "formal" seed sector officials and members of the "informal" sector to discuss common goals and the barriers faced by those outside the "formal" sector. A number of key points arose from these discussions:

1. The national legislation and administrative procedures define the criteria necessary for the recognition of varieties using the DUS (Distinctiveness, Uniformity, Stability) criteria, based on international systems, such as that of the International Union for the Protection of New Varieties (UPOV). The DUS system, when strictly interpreted, is an impediment to the recognition of local bean landraces, mainly because of the genetic diversity inherent in these landraces. The DUS system could be adjusted to recognize local landraces by changing the percentage of plants that correspond to a particular description.
2. Most national seed systems do not have the technical or administrative capacity to attend to small, local seed businesses, many of which are situated far from the capital cities. Many countries have only a few trained seed technicians, who often do not have access to the necessary transport and resources to visit and verify compliance of the field standards under which certified seed production should be carried out. Most countries of Mesoamerica have

only one official seed laboratory in which all seeds must be tested against phytosanitary and germination standards before they can be certified. Often the time required to send samples to the laboratory and receive back the results in remote areas is a serious impediment to marketing seeds.

3. The certification procedure and label is synonymous with "quality" seed in most Central American countries, leaving little room for discussion of "non-certified, quality seed". Recent high-profile corruption scandals involving the official certification of seed that did not meet the requirements and its export to a neighboring country led to a re-examination of the assumption that "only certified seed is high quality and all certified seed is of high quality." In South America there are examples of countries that allow labeling of seed by the seller and its commercialization. This system works well where there is a legal framework that allows the user to legally challenge misrepresented bags of seed. This system converts the national seed authority's role from that of inspector and pre-sale enforcer to that of auditor and post-sale adjudicator.
4. The lack of supply of the registered seed by NARI to local seed companies can be a serious roadblock to the production of quality seed by small businesses. The lack of fluid communication between small businesses and NARI and the lack of capacity to plan for and produce registered seed of the varieties required at the moment it is needed result in many lost opportunities for small seed companies. The necessity of having a public institute with the mandate of doing basic seed production was questioned, being an activity that can be produced by a company under the supervision and responsibility of the institute, eliminating the need for a public institute to handle complex operations that it may be ill-equipped or staffed to handle.
5. Even in countries with explicit laws and policies promoting food security and family farming, seed offices do not have a clear mandate to promote family farming seed systems through support of local seed businesses or view the small businesses as important clients.

4. Two Seed Systems? Or One Inclusive Seed System?

Dialogue among government seed officials, local seed business leaders and FAO experts resulted in some shared perceptions and recognition of the benefits of creating a unified, inclusive system, incorporating and supporting the "formal" and "informal" seed sectors. There was also recognition that the "informal" sector brought to the table valuable experiences and perspectives from which the formal sector could learn, and that the formal sector needed to fully appreciate and plan to change the legal and administrative impediments that kept the "informal" sector isolated.

Discussions converged on common recognition that:

1. National seed policies and systems should support the national goals of food and nutrition security and rural poverty reduction. The services and goods provided by the national seed system are public goods. An inclusive formal system should provide benefits to all clients.
2. Local seed enterprises and groups could and should benefit from the technological skills and infrastructure maintained by the official system, including training on seed production, processing, packaging, sales, market opportunities and the knowledge of seed health and the laboratories to test that health.
3. Local land races and varieties offer an excellent opportunity to conserve and utilize plant genetic resources. Instead of a narrow focus on DUS system and the exclusion of genetically-diverse varieties, varietal improvement programs should seek to integrate the goals of plant genetic conservation along with varietal development and use.
4. The public seed systems need to work more closely with the small local seed enterprises to better determine demand for registered seed of the required varieties at the required time.
5. Quality bean seed can be produced by non-traditional seed businesses given the appropriate training, supervision and quality control.

6. The lack of certification does not mean that seed is of low quality. Sometimes the seed simply has not had the benefit of the oversight or administrative processes required for certification. Similarly, certification is not always a guarantee of quality, as demonstrated by notorious corruption scandals.
7. To further the discussions and develop the agendas for action, it is important to include the small, local seed enterprises into the national seed governance structure.

5. Moving Towards an Inclusive Official Seed System

The facilitated dialogue created a number of proposals to make the public seed systems more inclusive. Some of the recommendations and actions taken originated with the public sector, others from the emerging private sector, and yet others came from the FAO-facilitated exchange of experiences with other countries.

Access to Official Recognition of Seed Quality

One of the first and most polemical discussions regarded the shared assumption among official seed regulators that only certified seed was quality seed. The discussions started with an examination of that assumption, including the fact that many countries outside the region do not certify seed, depending instead on the legal implications of truth-in-labelling laws. It is also believed that having a seed production system with optional certification will reduce the work needed by the National Seed Authority. On the contrary, it provides more demand for work since post-control of non-certified seed needs to be carried out and auditing of enterprises accredited for self certification needs to be permanently done.

Second, the many comments about the lack of resources of the official seed system to attend to the demands of many small, remote seed producers led to the conclusion that alternatives needed to be sought to provide services to small businesses so that they could receive official recognition of the quality of their seed.

The solutions offered to overcome the problem of lack of resources (inspectors, vehicles, travel funds and laboratories) were several. Costa Rica has worked at developing an alternative recognition process, which would grant an official label to seed that had been locally produced and its quality assured through a self-certification process. This process recognized that services should be provided to the remote seed producers, while also recognizing the unlikely probability that the government could directly attend the remote enterprises. This process and the resultant label would be different from the official certification process, and recognized as such.

Other countries (Panama, Nicaragua and Honduras) took a different path, stating that all seed should be certified under the same procedures and receive the same recognition (label). This decision was made in part to provide family farmers with the same level of quality as larger farmers, and in part to maintain a direct role in the quality assurance. These countries have worked closely with the new local enterprises to attempt to guarantee the supply of registered seed in a timely manner, field inspectors who could verify the quality conditions of the field production, and timely response from the seed laboratories that test the seed against standards. It should be noted here that for a country with one million ha of bean production that it is necessary to have 40,000 ha of seed production. If that came from small areas of production (i.e. 1 to 2 has each), 20,000 inspections would be needed during the two weeks of flowering time, meaning that 1,500 inspections would have to be done per day, as an inspector will rarely do more than 4 ha in one day.

Both Costa Rica and Nicaragua recognized that they would have a hard time providing field inspection service if the number of seed production fields continued to increase in remote areas and have begun internal discussions about the possibility of accrediting local inspectors, who would be trained and authorized to provide the same services as the official inspectors. Nicaragua has

also announced that it will build, equip and staff two regional seed laboratories in the bean seed-producing zones, so that small enterprises would have timely results from requests for testing of seed quality.

The dialogue and reflection regarding national seed services in Honduras led to a complete reversal of public policy and support for the seed sector. During the late 1990s Honduras had completely privatized their national seed services, eliminating its basic and registered seed banks and selling or renting its seed processing plants and storage capacities. As a result of their participation in the Seeds for Development project, Honduran authorities decided that a functioning public seed system is a fundamental national strategic asset that produces important public goods and requested that the FAO assist it in re-establishing their capacities to coordinate and protect the public interest, via re-building their capacity and re-stocking their germplasm bank.

Honduras and Nicaragua have moved forward on the issue of registering local varieties, supported by the efforts of the Collaborative Program for Participatory Crop Breeding in Mesoamerica. In both countries a number of bean varieties are close to receiving local recognition as registered varieties.

Finally, the discussions regarding the role of seed systems in promoting national food security led a number of countries to re-examine their national seed legislation and policies. Guatemala held a national workshop to begin the process of defining the key elements of a national seed policy and identify principle actors who should be involved in the process.

The Seeds for Development project was very successful in helping support the establishment or strengthening of twenty-nine small seed enterprises, which began to supply high-quality bean seed to family farmers across Mesoamerica. The project also supported the strengthening of the official seed systems, through infrastructure, training and learning through interchange with neighboring countries. But probably the most important impact that the project has had was in facilitating the dialogue between the nascent private sector with the public sector, that examined fundamental questions such as the role of the public seed sector in national priorities to administrative details of how make adjustments so that local, often remote small seed enterprises could enjoy the same level of services that received larger, more established seed companies.

6. Challenges for the seed systems

Great progress has been made and most countries are clearly on the path of creating more inclusive public seed institutions that support local seed enterprises in their business of supporting family farming and achieving food and nutritional security. But several important challenges remain.

6.1. Give-away seed social programs

Several countries in the subregion have very substantial and long-term public programs that provide seed and fertilizer for free to large number of family farmers. Figure 1 shows an estimate of some of these national programs, totalling over US$ 140 million spent by national governments in the purchase and give-away of seed through such programs. These figures include only the direct fiscal cost, and do not include the costs of distributing the seed.

While these programs may have a role in helping to pave a transition from an emergency situation (all seeds lost in a region due to extreme climatic events or pest damage, or in helping extremely poor farmers build working capital), some governments have become trapped into giving away large amounts of seed year after year to the same farmers, with no motivation for the farmers to transition to anything else. In fact, political and economic pressure from numerous interests groups have now made these programs so entrenched that they are difficult to shift away from, despite the stated interest of several recent governments. While the benefits of the programs have not been determined, their costs are quite obvious: beyond the yearly government budget outlay, the programs have effectively destroyed any local markets for small-scale seed purchases. In addition, the job of distributing the seeds and fertilizer was handed over to the NARIs, which meant that

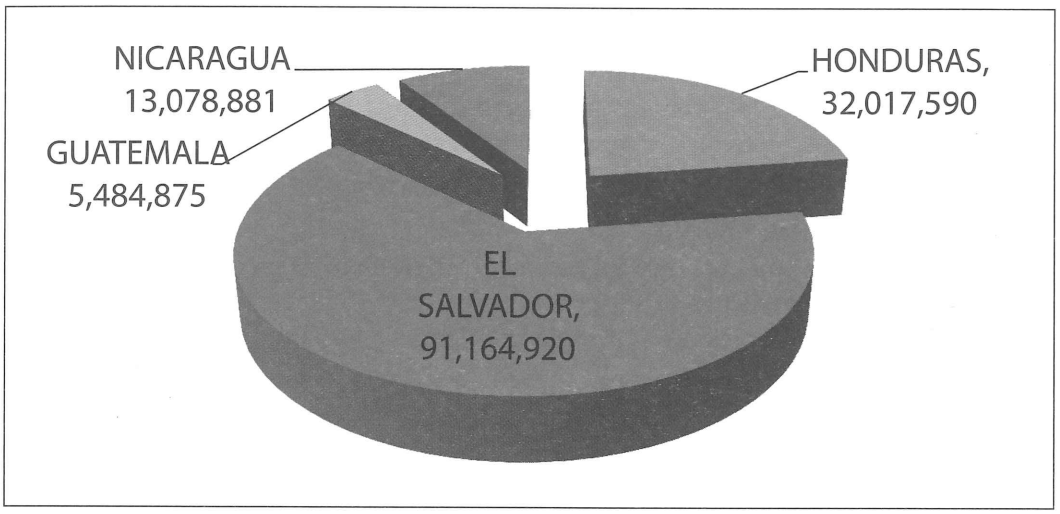

Figure 1. Direct public expenditures (US$) for seed give-away programs 2006–2012 (El Salvador, 2006–2013, Guatemala 2009–2013, Honduras 2006–2011, Nicaragua 2007–2010). Seed value estimated at US$2.42/kg).

instead of developing and testing new varieties and engaging in international research collaborations, the NARI researchers have been converted into logistic operators. Their spreadsheets have changed from lists of varieties and their field performance to lists of citizens who should receive some of the latest giveaway – and then having to travel to the communities to oversee the distribution.

In these situations farmers will not claim their rights if the seed received is of poor quality because it was a gift, so the most fundamental discussion between farmers and salesmen that a customer "will not purchase seed again" from that company if the quality does not improve, does not happen. That scenario is the basic incentive for a company to improve the quality of its seed.

6.2. Strengthening small seed enterprises

The twenty-nine small seed enterprises that were created or strengthened by the Seeds for Development project are all producing high-quality bean seed and all face serious challenges. Most are incipient businesses, and as such still have to improve the quality of their product, improve marketing and sales, and strengthen their internal governance, administration and finance situations. Obtaining and managing credit is one of their biggest challenges. But in some countries, so are the governments, via their seed give-away programs. Ironically, some small seed enterprises have benefited in the short-run from these programs, as they have purchased seed from the small businesses. In the longer-run, however, the programs damage the businesses, as the give-aways effectively destroy any real or future demand via direct purchase by the producers. Receiving the seed for nothing also does not create the sense that the seed is a good investment in their crop production and thus worth making.

The nascent companies are currently very limited in their offer of products and services, typically producing just one variety (albeit the most sought-after locally) of common bean. There is great potential to expand the varieties and crops that they offer and to begin simple comparison trials where testing of different varieties can be carried out and the results observed. There is great potential for these local businesses to be incorporated into national and region multi-varietal trials.

The Seeds for Development project held a conference and trade-fair to allow the new businesses to share their experiences and ideas that was enthusiastically attended and praised. Honduras has created a network, a nascent trade association or federation, of small seed businesses. They have developed a joint labelling scheme and are finding success in marketing well beyond what any one small company could achieve.

6.3. National seed policy

There is a need to engage in a process to define and approve national seed policy. A seed policy is understood as a document that directs seed law and regulations. It is a declaration of intent of the government on which direction to take in a complex seed sector, in areas such as public-private relationships, private sector development, regulations of foreign trade, taxes, subsidies, public and private breeding, compulsory or optional certification, etc.

The process of policy development should be accompanied by a thorough revision of national laws, decrees, institutional and administrative arrangements and adjustments to the governance structure. It is important that all actors participate actively in this discussion and the construction of the National Seed Policy.

6.4. Seed production, varietal development and plant genetic resources

An important pending issue is how to successfully merge the goals of varietal development and seed production with that of plant genetic conservation and utilization. This needs to be done conceptually, institutionally, via common policies and operationally.

Although inter-related, the two topics live in different universes. Plant breeding and seed production lie in the Ministries of Agriculture with their NARI at a national level and a set of international organizations and treaties (CGIAR, UPOV, etc.) and is driven by demands for increasing production, productivity, food security and exports. Typically it has a shorter time-horizon. The conservation and utilization of plant genetic resources are covered by different international treaties and governance mechanisms, often linking with the Ministries of the Environment, and not the Ministries of Agriculture, creating institutional divisions and rivalries that are often difficult to overcome. In practice, no country in Mesoamerica has a clearly articulated, coherent vision of how the two agendas could move forward jointly.

Beyond potential synergies and efficiencies, this division creates concrete difficulties. For example, local land races of common beans, which may have unique qualities and whose continued use could promote the conservation of local plant genetic resources, but are not permitted to be registered as varieties due to genetic diversity is one example of the contradictions of the current systems.

7. Conclusions

FAO's Seeds for Development project has clearly shown that the creation of inclusive national public seed institutions is desirable and achievable. The process requires structured dialogue that identifies and reaches agreement on the role of the public seed institutions and national seed objectives in the framework of larger national goals. The dialogue is important in both creating trust among the "formal" and "informal" sectors and for the formal sector to appreciate and seek solutions to the impediments that the "informal" sector faces under laws and administrative procedures that were created to support larger commercial farmers and the businesses that attend them. Once identified, the impediments have been directly addressed in some cases (building additional seed laboratories, hiring more field inspectors or accrediting local inspectors, improving planning mechanisms to ensure the timely availability of registered seed), whereas other issues require continued dialogue and action (modifying the rules for varietal recognition to permit more genetically-diverse landraces, opening the public governance structure to give voice to small, local seed businesses and their associations, creating a comprehensive national seed policy). The promotion of local markets and the transition out of on-going national seed giveaway programs are also key factors that must be addressed in order to achieve sustainable seed systems for family farmers in Mesoamerica.