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ARTISANAL SEED SUPPLY SCHEMES: A STRATEGY TO EXTEND THE DEVELOPMENT OF ORGANIZED SEED SUPPLY SYSTEMS TO MEDIUM AND SMALL FARMERS

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PROBLEM DEFINITION

Highly productive seeds are needed to support agricultural growth, production, and productivity at the large-, medium- and small-farmer level. In Latin America, while the utilization of improved seeds** has advanced in commercial/industrial crops, the estimated rate of use is below 40% in rice and 10% in beans, 1% in cassava, 10% in tropical pastures, and 10% in open-pollinated maize (Seed Unit estimates). It is generally accepted that almost 75% of farmers in the tropical world have not yet benefited from modern technologies being generated by research (CIAT, 1982). This problem is accentuated in medium- and small-farmer production systems. Despite this low rate of use of improved seeds, the contribution of small farmers to food production in Latin America is estimated at 32% for rice, 77% for beans, 51% for maize, and 90% for cassava (CEPAL, 1982)***, indicating that they have a very important role to play in the future. Their contributions in specific regions are much higher.

Several seed supply schemes coexist within countries: corporate, conventional, and traditional. The corporate schemes can be characterized as large, conglomerate organizations of national or

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** Improved seed, in its modern context, is a biological technology requiring physical quality attributes (viability, health, vigor, purity, etc.) to be an effective carrier of biogenetic innovations from the research phase to the farmers' fields.

*** CEPAL and FAO, in López Cordovez, 1982.

multinational scope, carrying out research/production/marketing functions, present in large, uniform, prime markets such as those for hybrids and commercial/industrial crops. This system has proved to be effective in responding to market changes, financially sustaining its overall activities, and assuring the quality of its product and services. Consequently, it has acquired prestige, visibility, and competitiveness. Despite all its strengths, this system has not delivered to small, scattered, diverse, and risky (SSDR) markets such as those found under medium- and small-farmer conditions in the developing world.

Another scheme that most national and international development programs favored in the past is the conventional scheme. These are typically indigenous schemes based on public support services in terms of varietal development, but with production/marketing operations in the hands of public and private organizations. The conventional scheme also operates in large, uniform, and low-risk markets. Like the corporate scheme, it is capital intensive, requiring large single jumps in investment. It has also shown that it can supply seeds of assured quality and can be financially sustainable when privately operated. Even though effective under large, commercial farming systems, this scheme has not delivered improved seeds to SSDR markets either. Since large seed companies have centralized production units to take advantage of economies of scale, the overall process of transfer and adoption is complicated, and small communities cannot be reached in an effective fashion.

In some cases, government corporations intervened in production and marketing of seeds. They sometimes attempted to reach farmers with subsidized seeds. However, this socially well-motivated approach has not been sustainable and enduring (Garay et al., 1989). In the meantime, a large segment of farmers in the developing world do not use improved seeds.

In contrast to the above two organized schemes, the major source of seed in the developing world is by far the traditional seed supply (Grossman et al., 1988). This scheme can be typified by the farmer

saving his own seeds, or obtaining them from his neighbors or in the local grain market. This scheme has several positive features: the farmer can do the work, the seed is available where farmer investment required is minimal, and the farmer has good knowledge of his seed's potential. A close analysis indicates that this system should not be interpreted as static; on the contrary, it is a dynamic system lending itself to farmer-to-farmer flow of seeds and it can produce rich dividends, if linked to modern technologies. The main weaknesses of this scheme may be that it is not linked to technologies generated by research in terms of both improved varieties and modern seed production methods. Consequently, the replacement of obsolete varieties is very slow (Rajbhandary and Bal, 1989) and maintenance of physical quality of existing varieties is erratic.

From this brief analysis, it is evident that development of seed supply cannot be treated monolithicly under a single strategy; instead, different schemes are needed to effectively deliver improved seeds to different segments in the market. The weaknesses of existing schemes vis-à-vis the need for improved seeds in SSDR markets clearly indicate that development strategies could ill-afford not to develop relevant alternatives.

Therefore, purposeful and clearly focused research and development strategies are needed to develop seed supply under medium and small farmers. When entering SSDR production systems where medium and small farmers predominate, most classical textbook seed technologies do not seem relevant. However, a skillful combination of lessons learned in modern seed schemes with the best features of traditional schemes, creates a new and ample opportunity for development. A new scheme of intermediate nature between the conventional and traditional schemes would gradually bridge the existing gap between modern and traditional seed supply. This evolving scheme is actually a family of new approaches currently beginning under the names of nonconventional, artisanal, on-farm, participatory, community, and local schemes.

THE ARTISANAL CONCEPT, METHODS AND RESULTS

Recent research and empiric observations indicate that the solution to SSDR systems may be in the development of simple, relevant, and not too costly seed supply schemes. This proposition that may not have been conceivable in the past, now seems feasible due to new evolutions that facilitate the process. For example, advances were achieved in improvement of varieties, many services were created to support seed and crop production, and seed production technologies are advancing.

Farmer-producer organizations (FPOs) and a range of government and nongovernment organizations (NGOs) interested in production technologies have also evolved. All these and other factors create ample opportunities to expand seed supply systems beyond large commercial operations.

Several new cases demonstrate the feasibility of artisanal methods (Ortiz and Trejos, 1988; PROGETTAPS Report, 1989; Garay et al., 1989; CIAT, 1987; Rajbhandary, and Bal, 1989). To illustrate some methods and achievements, some evolving cases in Latin America will be briefly described.

Colombia is a country with advanced organized seed supply schemes. Corporate and conventional seed schemes are very dynamic in hybrid sorghum, rice, and soybeans. With the exception of a small (20,000 kg) supply of an old variety by a government organization, the bean seed supply is practically nonexistent. In 1983, a small cooperative (COAGROSANGIL) initiated artisanal seed production. The project that had started in 1983 reached 30,000 kg in 1986, becoming the largest seed supplier in the country. Since then, innovations on several fronts (production methods, marketing network, incorporation of new varieties, and expansion of production volume) are being advanced by the cooperative. This pilot case is generating interest on the part of other FPOs and government officials. Recently, another small cooperative that had been active in participatory research (ASHORTOP, Pescador, Cauca) has successfully initiated similar

attempts. In the first attempt, 2,000 kg of seed were produced, which will increase to 5,000-10,000 kg in the second year. Similar schemes are being started in cassava seed production, based in local, organized cassava-drying cooperatives.

In the 1960s, the organized seed supply in Guatemala was in the hands of the government. In the 1970s, the strategy changed in order to promote the evolution of private suppliers, based on government support through basic seeds, quality control (certification), credits, etc. A very dynamic supply of hybrid maize evolved. But bean seed supply and highland open-pollinated maize were practically unaffected. In the late 1980s, a technology transfer project (PROGETAPPS) incorporated artisanal seed production as a central strategy. New varieties of beans were rapidly produced by local farmers and passed on to their neighbors through various sale/exchange/share arrangements. In the first pilot region (Jutiapa), production in the first year reached 2,727 kg, which is increasing yearly at a rate of 10,000 kg a year. The scheme has been gradually expanded to the whole country and to other crops. Realizing that just extending varieties will not generate a long-lasting supply system, Guatemalans are now incorporating the enterprise development concept with organized FPOs. In the new scheme, field production, post-harvest processing, and marketing will be carried out by the FPOs, while government agencies would offer assistance to them, providing basic seeds and technical assistance to promote quality seed production and market development.

Among Latin American countries, Bolivia has started to develop organized seed supply systems most recently. In organizing their system, different strategies were used under large-, medium-, and small-farmer conditions. The main features in adjusting strategies to medium and small farmers were: creating local seed organizations; simplifying production methods to allow entry to the process; and using a seed certification service in promoting quality seed production rather than policing. As a result, 55 participatory, nonconventional, dynamic,

and production/marketing enterprises have developed. Among these, half can be characterized as medium to small enterprises, producing seeds with hundreds of small farmers.

A brief diagnosis across countries that are beginning small-scale seed production indicates that the lack of simple methods and tools for post-harvest management of seeds is a serious constraint. Aware of this need, CIAT has started research on production technologies. In beans, inexpensive but highly effective methods and tools are being achieved to facilitate harvesting, drying, cleaning, and quality assessment (Camargo et al., 1989; Garay et al., n.d.). In cassava, effective methods based on good field agronomy, selection at harvest, and preparation and treatment of stakes are being put together. Results achieved with beans have triggered the initiation of new pilot projects by national programs in Honduras, Panama, Ecuador, and Peru. Research on rice, maize, and pasture seeds is being begun as well.

LESSONS BEING LEARNED

Field results in this area of research and development indicate that the development of seed supply systems under medium- and small-farmer conditions is feasible. There is increasing interest on the part of national government, nongovernment, and farmer-producer organizations in this approach, indicating opportunities for development beyond the magnitude of pilot projects. Since each case has different needs, it is probably advisable to avoid models. However, some of the useful lessons identified when looking across cases that are showing success follow.

1. *Do not confuse extending varieties with developing seed supply systems.* Realizing that having good varieties at the gate of research institutions is not enough, some research and extension programs have gone one step further by giving extension services the responsibility to extend the varieties. Some technology transfer projects focus on procuring improved seeds to *distribute* among

medium and small farmers. These methods fail to recognize the innovative ability of these farmers. Other projects provide small quantities of improved varieties and assist farmers in multiplying in their community, to facilitate farmer-to-farmer dissemination of seeds. Though effective in introducing varieties, even in the best of cases these approaches, which extend only the variety, quite frequently do not survive beyond the life of the project. Production and marketing of seeds need to be instituted in the form of commercial enterprises even if only on a small scale so that seeds can be delivered in a continuous and financially sustainable fashion.

2. *Build on organized farmers.* It is economically risky to think that new organizations have to be developed for the sole purpose of producing and marketing seeds. On the other hand, there is an abundance of organized farmer-producers (FPOs) or individuals who already have ongoing activities with some economic base (Camargo et al., 1989). These organizations may be cooperatives, committees, associations, etc., already dealing with supplying inputs, marketing produce, and channeling credit, among other activities. Experiences in Bolivia, Guatemala, Colombia, and Panama create a serious suspicion that existing organizations have a potential to develop a built-in capacity to produce and market seeds and so far they are still underutilized. Their organization makes channeling information, credit, and technical assistance easier, thereby being a good multiplying factor for the dissemination of improved seeds and related technologies. This creates the opportunity to add seed supply as a new line of product or service readily recognized by constituents. In the process, these production units become key links in a chain that joins research with farmers' fields.

3. *Start small and simple.* Many seed development projects in the past failed due to subjective and overenthusiastic estimation of the market. In Latin America, it is common to find large seed-conditioning facilities that hardly utilize more than 10% of their capacity. The same mistake can ill be afforded in the SSDR

markets. Instead, these situations seem to lend themselves to smallness as a condition for beginning a process. Smallness and simplicity, however, should not be confused with deficiency or mediocrity. Scientifically sound principles and methods are needed to assure the delivery of quality seeds at low cost. The small initial pilot units permit adjusting strategies and methods without great risks of failure. Once enough experience has been gathered, more complex methods can be incorporated if needed and the operation can be enlarged following changes in the market. This has been the case in beans and wheat in Bolivia, rice in Daule, Ecuador; and beans in San Gil, Colombia, and Jutiapa, Guatemala.

Past and current experiences demonstrate that if the process is allowed to start, even with a small-artisanal nature in the beginning, it will evolve and become more specialized with time and experience, if given room to operate. A high level of specialization should not be a requirement to begin. This makes simple, local, artisanal seed supply schemes an attractive approach to extend both supply and utilization of improved seeds under medium- and small-farmer conditions.

4. *Assure availability when needed and where needed.* Seeds supplied to farmers should have better quality than the seeds saved by the farmers themselves (Delouche, 1982). Some orthodox seed developers would prefer perfect-quality seeds from the outset. However, availability of reasonably good seeds when and where needed seems to be more important than nonexistent or scarce perfect seeds.

Sophistication in technologies aimed at perfection in quality to the point where it is no longer affordable by the majority of potential participants may be limiting development. The perfection objective led to the establishment of hard-to-achieve norms and procedures, which in the long run inhibited participation in the system. In contrast, the approach that seems to allow participation in and

initiation of the process seems to be flexibility, focusing on availability. Quality should be one of those features that is good enough to start with and then perfect over time.

5. *Differentiate the product.* It should be recognized that in non-hybrids, such as open-pollinated varieties and clonally propagated crops, all farmers are virtually seed producers. In theory, once they have access to a new variety, they can keep seeds for subsequent plantings year after year. However, recent evidence is showing that the lack of abilities and environmental stress create the need for dependable sources. And a market is developed gradually as a result of specialized supply and awareness of the advantages of improved seeds by farmers. To take advantage of this phenomenon, a seed enterpriser needs to differentiate his seeds from common grain regardless of the size of the operation. This has been universally used in corporate and conventional seed schemes with highly successful results in the past. One of the simplest ways to differentiate improved seeds has been distributing them in bags that clearly show brand name, type of seed, basic quality features (purity, germination), weight, etc.

   This information can be printed on the bag or attached as a tag. It is being recognized that even if seeds are not certified, this information is extremely valuable in gaining visibility for good suppliers, repeating sales, expanding the market, and competing through quality and price. Depending on the development stage and sophistication level of the consumer, this differentiation can be very simple or elaborate.

6. *Don't control prices.* Paternalistic schemes such as seeds at subsidized prices and market interventions controlling artificially low prices in the best of cases have given short-lasting results. There is a clearer understanding that improved seeds are technologies that need to be produced and sold. Somebody needs to develop a special capacity to produce them and make a business of it so that improved seeds can be supplied in a continuous and

growing fashion. In the past, trying to control prices has been a frequent error that inhibits investment in seed production and marketing, which in turn blocks the transfer of this productive technology to farmers' fields. One loser in the process is the farmer, who will not profit from more efficient seeds. Other losers naturally are the final consumers due to insufficient production and increased prices.

Corporate and conventional seed systems demonstrated that to develop a seed industry on a sound economic basis, prices must be defined by market forces. Without this, the competitive aspect of the market and the incentive to innovate are lost, and financially sustainable seed supply systems cannot be developed. This principle is even truer when promoting investment in seed systems to supply to medium and small farmers.

Some lessons are being learned. One clear lesson is that even in the most remote and apparently "resource-scarce situations," it is possible to develop seed supply systems if rigid conventionalisms in the approach are overcome. Much ground remains to be covered. There is a need for research and development. Research needs to be development oriented and with easy implementation in mind. Both biological production methods as well as socio-organizational technologies are needed to incorporate the farmer as the central actor in the process.

There is growing evidence that corporate, conventional, and artisanal schemes have a role to play under different market situations. Special efforts in terms of policies, strategies, and specific actions are needed to facilitate their development. Most countries are interested in principle in the artisanal scheme, but potential groups need to be identified, trained, and financed. National research and development organizations need to provide key services, and some classic barriers need to be overcome. In summary, development projects with a clear objective of stimulating this scheme will be needed. Finally, by supporting the development of seed supply for medium and small farmers, a greater return to investment in crop research, agricultural growth, equity, and food security will have been furthered.

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