Seed-Production Mechanisms

Proceedings of a workshop held in Singapore, 5–9 November 1990
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# TABLE OF CONTENTS

- **Seed Production Mechanisms Meeting** - Chris McCormack 1
- **Seed Production Mechanisms Meeting: Some Issues For IDRC** - Nicolas Mateo 2
- **Seed Production and Distribution Mechanisms** - Neil Thomas 4
- **Artisanal Seed Supply Schemes: A Strategy To Extend The Development of Organized Seed Supply Systems To Medium and Small Farmers** - Adriel E. Garay 16
- **Seed Production and Distribution Mechanisms** - P.M. Kamani and O.L.E. Mbatia 23
- **Seed Production Adoption and Perception Among Karen and Hmong Farmers of Northern Thailand** - Uraivan Tan-Kim-Yong and Manee Nikornpun 48
- **Chickpea and Lentil Seed Production and Distribution Mechanisms in Pakistan** - A.M. Haqqani and M. Riaz Malik 62
- **Seed Revolving Funds: Experiences in Dissemination Mechanisms in Peasant Communities of Peru** - Faustino Ccama, Adolfo Achata and Francisco Torres 76
- **The Rotational Seed Fund: A Case Study of Seed Potato Production and Distribution in Puno, Peru** - Jorge Reinoso and Roberto Valdivia 96
- **Sweet Potato Systems in the Philippines** - Julieta R. Roa 109
- **IRDC Supported Rapeseed-Mustard Research Project at G.B. Pant University of Agriculture and Technology Pantnagar India** - Dr. Basudeo Singh 134
- **Seed Production and Dissemination Mechanisms Workshop General Lessons Learned** - Neil Thomas 155
- **Guidelines for the Development of Seed Supply Under Medium and Small Farmers Situations** - Adriel Garay 159
- **Review of Meeting’s Goals and Achievements** - Nicolas Mateo 161
- **Seed Production Mechanisms Workshop Singapore, 5-9 November 1990, List of Participants** 163
SEED PRODUCTION AND DISSEMINATION MECHANISMS WORKSHOP

CASE STUDY REVIEW

Neil Thomas, Study Coordinator

This workshop has focused on the experiences of seven IDRC projects active in the general area of plant breeding or technology generation and transfer. The presentations have shown us that these projects have been active in multiplying and disseminating improved materials produced by the projects, and that the projects have had close links with the rural communities for which these materials were intended. What characteristics of these projects are of particular interest to our pursuit of effective mechanisms? Can we draw any specific lessons?

The Vegetable Seed Project in Northern Thailand shows that it is feasible to produce seed of sweet corn and crucifers in this area. It shows that some of these may be effective farm-level substitutes for the opium poppy in terms of income-generation, though there are still some marketing constraints to solve. The Project is well-placed to feed its own varieties into this production system. The Project has elucidated differences among the Hill tribes in their interest and capability in technology adoption, and has suggested ways of capitalizing on these differences. Having worked so closely with small farmers, the Project has learned which crops are of interest to the farmers, and how these people prefer to grow them. In the last year it has seen a significant increase in spontaneous adoption of one seed crop, Chinese radish. Of importance is that the Project developed seed production systems prior to the release of its own varieties, i.e., it has already developed on-farm systems that the farmers have adopted. However, the marketing of farmer-produced seeds is still a concern, and will be crucial to seed production being a sustainable alternative in these cropping systems. To date the Project has bought back all farm-produced seeds.

The Pigeon Pea Project in Kenya has been successful in achieving dissemination of its new varieties. Several mechanisms were tried, including an existing integrated rural development project which was looking for appropriate interventions. The Project itself is still the largest multiplier and provider of seed, due principally to little interest on the part of the private sector in a rainfed crop for marginal areas. Successful adoption was due to a variety which was significantly shorter-seasoned than, though with similar quality characteristics to, the traditional variety. The Project will try private-sector marketing in the coming year.

The Rapeseed Project in India has released five varieties which now occupy a significant proportion of the total area of the country planted to oilseed crops. The material has also been adopted in Nepal through free trade across the border. Throughout their development, these varieties were tested in on-farm trials, and as a result of large releases of seed by the originating institution, were seeded over a significant area well before their official release. Minikit testing was also carried out, as is common to all crop varieties in India. Undoubtedly important to widespread adoption was the superiority of these materials when compared to previous varieties, but the unique ability of the originating institution to move breeder’s seed directly into widespread multiplication cannot be overlooked in examining the rate of adoption.
The Sweet Potato Project in the Philippines has had material disseminated throughout the country. Some adoption was due to the rapidity which earlier varieties provided a crop, an important characteristic after decimation of other crops by typhoons. To increase adoption rates, which appear to have been limited so far, the Project team has focused on the different quality characteristics of each cultivar, developing specific industrial processes for them. It is not known how the availability of this technology has influenced adoption. Later varieties have been closer to traditional varieties in their qualitative characters. Informal channels have been far more important factors in dissemination than formal ones, suggesting that efforts to create a more effective formal system may not be worth the cost.

The Andean Farming Systems Project in Peru has established revolving funds as a way of disseminating new varieties of various crops throughout campesino communities in the Andean highlands. Originally started as a service component to a broader research program, this component is now involved in disseminating other aspects of the production technologies of these crops. Potato is the principal crop being disseminated. The marginal environment of this region has shown the fragility of crop production, and thus of any mechanism designed to be continuous across years, especially under campesino management. Clear from this project is the need to focus as much research emphasis on dissemination and campesino adoption as on the biological processes of varietal improvement. These funds were established at a time when Peru was passing through a period of hyperinflation, and the effects of this have been evident. It may be questioned whether government agencies have the entrepreneurial skills to operate these funds successfully, both administratively and financially. At this time, these funds have not shown themselves to be sustainable. They require a high degree of managerial capability.

Two other Projects included in the case studies, but not represented at the workshop, have both achieved some success in dissemination. This is clearer in the Food Legume Project in Pakistan, where new varieties, especially of chickpea, have found considerable acceptance. It is less clear what acceptance the millets of the Millets Project in India have had; the author reports that the area seeded to millets is under a continual decline even though new varieties are being developed. Millets, particularly, are a crop of marginal areas, where few possible alternatives exist for the small farmers of such regions. The manuscript of the Food Legume Project only is included here.

General lessons learned

1. These projects have been flexible in their multiplication and dissemination of material. Farmers have been given access to the material during its development, and have been involved in on-farm testing. This has resulted in high rates of adoption in relatively short periods of time. In most cases, seed has been available when farmers have wanted it.

2. Where fairly rigorous state-controlled systems of varietal screening and release exist, they have neither contributed to nor constrained rapid dissemination, having perhaps operated more as official baptizers of material already widespread. Informal dissemination systems have been the most significant channels in adoption, and local organizations may have been significant contributors.

3. In general, production issues do not seem to be as critical in dissemination and adoption as marketing issues. Projects generally have not considered
downstream aspects, or have not been able to establish sustainable marketing mechanisms. In the traditional sense, it might appear to be too early to consider these, though an holistic approach to crop improvement would suggest that such issues should be built in from the start.

4. Projects dealing with marginal crops have difficulty in assuring private-sector involvement in seed supply. Demand exists generally only in years after on-farm production shortfalls, when farmers cannot save enough of their own material. Continued public-sector involvement in one form or another may be necessary to ensure continued availability of improved varieties.

5. Revolving funds do not necessarily guarantee continuity in the resources necessary to ensure availability of planting materials. Revolving funds require a high level of managerial capability, which is not often available in public-sector institutions or farm communities.

6. Had these case studies not been undertaken, it is questionable whether most projects would have been sure of the amounts of improved material reaching farmers, and thus the potential benefit of these varieties. At the outset, projects’ staff were sensed to be ambivalent about the usefulness of such studies. The results show, that, in some cases, the actual amounts moving through different channels still have not been well quantified. In these projects, as in many others, often there is not a need felt by staff to know precisely how much is moving, as long as there is evidence that some is. This is a typical public-sector response, and does not argue for efficient use of resources in achieving objectives.

7. Projects need more clearly defined methods to allow measurement of the amounts of seed moving through different channels.

Guidelines for the future

These experiences, and others from projects elsewhere, should be used in improving the efficiency and effectiveness of crop and varietal improvement projects, and the small-farmer-oriented seed industry as a whole. Perhaps the most important issue is that of the involvement of the farmer in the improvement or development process. If this is a basic precept, then the following suggestions can be made:

1. View plant breeding in a wider context. It should not just be a biological process conducted in an institutional environment, rather it should be an interactive multidisciplinary process where the end-user is involved in the definition of the improvements intended, and the evaluation of the material as it is produced. This may even extend, as has been suggested before, to the farmers operating low-cost trials networks.

2. A project should document the process of on-farm testing and development much more completely than is currently done. This means looking beyond the simple measure of improvement in the prime characteristic under study, to recording the farmer's management, and what he or she does with the material once the test is over. Where possible, evaluative procedures should be built into these activities, to determine whether, both in the farmer's and the researcher's eyes, worthwhile gains are being made.

3. Encourage the public-sector institutions which view their function as one of regulation to look more towards the provision of technical assistance and
training to the small-scale seed industry. Attempted regulation of this sub-sector, beyond the provision of basic guidelines which training would encourage be accepted, will stifle entrepreneurial spirit.

4. Where a donor agency, such as IDRC, commonly funds several projects in a given sub-sector, a generic framework for definitive issues and data collection would be extremely useful. Many of the IDRC projects reviewed here were developed independently, and, while successful in meeting their specific objectives, pose difficulties when evaluation (especially comparative) is considered. Such projects should collect a minimum set of baseline data for future impact evaluation. This dataset should be specified in the generic framework. A minimum data set should cover (it should be noted that some issues may be qualitative):

i) Characteristics of target group(s), including farming system(s).

ii) Production and its constraints in crop being improved, including average yields, losses due to pests and diseases, agroecology.

iii) Marketing and its constraints in crop being improved, including on and off-farm flows, costs and returns, demand and stability.

iv) Sociocultural issues which impinge on the farming system, and which may affect labour availability, acceptance of new varieties, entrepreneurial capability. Importance of local organizations in the farming community, and what they do.

v) Existing extension systems, and methods used in reaching farming community.

vi) In relation to iii), the dissemination mechanisms common to the target group, and the proportions of material that flow through each. An analysis of the relative efficiency of each.

During the course of a project, the staff should review these aspects on a regular basis, updating their baseline information. Rapid rural appraisal could be a particularly useful technique for this purpose. Particular attention should be paid each year to the changes in the target crop, especially in farmers' responses to materials being tested on-farm. Information of the type listed here is necessary for ex-ante analyses which will justify the effort to be dedicated to a breeding program.