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Complementary Research and Development Efforts of IARCs and NARS — An ICRISAT Perspective

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Agriculture is as old as civilization. As human beings evolved and developed, so did agriculture. When agriculture and human civilization were at rudimentary stages, research and development (R&D) efforts were informal, individual, and remained largely undocumented. As human society evolved and developed into nations, R&D efforts became semi-formal or formal. In many cases, the knowledge generated from these efforts was documented in old scriptures and books. Thus, the national agricultural research systems (NARS) have long histories and traditions. In the past, NARS were able to meet the aspirations of their populations, but as these grew and scientific development in agriculture lagged, food shortages became frequent in underdeveloped societies. As a result, international efforts to assist societies that were not self-sufficient in food production began to emerge.

Complementary R&D Efforts

The guiding philosophy of international agricultural research centers (IARCs) has been to complement NARS R&D efforts. The NARS have the advantage of local knowledge and local germplasm, and the IARCs have access to better resources and an international pool of scientific knowledge. They complement each other in a common endeavor to increase food production and improve the quality of life of the poor. NARS assist in the development of IARC research portfolios, and also contribute tremendously to the vast genetic resources of the IARCs, upon which research success is based.

This symbiotic relationship evolved successfully and has contributed significantly to the welfare of mankind. Over the years, NARS have also gained technical strength. As the success stories became many, the equation of complementary relationships became somewhat diffused. Questions have been raised on the nature of the complementarity, and in some cases, even on the systems as such. IARCs have responded to the criticism by moving into a mixed portfolio of strategic, applied, and adaptive research by considering the needs of NARS and wishes of the donor community.

As IARCs are now concentrating on strategic research to develop intermediate outputs, NARS, including private sector and non-government organizations (NGOs), have a greater role in transferring technology and creating impact.

Complementary R&D at ICRISAT

ICRISAT's recent approach has been to forge an effective collaborative research partnership with NARS. Equality of the partnership is very important, and NARS have responded positively.

Since 1986 in Asia and elsewhere, ICRISAT has adopted the network approach in its collaborative activities. These networks are NARS-driven, with ICRISAT acting as a facilitator. Networks allow complementary R&D efforts and facilitate direct collaboration and exchange of information and technology among NARS. Over the years, many special working groups and networks have been established to achieve specific objectives of

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the research portfolio. These include working groups on groundnut bacterial wilt, legume viruses, and botrytis gray mold of chickpea. In Asia, all collaborative research and special working groups operate under the aegis of the Cereals and Legumes Asia Network (CLAN), that was formed in 1992 after merging the Asian Grain Legumes Network (AGLN) and the Asian component of the Cooperative Cereals Research Network (CCRN). Each member country signs a memorandum of understanding (MOU) with ICRISAT that provides a broad umbrella for cooperative research and administrative procedures to assist in the movement of staff, material, and equipment.

A collaborative work plan is prepared for each country depending upon its needs, interests, and capabilities. The work plans contain the details of experiments, germplasm exchange, joint monitoring tours, surveys, training needs, [illegible] procedures to be followed. Plans are reviewed every 2–3 years to assess progress, and are modified if necessary. The CLAN Coordinating unit based at ICRISAT Patancheru facilitates and organizes logistical support. A Coordinator is designated in each country to ensure successful implementation of the agreed work plan.

This arrangement for collaborative research has been very successful. Because of a formal MOU, the support of policymakers and administrators is assured. This also provides frequent contacts with policymakers and NARS scientists, that is so essential for success.

Examples of joint NARS/ICRISAT R&D

In ICRISAT's research of the past two decades, there have been many good, examples of its expertise complementing that of NARS. Where this has been effective, the result has been an efficient achievement (in terms of time and money) of desired objectives by exploiting the comparative advantages of each organization.

International trials and nurseries

ICRISAT coordinates this work, while NARS provide genetic material (in some cases) for testing, test sites, and scientific expertise to properly conduct trials at those sites. Several joint cultivar releases have resulted from the trials and nurseries.

Hybrid parental lines

Numerous parental lines of hybrids in sorghum, pearl millet, and pigeonpea developed by ICRISAT are commercially exploited by private and public sectors of NARS. ICRISAT is focusing on transferring resistance to a broad array of insect pests and diseases into productive seed parents and pollinators. This complementary collaboration has been very active and successful in India. Male sterile lines bred at ICRISAT have also been used to develop sorghum hybrids in China and pearl millet forage hybrids in the Republic of Korea.

Collaborative breeding

ICRISAT contributes elite genetic material with an adapted background that provides opportunities for disease screening and recombination. NARS contribute appropriate selection sites, selection criteria to match local farmers' needs, expertise in selecting for these locally desired traits, and appropriate testing systems for product evaluation. Such collaboration leads to the development of high yielding cultivars that are resistant to diseases and insect pests, and are adapted to the target environment with characters preferred by farmers.

Technology transfer

Partnership in technology transfer has been equally effective. Legumes On-farm Testing and Nurseries (LEGOFTEN) in India and Asian Grain Legumes On-farm Research (AGLOR) in Indonesia, Nepal, Sri Lanka, and Vietnam are good examples. Through these on-farm testing programs involving NARS

and ICRISAT, many technologies have been successfully transferred to farmers in these countries.

Resident scientists

On a number of occasions ICRISAT has provided the services of its scientists to NARS on special assignments. These short-term assignments have played a catalytic role in achieving the objectives of the work plan. In addition, they have been very useful in providing 'hands-on' training to NARS staff. Examples of such collaboration include posting of ICRISAT scientists in Bangladesh, Ethiopia, Nepal, Sri Lanka, and Vietnam.

In Bangladesh and Nepal, this collaboration has led to the identification of high yielding and fusarium-wilt-resistant chickpea cultivars. In collaboration with the Crop Diversification Program of the Canadian International Development Agency (CIDA), chickpea cultivation in the Barind region of Bangladesh has increased from 100 ha in 1991/92 to 3000 ha in 1993/94. There are 1 million ha of land that remain fallow after rice, and offer great potential to increase chickpea cultivation in the country.

Similarly, a scientist in Sri Lanka is playing a key role in assisting NARS scientists in increasing and stabilizing pigeonpea production in the country. Contributions of a groundnut scientist in Vietnam have been highly appreciated by the authorities there.

What has made these examples successful is not always possible to identify, but certainly the following factors have contributed in many cases:

- Partnership equality of the concerned NARS and ICRISAT resulting from mutual interest;
- NARS-driven networks, including national and regional trials systems;
- Appropriate collaborative work plans;
- Appropriate memoranda of understanding wherever needed to facilitate close collaboration by scientists from the concerned institutions;

Need for impact assessment of R&D

IARCs and NARS have played a significant role in changing the food security scenario in the world. In the past, this role was so visible that it hardly needed any study to convince donors and policymakers of the effectiveness and usefulness of these efforts. We have now moved into a phase where research evaluation and impact assessment have become more important. In the past, the indicators of impact assessment were simple and probably unidirectional, but under the present changed scenario, those simple indicators are not enough to assess impact. In addition to the impact of technology generated, the impact of scientific knowledge generated has become equally important. The unidirectional mode of indicators toward developing NARS must transition to a multidirectional mode. What impact NARS (both developed and developing) have [illegible] as the impact of IARCs on developed NARS.

To maintain the joint partnership between IARCs and NARS and strengthen it further, we must convince the donor community and policymakers of the usefulness of our association in the service of humanity.

Collaboration and partnerships to exploit complementarities and comparative advantages are becoming the norms, which implies that in evaluating the benefits of agricultural R&D efforts, cooperation and collaboration should be emphasized (Ryan 1994).

Reference

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