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AND PLANTING MATERIAL



Nguyen Thanh Binh of the government's Hnn Loc Agricultural Research Center in southern Vietnam assesses a lot of LVN10 hybrid maize seed. In 1996 Vietnam is expected to plant as much as 200 000 hectares with hybrid maize, and as our story on page 16 explains, 400 000-500 000 hectares by 2000.

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Patents

New plant varieties in the U.S. receive patent protection.

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Thailand

Thai seed exports register sharp recovery in 1995.

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Highlights of country and technical reports at Asian Seed '96

Page 10: Country report on Bangladesh

Page 12: Country report on New Zealand

Page 14: Country report on Pakistan

Page 16: Country report on Vietnam

Page 18: Progress of genetic engineering in field and horticultural crops

Page 22: Acquisition and transfer of transgenic plants in the Asia-Pacific region: the case of the *Bt* gene

Page 24: Public- and private-sector partnership in the Netherlands' seed industry

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Page 31: Collaboration in plant breeding among international and national agricultural research centers: the case of ICRISAT

Page 35: Professional plant breeders' contribution to food supply in Asia-Pacific region

Worldwide collaboration in plant breeding

The global mandate of the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) is to conduct research on six food crops: sorghum (*Sorghum bicolor*), pearl millet (*Pennisetum glaucum*), finger millet (*Eleusine coracana*), chickpea (*Cicer arietinum*), pigeon pea (*Cajanus cajan*), and groundnut (*Arachis hypogaea*). ICRISAT has also been designated as the world germplasm repository for several other minor millets such as foxtail millet (*Setaria italica*), proso millet (*Panicum miliaceum*), kodo millet (*Paspalum scrobiculatum*), little millet (*Panicum sumatrense*), and barnyard millet (*Echinochloa crus-galli* and *Echinochloa colona*).

One of the major objectives of ICRISAT is "... to serve as a world center for the improvement of the grain yield and quality of its mandate crops and to act as a world repository for genetic resources of these crops." ICRISAT has worked closely with both public- and private-sector agriculture research and development (R&D) programs for the improvement of the yield and quality attributes of its mandate crops.

Germplasm

ICRISAT has a major role in the collection, conservation, and supply of germplasm to interested scientists in different countries. Its Genetic Resources Division has 110 384 germplasm accessions in its gene bank at ICRISAT Asia Center. This represents the contribution of germplasm held by various national and regional programs, and germplasm collected by the Institute since 1972 jointly with the national agricultural research systems (NARS) of collaborating countries.

There are three types of collaboration in breeding at ICRISAT:

- 1) Among international agricultural research centers (IARCs), where two or more IARCs collaborate in crop improvement programs.
- 2) Between IARCs and NARS, where IARC and NARS programs have explicit work plans for collaborative breeding projects.
- 3) Among scientists, to cater to nonformal requests from individual scientists. These usually involve scientists from universities and private seed

companies.

Before 1991 crop improvement programs at ICRISAT were engaged in developing end products (varieties/hybrids) and intermediate products (segregating populations and advanced generation bulks, hybrid parental lines, and breeding lines). More recently, ICRISAT has concentrated on developing intermediate products.

Currently, ICRISAT does not directly contribute to coordinated trials in India. NARS partners can contribute varieties/hybrids originating from collaborative breeding projects. However, hybrid seed parents (A/B pairs), restorers, disease- and pest-resistant sources, and other materials of exceptional promise developed by ICRISAT are tested in appropriate national program nurseries or trials.

Trials and nurseries

Selected breeding products are shared with NARS (mostly public sector) through a system of international trials and nurseries networks. These nurseries and trials serve the dual purpose of providing elite lines/hybrids for selection by NARS breeders and an opportunity for ICRISAT scientists to



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Comprehensive catalogue available

The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) is one of 16 international agricultural research centers (IARCs) established under the Consultative Group on International Agricultural Research (CGIAR). ICRISAT has regional programs for Asia, Southern and Eastern Africa, Western and Central Africa, Latin America and the Caribbean. The corporate headquarters and the ICRISAT Asia Center are located at Patancheru, near Hyderabad, India.



On-farm research at village level: major component in resolving real problems with real people. (Photo: ICRISAT)

evaluate their selections in multilocal testing. National programs could therefore choose appropriate varieties for future testing and release in their region, while ICRISAT scientists were able to study adaptation patterns and usefulness of specific parents and crosses in different agroclimatic conditions.

Field days are organized by individual crop improvement programs at ICRISAT locations. Crop-improvement scientists from both public and private seed-sector R&D agencies are invited. During these meetings, ICRISAT scientists provide information on screening procedures for various biotic and abiotic stresses, show visitors the germplasm and breeding material available, and hold discussions on our research priorities and their relevance to our partners in both public and private sectors. NARS scientists are provided opportunities to select elite hybrid parents, advanced breeding lines, segregating progenies, and population bulks.

Assistance to seed companies
ICRISAT has assisted private seed com-

panies in India in widening their network of test sites and has provided opportunities to evaluate their sorghum and pearl millet hybrids against those of their competitors.

ICRISAT does not release varieties or hybrids. If any genotype is found promising in national yield trials, NARS scientists identify and release the genotype through the national system. ICRISAT scientists, if requested, provide the necessary details and data, and also assist in preparing registration proposals on behalf of NARS.

ICRISAT signed an agreement on 26 Oct 1994 with the United Nations Food and Agriculture Organization (FAO) placing germplasm collections maintained by ICRISAT under the auspices of FAO, as part of the International Network of *Ex situ* Collections provided for in Article 7 of the International Undertaking on Plant Genetic Resources, to be held in trust by ICRISAT.

ICRISAT has made its breeding products freely available to both public and private-sector R&D institutions. NARS have tested and used materials from ICRISAT directly as cultivars or

as parents in their breeding programs.

Comparative advantages

There is excellent scope for future collaboration between ICRISAT and the public and private sectors of interested national programs, especially in areas of germplasm enhancement and intermediate products. Such collaboration will continue to improve if the partners recognize each others' strengths and weaknesses. The NARS can benefit by having access to new parental material, and ICRISAT can gain by having its materials in very targeted breeding programs on a scale that it cannot achieve on its own. Another potential area for synergistic collaboration is in biotechnology (development of molecular markers, transformation, etc.). Both ICRISAT and NARS can benefit by dialogue and exchange regarding experiences, constraints, breeding objectives, and breeding approaches.

(BASED ON: COLLABORATION IN PLANT BREEDING AMONG INTERNATIONAL AND NATIONAL AGRICULTURAL RESEARCH CENTERS AND THE PRIVATE SECTOR: THE CASE OF ICRISAT. C.L.L. GOWDA, COORDINATOR, CLAN, INTERNATIONAL CROPS RESEARCH INSTITUTE FOR THE SEMI-ARID TROPICS.)