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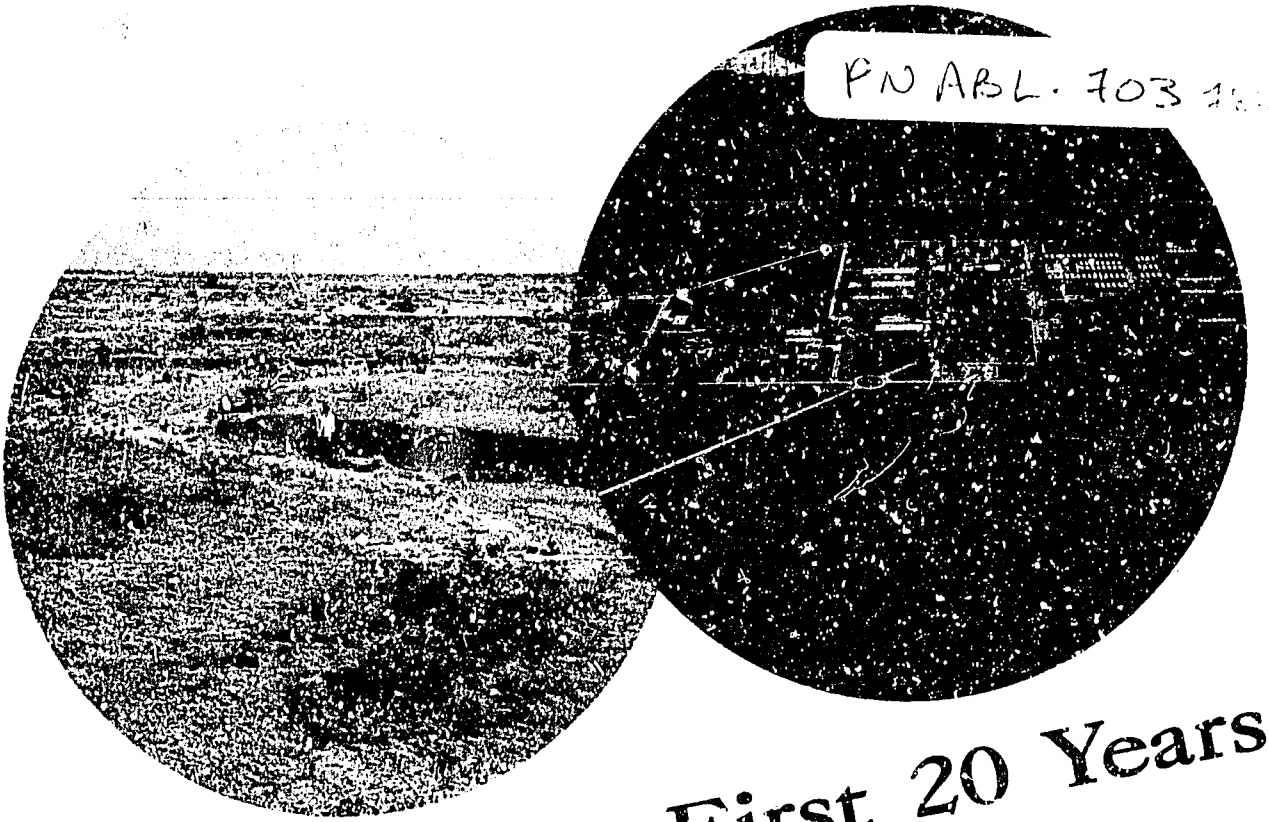
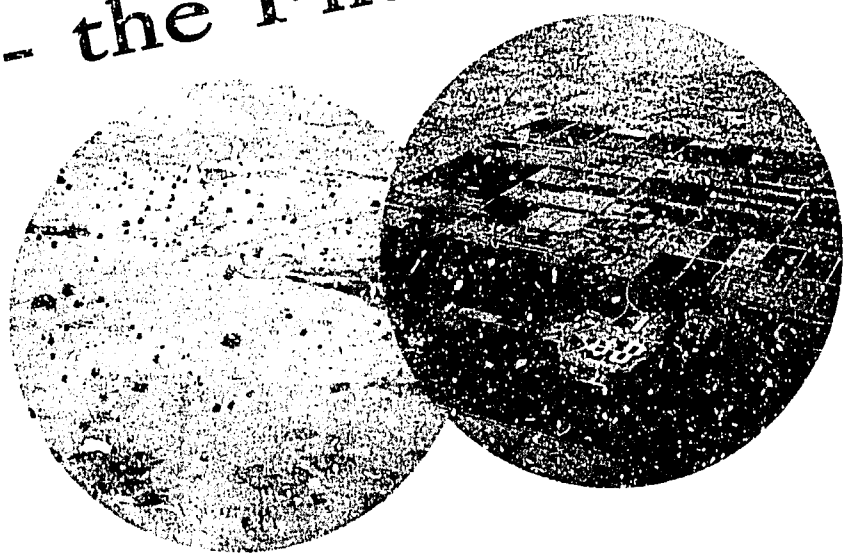


ICRISAT - the First 20 Years



International
Crops Research Institute
for the Semi-Arid Tropics

ICRISAT — the First 20 Years

This is an account of high endeavor and achievement for humanity. It was the vision of the founders of ICRISAT to improve the quality of life for the people who dwell in the semi-arid places on the edges of the world's deserts, by improving the reliability and productivity of their food crops. What has already been accomplished in the first 20 years in every part of the world, however remote, is a record of sustained commitment and hard work by ICRISAT's scientists. Their research has been conducted in cooperation with the world's farmers and agricultural research centers in harmony and friendship unmatched in the political world.

This is just the beginning. From work already in progress will emerge future harvests which will mean a better life for millions of people who might otherwise face serious food shortages.

As populations grow and more food needs to be produced to feed them, the demands for ICRISAT's products have become more persistent because the search for cultivable land drives farmers into the marginal semi-arid areas. Furthermore, whether as a result of use, global warming, or a temporary shortfall of rain, water tables are falling in many parts of the world. Towns and cities want more and more water, and village wells have to be dug deeper and deeper.

ICRISAT's own scientists are deeply aware of their responsibility to humanity. It is as noble a cause as can be found. The crops on which ICRISAT works are grown by resource-poor farmers in some of the world's poorest countries, and as such have not attracted the commercial research funding that has been made available to more profitable world crops. There is thus a continuing need for the finance which has been so generously provided by donors to ICRISAT.

In the 20 years since it became the first center to be founded under the aegis of the the Consultative Group on International Agricultural Research (CGIAR), ICRISAT has considerable achievements to its credit. We now have established laboratories and research stations at several locations including the Headquarters at Patancheru, Andhra Pradesh, India, the ICRISAT Sahelian Center (ISC), at Sadoré near Niamey, Niger, and the SADCC/ICRISAT Sorghum and Millets Improvement Program (SMIP), at Matopos near Bulawayo, Zimbabwe (see cover photographs). At these and seven other locations our scientists and those of the national agricultural research systems (NARSs) concentrate on the basic, strategic, adaptive, and applied research needed to overcome the problems of farmers in our mandate region—the semi-arid tropics (SAT).

This commemorative publication shows the story of our successes and our ongoing work through photographs related to each of the four clauses of our mandate and contains a 'Milestones' section on the major events of ICRISAT's history.

ICRISAT serves as a world center for the improvement of grain yield and quality of sorghum, millets, chickpea, pigeonpea, and groundnut and acts as a world repository for the genetic resources of these crops.

Our first priority is to act as a world repository for the genetic resources of our mandate crops; sorghum, pearl and finger millets, pigeonpea, chickpea, and groundnut and our collections have come a long way since the genebank was started with short-term storage facilities. The long-term genebank (1) was inaugurated in 1991 and we now have the world's largest collections of germplasm of our mandate crops. These include 33108 accessions of sorghum from 88 countries, 22110 accessions of pearl millet from 44 countries, 16443 accessions of chickpea from 42 countries, 11910 accessions of pigeonpea from 54 countries, 12841 accessions of groundnut from 89 countries, and 7144 accessions of minor millets from 42 countries. The genebank also holds several hundred accessions of the wild relatives of our mandate crops.

This germplasm bank has been accumulated through gifts and exchanges with many international organizations and national programs, particularly those in India, and also by our scientists traveling throughout the SAT on collection missions, in association with representatives of the national programs, with whom ICRISAT shares all its collections (2).

1

2

But none of our collection efforts would be possible without the help of the local farmers and scientists who generously share their material, e.g., when collecting chickpea in Bangladesh in 1985 (3).

Collected material is evaluated for its potential use in breeding programs. Some accessions are very valuable like the zera-zera sorghums from Ethiopia and Sudan (4) that were recently converted from photoperiod-sensitive genotypes that grow tall and do not flower in the rainy season, to photoperiod-insensitive ones that do flower after a given number of days irrespective of when they are sown. Pearl millet collected in Togo in 1989 (5) has several good agronomic traits that are now being used to improve breeding populations.

We collect as near to the centers of crop diversity as possible, e.g., pigeonpea (6) originated in India where many wild species are found. Groundnut (*Arachis*) wild species are particularly useful in crop improvement work for the disease resistance genes they confer to the cultivated species. *Arachis* material collected in Brazil in 1982 (7a) is now growing at ICRISAT Center (7b) where it was visited in 1983 by its collector.

3

4

5

6

7a

7b

8a

The collected material shows an amazing range of variability in color, shape, and maturity (8 a,b,c). It is evaluated at ICRISAT Center and jointly with our NARSs collaborators in many countries such as; pearl millet in India (9a), finger millet in Zambia (9b), and pigeonpea in Kenya (9c). The results of these evaluations yield many benefits because the material identified provides the basic 'building blocks' from which improved cultivars are developed.

8b

8c

9a

9b

9c

ICRISAT develops improved farming systems that will help to increase and stabilize agricultural production through more effective use of natural and human resources in the seasonally dry semi-arid tropics.

The SAT is a harsh environment. For most of the year it is dry, but when the rains come, they often wash away precious soil (10). On soils that are not well drained, crops become waterlogged (11). Precious rainwater needs to be conserved and put to the best possible use by managing the land through a watershed approach (12) which today forms the basis of the Government of India's multi-million dollar development program. The watershed approach helps the farmer to make the best use of land relative to the growing season. Early work in Vertisol areas in India led to the development of the graded broadbed and furrow and fertility management system (13). This system involves surface draining the land sufficiently to allow two crops a year to be grown where previously farmers could only grow one because the soil was too heavy and wet to be worked in the rainy season (14). Over 10 years the average runoff of water from the traditional system was halved from 220 mm to 110 mm per hectare, meaning more soil moisture for the following crops. The broadbed and furrows if double cropped lost 1.1 t of soil per hectare per year, whilst the traditional flat system fallowed in the rainy season lost 6.6 t of soil.

Two crops a year with improved technology over 12 years yielded 3.2 t of maize or sorghum *and* 1.1 t of pigeonpea or chickpea per hectare but the traditional single postrainy-season crop yield was only *either* 0.6 t of sorghum *or* chickpea. This technology is now being put into practice in Ethiopia where conditions and soils are similar to those of Vertisol regions in India.

Intercropping has always been a component of many traditional farming systems (15a). Our early work on determining the best combinations of crops has helped farmers increase their yields and incomes (15b). In a long-term experiment over 8 years a cowpea/pigeonpea intercrop benefitted the succeeding cereal (sorghum) consistently by the nitrogen it added to the soil. This nitrogen was equivalent to about 40 kg of nitrogenous fertilizer per hectare. Intercropping pearl millet with cowpea has been studied at ISC from the mid 1930s (16a). In years when the rains come early, short-duration millet can be harvested while there is sufficient residual soil moisture to get a 'bonus' crop from intercropped cowpea (16b). This practice should help farmers in the Sahel to increase the sustainability of their farming systems, because it provides them with both food grains to eat and fodder to maintain their livestock throughout the dry season, and the cowpea enriches the soil by fixing nitrogen.

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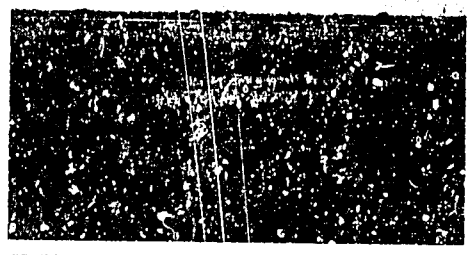
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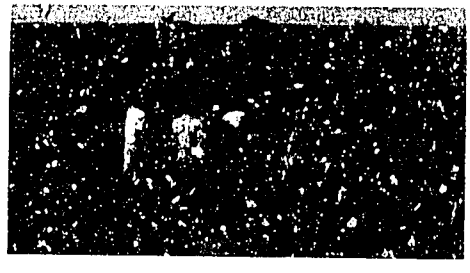
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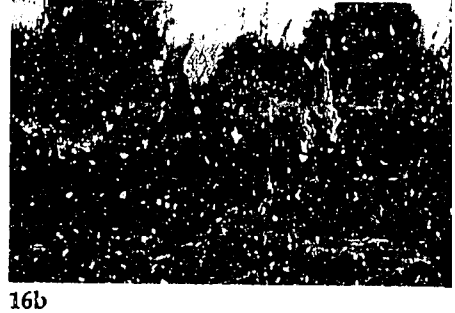
15a

15b

16a


16b

17a

17b

In the Sahel, wind erosion is a problem and wind-driven sand often buries and kills pearl millet seedlings (17a). Windbreaks have been shown (17b) to reduce soil drift. Among the tree species that can be used for windbreaks some provide fodder for livestock and domestic fuel in addition to conserving precious soil.

ICRISAT identifies constraints to agricultural development in the semi-arid tropics and evaluates means of alleviating them through technological and institutional changes.

Special problems restrict productivity in some areas and demand research attention for their resolution. For example, saline soils restricted chickpea growth at our Cooperative Research Station at Hisar (18). Nutrient deficiencies are serious growth-limiting factors, particularly on Alfisols in India and Africa. Acidity and aluminium toxicity in Latin American and some African soils affect the growth of sorghum. We have been able to develop cultivars (19) that are acid-tolerant and can produce better crops than the local varieties in this region.

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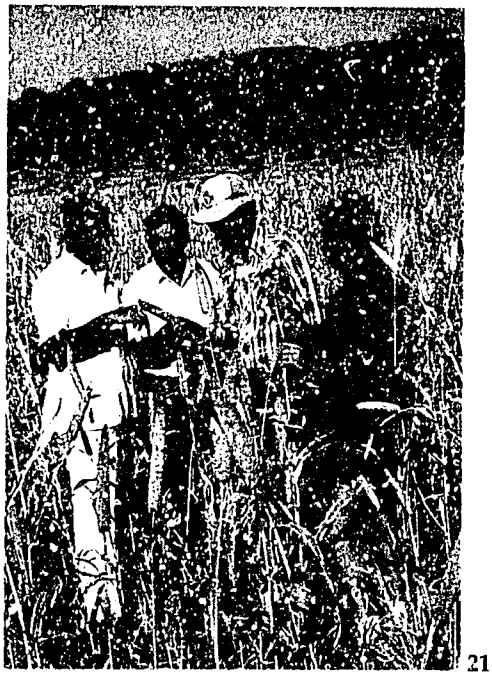

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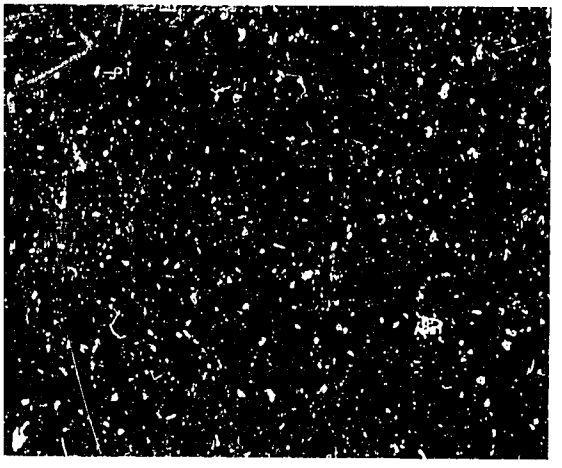
Drought is a universal problem throughout the SAT. Some genotypes are more affected than others (20a). We use various techniques to screen material under controlled conditions, e.g., in this rainout shelter (20b) and under line-source irrigation (20c) at ICRISAT Center. We are also studying the physiology of the plants to determine the mechanisms involved in drought tolerance or resistance. The results of these efforts culminate in the development of cultivars that can withstand drought like pearl millet ICTP 8203 that has been released as Okashana 1 in Namibia (21) and is doing well in farmers' drought-prone fields.



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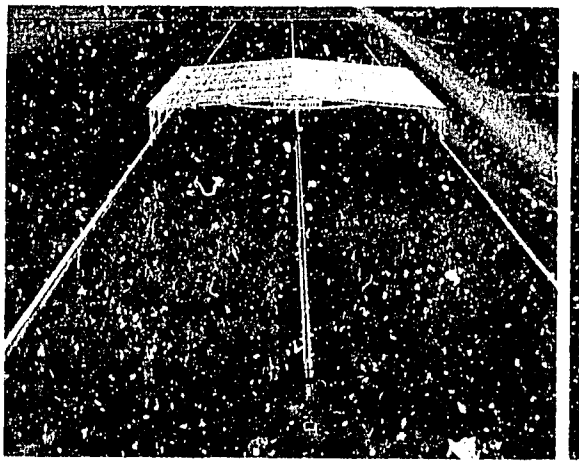

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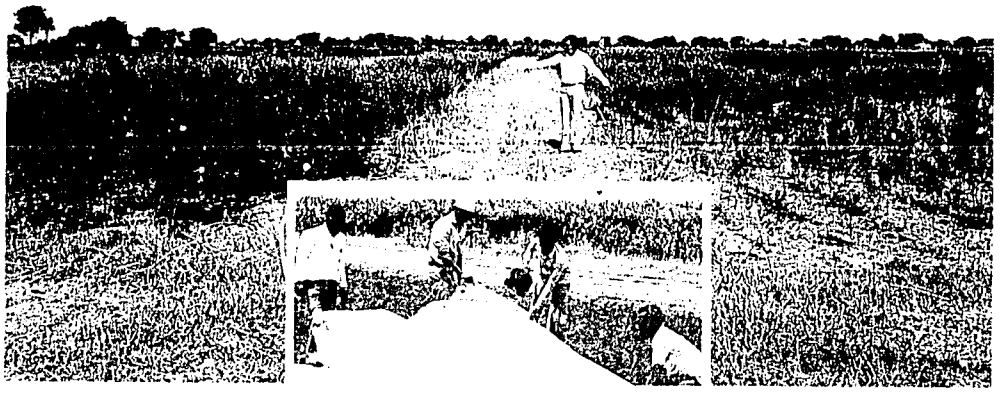

23a

Biotic stresses are many and varied; they involve insect pests, pathogens, and weeds. Techniques that overcome several constraints at one time are available, e.g., soil solarization that involves covering the soil surface with polythene sheets (22, inset). The resulting increased temperatures under the cover reduce populations of soilborne nematodes, fungi, and insects. Crops grown in solarized soil (22, left) thrive better than those in nonsolarized soil (22, right).

A problem that affects many cereal crops is that caused by the parasitic weed *Striga* which parasitizes crop plants' roots depriving them of water and nutrients. A heavy attack combined with early drought can devastate a sorghum crop (23a). The annual losses to sorghum worldwide from this problem are estimated at U.S.$ 764 million. A genotype (SRN 39) originally from Nigeria, that was sent to Sudan in an ICRISAT screening nursery proved to be resistant to *Striga* under Sudanese conditions. It was used to develop a resistant variety released as Mugawin Buda 1 by the Sudanese national program, and is now being multiplied to provide seed for farmers (23b).

23b

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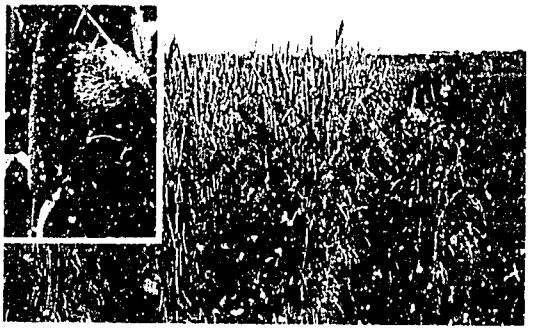

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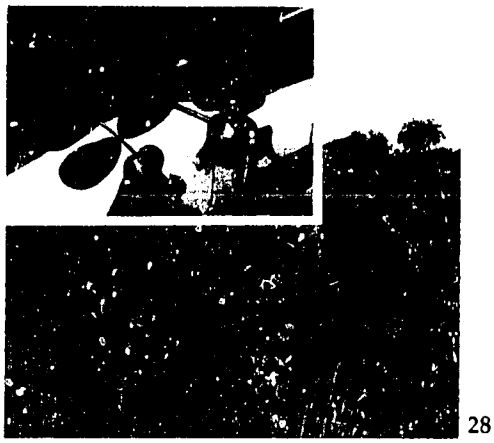
Downy mildew is a crippling disease of pearl millet (24, inset) but luckily some genotypes have resistance (24, left). Using these and screening techniques (25) that use seedlings and produce results more rapidly in the laboratory than in the field ICRISAT developed WC-C75 (26) from a composite that originally came to ICRISAT Center from Nigeria. This variety was released by India in 1982 and by Zambia in 1987 as ZBMV 871. Private and public sector seed companies are now marketing WC-C75 very successfully (27) and farmers benefit from increased yields. Our linkages with the private and public sectors are essential for the transfer of technology to farmers, because it is the seed companies who use our material and produce seed in large amounts for sale to farmers. Recently an easily produced topcross hybrid of pearl millet, ICMH 88088 that resists both downy mildew and drought and is a very stable performer, has been developed by our breeders – evidence that we are continuing to stay ahead of the downy mildew pathogen.

Groundnut rust is endemic in most of the world's groundnut-producing countries. Techniques have been developed (28, inset) that enable us to work on the pathogen and the plants' mechanisms of resistance to it. These led to the release by India of rust-resistant ICGS 44 now being grown by farmers in Karnataka (28).

Groundnut rosette virus (29) is transmitted by aphids. It causes severe losses to crops across the African continent, but does not occur in Asia. Wild *Arachis* germplasm collected in South America was used to produce interspecific hybrids using cytogenetic and tissue-culture techniques at ICRISAT Center (30). When over 1000 genotypes were screened at the SADCC/ICRISAT Groundnut Project based at Chitedze Research Station near Lilongwe, Malawi, one of these interspecific hybrids showed resistance (31). It will be used in breeding programs to transfer the resistance to genotypes with other good traits.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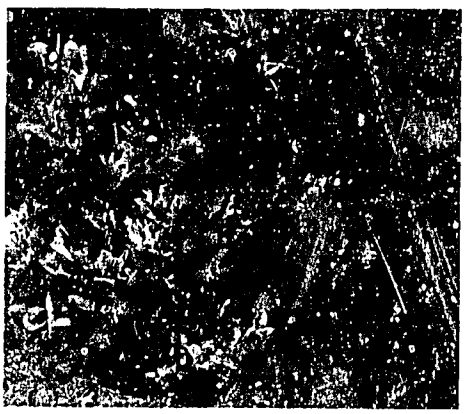
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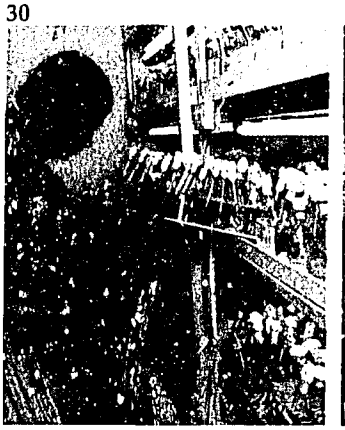

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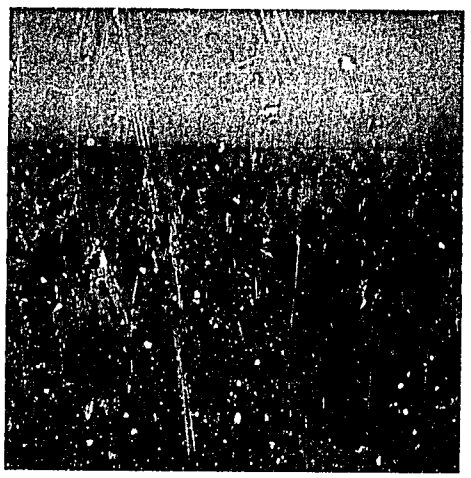
ICRISAT and our sister institute the International Center for Agricultural Research in the Dry Areas work together on kabuli chickpea and have developed ILC 3279 (32, right) that is cold-tolerant and resists ascochyta blight (32, left). The variety was released by Cyprus in 1984, and later by Syria, Tunisia, and Iraq. The development of cold-tolerant lines makes it possible to sow chickpea during winter in the Mediterranean region instead of in the spring; yields from winter-sown crops are much higher than those from spring-sown crops. Chickpea can also be killed by fusarium wilt. After screening genotypes in wilt-sick plots (33, left), ICRISAT developed ICCV 2, the shortest-duration chickpea and first wilt-resistant kabuli for lower altitudes (33, right). It was released in Andhra Pradesh as Swetha in 1989.

The *Fusarium* fungus also attacks pigeonpea (34, left)–but we now have genotypes like ICPL 87119 (34, right) that resist both wilt and sterility mosaic disease.

35

Sorghum midge (35, left) attacks developing grain, resulting in chaffy florets (35, center) which do not fill or mature (35, right). ICSV 745 (36) has resistance and was released in 1989 by the Karnataka State Department of Agriculture for cultivation in midge-endemic areas where farmers appreciate the opportunities it affords to produce midge-free crops.

Some problems are yet to be fully solved. *Helicoverpa armigera* (37, inset) has been studied by our entomologists for many years. Its larvae damage both pigeonpea and chickpea by boring into their pods. Pheromone traps (38) monitor adult populations in a network that spans south Asia and are used as a component of integrated pest management programs. Meanwhile, our breeders have developed pigeonpea ICPL 332 (37), that has good resistance to the caterpillars and was released in 1989 in Andhra Pradesh, an area where *Helicoverpa* damages both pulses and cotton causing severe economic losses.



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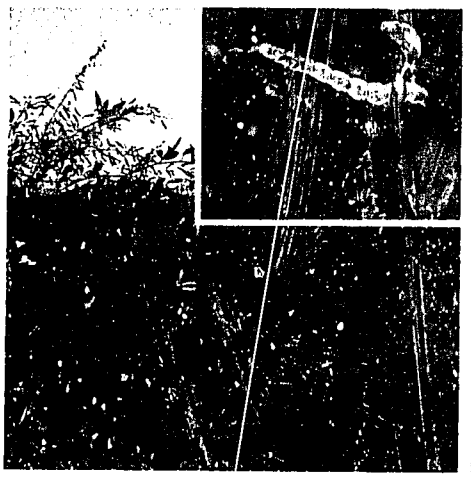

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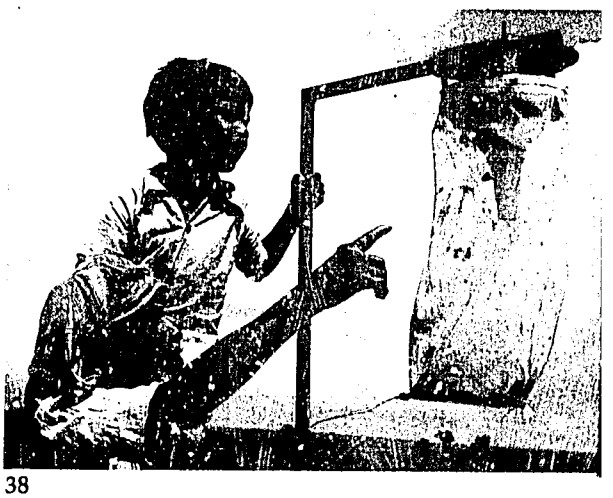

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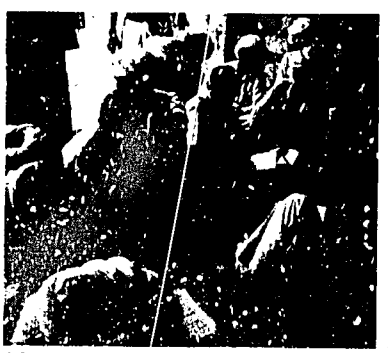
39a

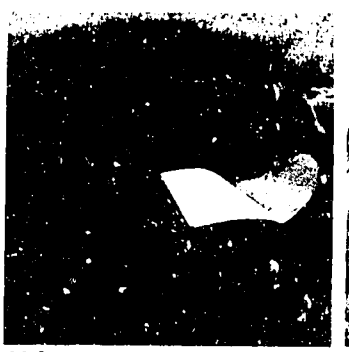
No change in technology or institution should be suggested unless the traditional system used by farmers is fully understood. From the time the Institute started work until the present, our economists have spent many months talking with farmers in the villages of India: Maharashtra, 1977 (39a) and 1985 (39b), Rajasthan 1990 (39c); and Africa, Burkina Faso 1980 (39d), and Niger 1982 (39e).

Major areas of impact of economics research at ICRISAT include production relations, nutritional status, risk, poverty, and common property resources. Such research has led to a greater conceptual understanding of agricultural development in the SAT, has influenced technology design, and has been an input into policy formulation in multilateral lending agencies, such as the World Bank. Much of this research is based on village-level studies (VLS) which have continued to bear fruit several years after the data were collected.

39b



39c



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Collection of household records (40) from benchmark sites has provided a cost-effective vehicle for marshalling analytical talent in mentor institutes to address a range of developmental issues in the SAT of India and West Africa. More than 25 Ph.D. theses have been based on our source material.

Economics research questioned the relative priority which ought to be accorded to breeding for improved protein content and quality, versus improved yield and stability. This involved nutrition studies in the VLS which showed protein deficiencies were not so important as energy, vitamin, and mineral deficiencies (41a,b). More recent economics research shows that income growth does *not* result in substantially enhanced nutritional status. These findings imply that breeders should comply with the poor's preference for higher quality food attributes, as well as selecting for higher-yielding cultivars, to ensure that their products would be eaten by the poor (42).

Analysis of the VLS data also shows that improved yield stability does not appreciably lessen instability in household incomes. Subsequent studies on drought have shown that households in poorly endowed SAT environments can effectively adjust to such risks. Agricultural researchers should therefore focus attention on increasing long-term productivity in preference to attempts to decrease variability.

42

Our research on trends in the size, productivity, and use of common property resources was the first of its kind in India (43). It has had a catalytic effect in focusing attention on pressing researchable problems in the SAT and has stimulated other researchers to carry out similar studies. Techniques for analyzing climatic data developed at ICRISAT have been used to guide the testing of appropriate germplasm in different agroclimatic zones. Appropriate emphasis can be given to the length of the growing season, exposure to drought at different stages of crop development, and selection for biotic stresses. This work, which began in India, has been extended to Africa and Asia. Agroclimatic research is now considered an essential ingredient in any dryland resource management program.

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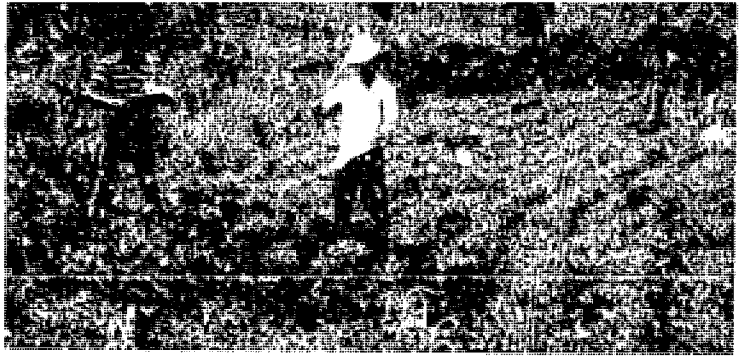

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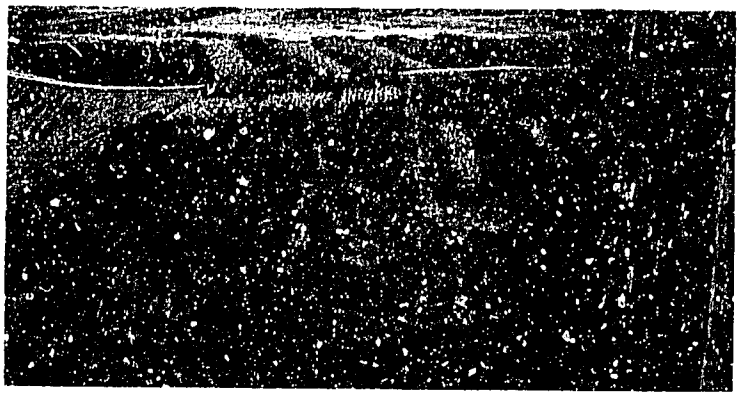
An essential part of our approach is the cooperation generated in the field between farmers and scientists. For example, the joint surveys to identify insect pests (44) conducted through the Asian Grain Legumes Network in Thailand in 1987, and the joint working group on peanut stripe virus that met in Indonesia (45) and involved the Peanut Collaborative Research Support Program, the Australian Centre for International Agricultural Research, ICRISAT, and the NARSs of China and Indonesia.

Identified problems find a range of solutions, e.g., the lack of fodder for farm animals in southern Africa can be alleviated by growing a pearl millet/napier grass hybrid developed at SADCC/ICRISAT SMIP. The interspecific hybrid is finding acceptance among the farmers of the SADCC region. Sorghum flour can be made into both cookies and traditional *chapathis* to extend its use as a convenience food for city dwellers (46), and its stems can be used to make particle board for use in construction industries in areas where wood is scarce. Pigeonpea is very versatile, it can be used as a substitute for mung bean to make noodles that are a popular food in southeast Asian countries (47). When used as a component of agroforestry systems (48), its stems provide up to 4 t of fuel wood per hectare–very valuable for cooking in the fuel-scarce SAT (49). Groundnut, a vital source of protein and oil has long been eaten as a traditional snack food (50) but now it can be processed and preserved in many ways. Growing confectionery groundnuts offers the chance to augment incomes via the export markets to a wide range of countries who formerly only grew groundnut for their home markets (51).



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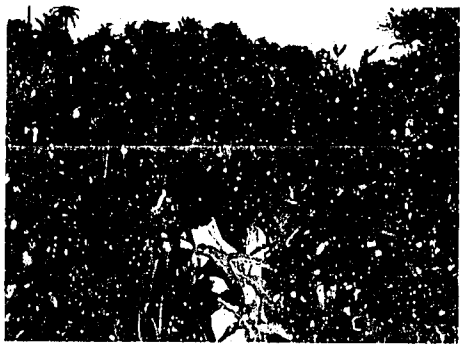
ICRISAT assists in the development and transfer of technology to the farmer through cooperation with national and regional research programs, and by sponsoring workshop and conferences, operating training programs, and assisting extension activities.

ICRISAT does not release the varieties, hybrids, breeding material it develops directly to farmers. They are shared with NARS scientists and tested on research stations and in farmers' fields by national programs throughout the SAT. If they do well, they are approved for release by the national programs. Over the years we have made many such contributions. Only a few are mentioned here: sorghum variety SPV 351 with resistance to several leaf diseases released as CSV 11 by India in 1984; and sorghum hybrid SPH 221 released by India in 1986 as CSH 11 (52). The first groundnut to be released by India was ICGS 11 in 1986, since then many others have followed, including BARD 699, a composite variety derived from ICRISAT selections that was released by Pakistan in 1989 (53). Chickpea Shwve Kyay Mon was released by Myanmar in 1986 (54a), Mariye by Ethiopia in 1988 (54b), and Nabin by Bangladesh in 1987 (54c). ICPL 87 a short-duration pigeonpea was released as Pragati by India in 1986 (55); and ICPH 8 the world's first pigeonpea hybrid released by India in 1991. It is now in commercial seed production at Nandikottur in Andhra Pradesh (56).



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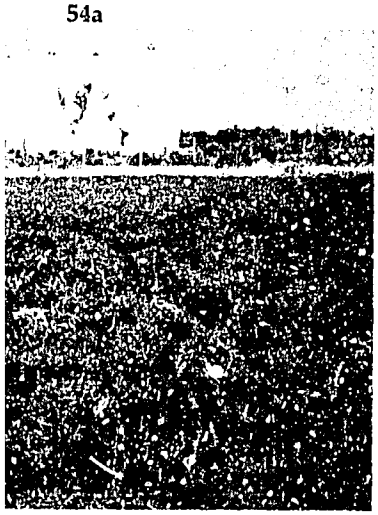

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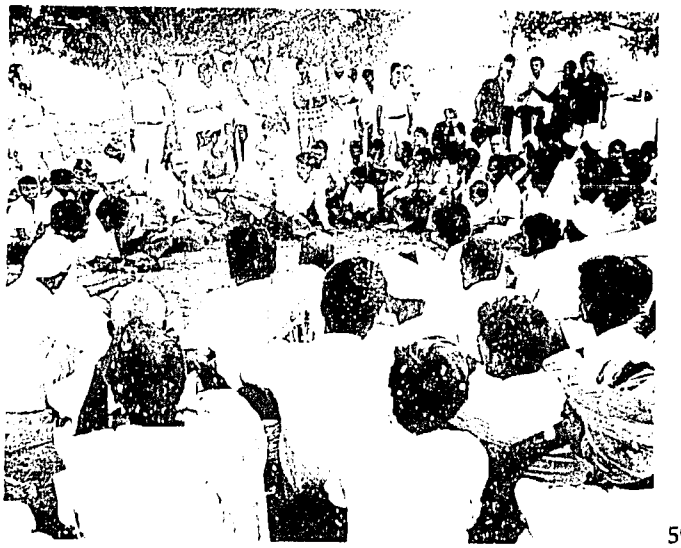
- *Over 24 kabuli ICRISAT/ICARDA chickpea cultivars had been released under 41 names in 16 countries, and at least 17 desi and kabuli chickpea cultivars from ICRISAT Center in 6 countries by 1991.*
- *A third of the pearl millet crop grown in India is derived from improved genotypes developed at ICRISAT.*
- *Over 40 ICRISAT sorghum genotypes are growing in farmers' fields in the Americas, Africa, and Asia.*
- *The world's first pigeonpea hybrid to reach farmers' fields was ICRISAT's ICPH 8.*
- *Over 20 ICRISAT groundnut genotypes are being grown by farmers in the Americas, Africa, and Asia.*

Farmers are the key to our success – we go to their fields (57) and they in turn come to ours at all our locations; e.g., ICRISAT Center 1979 (58). The feedback we receive from them is vital to our research.

National program scientists also visit us, e.g., the Nigerians who visited our WASIP—Nigeria trials; the twenty-five scientists from 11 countries and 7 international organizations who met in 1978 to discuss the Agroclimatological Research Needs of the Semi-Arid Tropics; and the 54 delegates from 13 countries who came to ICRISAT Center in 1979 for an International Workshop on Socio-economic Constraints to Development of Semi-Arid Tropical Agriculture (59).

Regional meetings such as the one for grain legumes in eastern Africa held in Ethiopia in 1986 (60) can be very effective; that meeting resulted in collaborative work on pigeonpea starting in the region, and by 1991 we had established trials and locally adapted material growing in Kenya.



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Our workshops range from country-specific, e.g., Phosphorus in Indian Vertisols (61), to the Regional Groundnut Workshop for Southern Africa, held in 1988 in Lilongwe, Malawi, and the International Workshop on Farming Systems that ICRISAT hosted in 1986 for all the CGIAR Centers.

57

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National systems and research institutions are only as good as their staff can make them. Human resource development is essential if the research capabilities of national programs are to be developed. ICRISAT Center has over the years provided learning opportunities to over 2234 trainees from 89 countries.

Research scientists and technicians spend varying lengths of time with us. They conduct research, work in experimental fields (62a) and laboratories (62b), and assist our scientists in VLS (62c). At all our locations opportunities to learn and participate in our projects are provided to students at all levels, and to national scientists who come to share their knowledge and experience with us. Some of these are involved with special projects, e.g., the Government of Japan work on phosphorus nutrition of grain legumes (63). ICRISAT provides facilities for students studying for higher degrees to do their project work, and also assists NARS scientists to study for higher degrees, e.g., the SADCC/ICRISAT SMIP assists scientists from the SADCC region to study for higher degrees in USA, Canada, and Brazil.

62a

62b

62c

63

Our material and technologies also reach farmers through international extension efforts such as those made by Sasakawa Global 2000 in Tanzania (64) in collaboration with our Eastern Africa Regional Cereals and Legumes program.

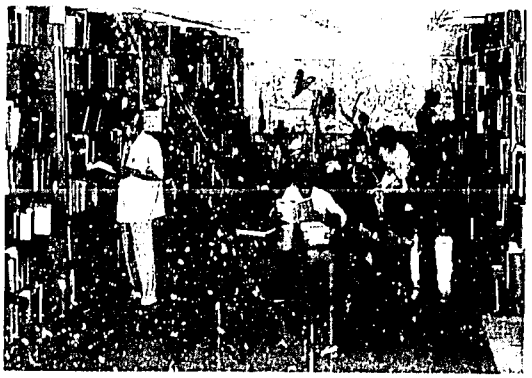
Some efforts are special. In 1987, ICRISAT was requested by the Government of India to help extend its groundnut varieties and production technologies to farmers in India in an attempt to increase oilseed production. The efforts over several years by the Legumes On-Farm Testing and Nursery Unit working through 141 on-farm trials in eight states produced quite dramatic improvements in groundnut yields (65a) compared with the local system (65b).

64

65a

65b

66



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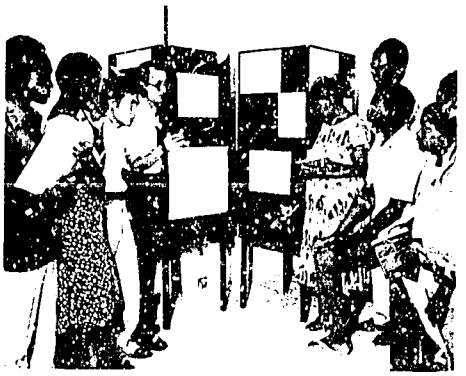
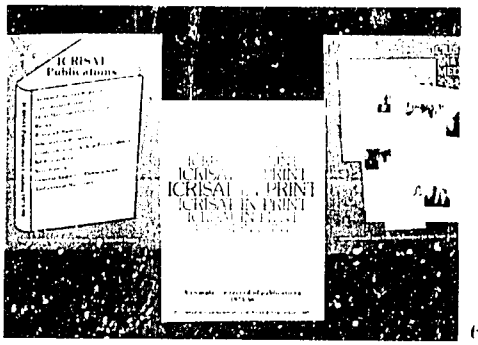




68a

68b

Our Library (66) provides a comprehensive background to our scientists' work it has access to the latest on-line information from several of the world's premier agricultural databases and it provides support to over 370 scientists in the NARSs (67) through the Semi-Arid Tropical Crops Information Service. This service means that scientists isolated from libraries can still keep abreast of their peers by having the latest published material on their research topics provided free to them at regular intervals.

We reach the public through a range of media: by our publications, by those of our scientists in the world scientific literature, and by press releases and magazine stories (68a, b, c). We also encourage our scientists to broadcast on radio (69a, b) and television (69c) to reach the widest possible audiences.

68c

69a

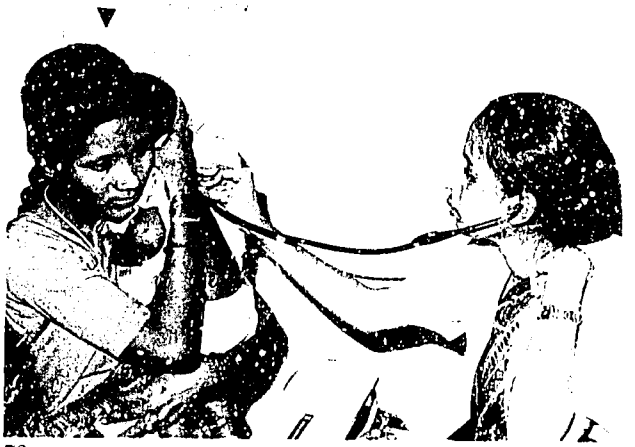
69b

69c

ICRISAT also tries to help the community in which it works. ICRISAT Ladies Association for the Welfare of Women and Children founded in 1980 at ICRISAT Center, organizes self-help programs (70a), and supports education (70b) and health programs (70c) for ICRISAT employees and their children.

70a

70b



70c

ICRISAT—The Years Ahead

Nearly one-third of the 800 million inhabitants of the SAT live in poverty. That fact, together with the periodic recurrence of drought and famine, guarantee the region's high priority on the list of donor concerns.

ICRISAT's mandate crops continue to be the important food crops of the SAT. Our scientists are dedicated to the continued development of improved cultivars and breeding lines to meet the food needs of the ever-increasing population. Germplasm enhancement, and concentration on combating globally and regionally important yield-reducing stresses will continue to be our main areas of emphasis.

Within the fragile environment of the SAT, it is vital that the resource base on which crops are produced is not damaged in the push for higher yields. ICRISAT is very conscious of the need to maintain such sustainability, and is working on the development of farming systems that make more efficient use of low inputs. These new systems aim to provide for the timely application of water while enriching nutrient-poor soils and preventing erosion from runoff in the unpredictable, intensive rainstorms common to much of the SAT.

Women will continue to play a vital role in agricultural development in the SAT as farmers, field workers, homemakers, and increasingly, as research technicians and scientists. We are aware of the considerable barriers to full participation which women still face in many countries and we encourage the removal of those obstacles.

We will look for new skills in social sciences to support the shift towards research on institutional constraints, gender issues, and evaluation of research achievements. Constant or declining budgets increase the demand for formal modeling and other analytical techniques when allocating resources for research.

We will continue to assess the usefulness of new technologies to increase the efficiency of our research. Biotechnology, for instance, will become increasingly useful in our crop improvement research.

Assessing the reasons for a project's success or failure is essential when planning future research projects. Because we must become even more cost-effective and accountable, we will conduct impact assessment studies in full cooperation with scientists in NARSs.

We have developed, but must improve upon, methods for determining priorities in strategic resource management research. Particular emphasis will be placed on the importance of quantification, and will include the development of long-term experiments involving both cereals and legumes.

We believe we work well with national programs, but we must reach out farther to establish working partnerships that are appropriate to what is possible and to our partners' resources, priorities, and national policies. Even though ICRISAT programs have trained more than 2000 scientists and technicians to help improve food production in many countries, some national programs are still unable to maintain effective research programs. We will work for better coordination of training programs across centers and with the stronger national programs. We will encourage stronger NARSs to provide leadership in collaborative research networks and we shall continue to support the NARSs in smaller countries. We shall maintain and strengthen our information management and exchange services and capabilities.

ICRISAT is an effective research and training institute of scientific excellence and with measurable impact. We have worked hard to make it so. We hope to receive the support and contributions necessary to achieve our plans, with the CGIAR coordinating support for most of our core activities.

The role ICRISAT will retain, despite dynamic change in its programs and projects, is that of a provider of new scientific methodology and improved germplasm of its mandate crops, and as a coordinator of scientific and information exchange. We expect to continue to be a vital contributor to agricultural development well into the 21st century. These strategies will enable ICRISAT to fulfill its global mandate and to maintain its reputation as a center of excellence.

Milestones

1972 – Memorandum of Understanding for the formation of ICRISAT signed between the Government of India and the Consultative Group on International Agricultural Research (CGIAR) on 28 March
- City office opened 1 April in what is now ICRISAT Guest House
- Property title for ICRISAT Center transferred 27 April.
- First international staff appointed
- First experimental trials sown, 24 June.

1973 – First Indian national scientists appointed

1974 – First group of In-Service Trainees arrived.
- Laboratories established in Banjara Hills, Hyderabad.
- First international workshop on Farming Systems held, 18-21 November

1975 – Hon. Mrs Indira Gandhi, Prime Minister of India laid the Foundation Stone, ICRISAT Center, 11 January
- Village level studies initiated in India, May.
- Regional cooperative program for West Africa launched; work started in Upper Volta (now Burkina Faso)

1976 – Establishment of ICRISAT West Africa Sorghum and Pearl Millet Improvement Project, based at Dakar, Senegal.
- Groundnut added as the fifth mandate crop.
- Dedication of Lake ICRISAT, April
- Visit of R.F. McNamara, President of the World Bank, November.

1977 – Decision to include minor millets in germplasm collections, March.

1978 – Establishment of Core Program in Africa.
- First Quinquennial Review.
- Establishment of Export Certification Plant Quarantine Laboratory at ICRISAT Center.
- Initiation of cooperative research project with All India Coordinated Research Project for Dryland Agriculture (AICRPDA) on watershed development and management.

1979 – Inauguration of new facilities at ICRISAT Center, by Hon Charan Singh, Prime Minister, India, 30 August
- Establishment of Genetic Resources Unit.

1980 – Establishment of Electron Microscopy Unit.

1981 – Memorandum of Understanding signed with Government of Niger for the establishment of ICRISAT Sahelian Center (ISC) at Niamey.
- ISC became operational.
- Governing Board Meeting held at Ouagadougou, Burkina Faso.
- First release of an ICRISAT crop variety, pearl millet Ugandi (Sudan).

Signing the Constitution of ICRISAT, 5 July 1972. Seated left to right; M.S. Swaminathan, Vice Chairman, ICRISAT Governing Board, R.H. Demuth, World Bank, D.L. Umali, FAO, C.F. Bentley, Chairman, ICRISAT Governing Board (June 1972 to October 1983). Standing; R.W. Cummings, Director, ICRISAT (1972-77).

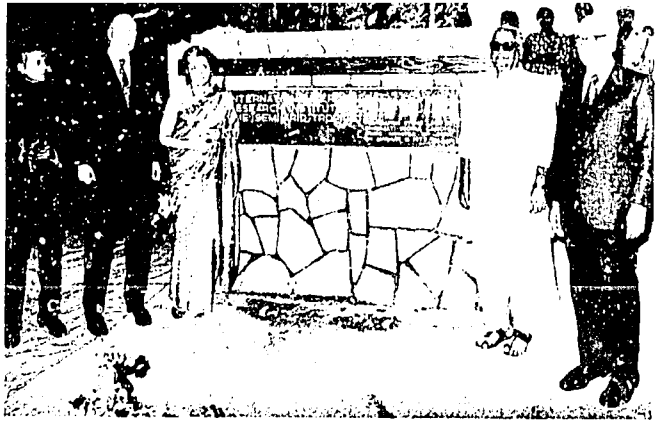
Sowing the first trials, ICRISAT Center, 1972.

The first trainees from Nigeria at ICRIS with A.S. Murthy, E.G. Lawrence, M. R.W. Cummings, and J.S. Kanwar, 1974

R.F. McNamara, President, World Bank, with Associate Director, J.S. Kanwar, during a visit to Manmool village on ICRISAT Campus, November 1976.

R.W. Cummings performing the ground-breaking ceremony to start construction of ICRISAT Center, 1975.

The first workshop, Ritz Hotel, Hyderabad, 1974.



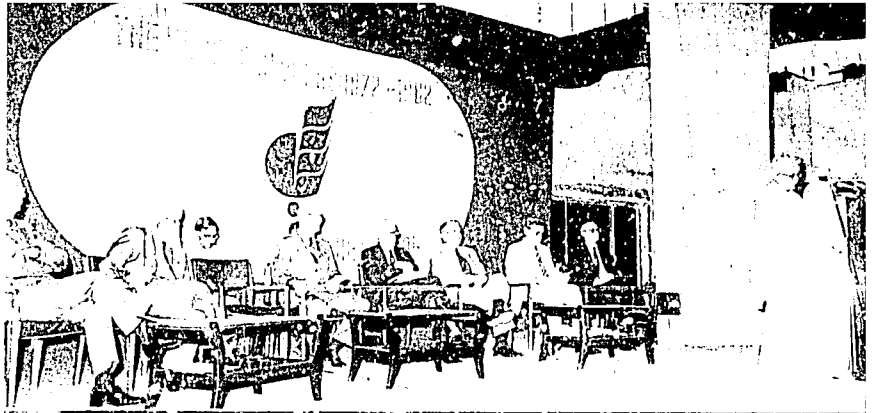
Laying the Foundation Stone for ICRISAT Center 11 January 1975. Her Excellency Hon. Mrs Indira Gandhi, Prime Minister of India, and J. Vengal Rao, Hon. Chief Minister of Andhra Pradesh.

1982 – ICRISAT celebrated its 10th anniversary.
- Release of four sorghum varieties (People's Republic of China), hybrid Hageen Durra 1 (Sudan); and pearl millet WC-C75 (India).
- Establishment of SADCC/ICRISAT Groundnut Project, Lilongwe, Malawi.
- Establishment of Comisión Latinoamericano de Investigadores en Sorgo (CLAIS).

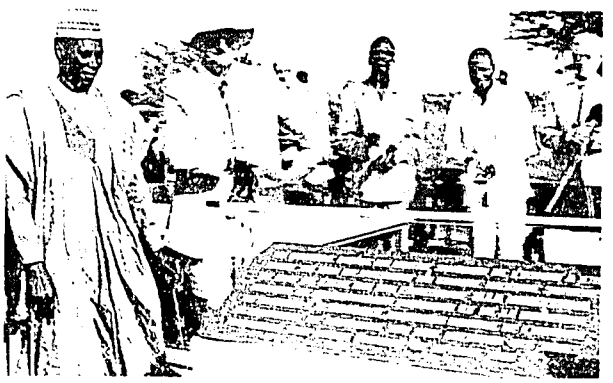
1983 – Illa Maikassoua, Hon. Nigerien Minister for Higher Education and Research, laid the Foundation Stone of ISC, 16 August.
- H.M. Queen Elizabeth II and H.R.H. Prince Philip, Duke of Edinburgh, visited ICRISAT Center, 19 November
- Release of sorghums ZSV 1 (Zambia), ISIAP Dorado, and San Miguel 1 (El Salvador); chickpea ICCV 1 (India); and pigeonpea QPL 1 (Australia).

1984 – Establishment of SADCC/ICRISAT Sorghum and Millets Improvement Program (SMIP).
- SAFGRAD/ICRISAT Regional Sorghum and Millet Project for Eastern and Southern Africa, started at Katumani, Kenya.
- Release of sorghums ICSV 1 (CSV 11) (India), ESIP 11 (IS 9302), and ESIP 12 (IS 9323) (Ethiopia); chickpea ILC 3279 (Yialousa) (Cyprus).

1985 – Construction of SMIP office and laboratory buildings at Matopos, Zimbabwe started.
- Release of sorghum hybrid ICSH 1 (India), ICSV 112 as SV 1 (Zimbabwe), ICTA Mitlan 85 (Gautamela), M 62650 as Sureño (Honduras), Nica-sor (T-43) (Nicaragua); pearl millet varieties, ICMV 4 as ICMS 7703 (India), ICMV 5 as ITMV 8001, ICMV 6 as ITMV 8002, ICMV 7 as ITMV 8304 (Niger); chickpeas ICCC 32 (ICCV 6) (India), ICRISAT/ICARDA cultivars ILC 720 as Fardan, ILC 200 as Zegri, ILC 254 as Almena, ILC 2555 as Alcazaba (Spain); pigeonpeas ICP 7035 as Kamika (Fiji), Quantum (Australia).



Celebrating 10 years of ICRISAT, 1982.



Hon. Minister for Higher Education and Research, Niger, and J.L. Dillon, Chairman, ICRISAT Governing Board (November 1983-March 1986) laying the Foundation Stone for the ICRISAT Sahelian Center, Sadoré, 16 August 1983.

Her Majesty Queen Elizabeth II with L.D. Swindale, Director General ICRISAT (1977-1991), during her visit to ICRISAT Center, November 1983.

1986 – First meeting of Governing Board in Zimbabwe, 14-18 Mar.
- ICRISAT Management reorganization.
- Memoranda of Understanding signed with Bangladesh and Burma (now Myanmar).
- Establishment of Asian Grain Legumes Network (AGLN), Eastern Africa Regional Sorghum and Millets Network (EARSAM), West and Central African Sorghum Research Network (WCASRN).
- Hon. Seyni Kountché, President of Niger visited ISC, 2 Oct.
- Release of sorghum hybrid CSH 11; three pearl millet hybrids ICMH 451 (MH 179), ICMH 501 (MH 180), and ICMH 423 (MH 143) (India); chickpea cultivars Shwye Kyay Mon (Myanmar) ILC 482 as Ghab 1 ILC 3279 as Ghab 2 (Syria), ILC 3279 as Chetoui, FLIP83-46C as Kassab, Be-sel-81-48 as Amdoun 1 (Tunisia); ILC 195, and ILC 482 as Gun Cy Sarisi 482 (Turkey); pigeonpea varieties ICPL 87 as Pragathi, and ICPV 1 as Maruthi (India); and groundnut variety ICGS 11 (India).

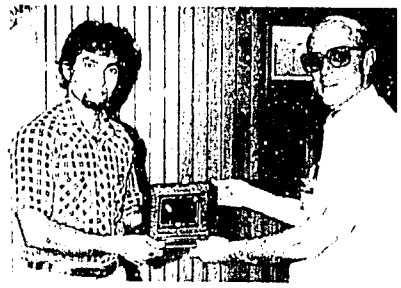
1987 – Memoranda of Understanding signed with Nepal, Nigeria, and Sri Lanka.
- Establishment of Legumes On-Farm Testing and Nursery Unit (LEGOFTEN).
- Release of sorghum varieties Blanco 86, UANL-1-187, UNAL-1-287 (Mexico); pearl millet variety WC-C75 as ZPMV 871 (Zambia); chickpea ICCL 81248 as Nabin (Bangladesh), ICCV 1 (ICCC 4) as Sita (Nepal); ILC 464 as Kyrenia (Cyprus); ILC 172 as Califfo, ILC 3279 as Sultano (Italy), ILC 195 and ILC 482 (Morocco), ILC 1335 as Shendi (Sudan); and pigeonpea variety Megha (Indonesia).

1988 – Establishment of Cooperative Cereals Research Network (CCRN).
- Operations in Burkina Faso terminated.
- Memorandum of Understanding signed with Peoples' Republic of China.
- Release of sorghums ICSV 112 (CSV 13), SAR 1 (ICSV 145); pearl millets MP 124 (ICTP 8203), ICMA 841 and ICMB 841 (India); INIAP 201 (Ecuador), Agroconsa I (El Salvador); chickpeas ILC 482, ILC 3279 (Algeria), ILC 202 and ILC 411 (China), ILC 482 (TS 1009) and FLIP 81-293C (TS 1502) (France), ILC 237 (Oman), JG 74 as Radha (Nepal), Mariye (Ethiopia); pigeonpeas Quest (Australia), ICP 9145 as Nandolo Wansawara (Malawi); and groundnut ICGV 87128 (ICGS 44) (India).

1989 – Inauguration of ISC, Niamey, 7 March and Governing Board Meeting at ISC, 5-7 March.
- Foundation Stone laid for ICRISAT regional research complex for sorghum improvement in West Africa by Hon. Cheik Bougadary Bathily, Cabinet Director of the Malian Ministry of Agriculture, Samanko, Mali, 11 August.
- Memorandum of Understanding signed with Vietnam.
- Release of sorghum varieties ICSV 112 as SV 1 (Zimbabwe), M 62641 as Costeño 201 (Mexico), SDS 3220 as Macia, and IS 8571 as Mamouhe (Mozambique), WSV 387 as Kuyuma, WSV 187 (IE 2929) as Sima (Zambia), sorghum hybrids MMSH 413 and MMSH 375 (Zambia), SPV 351 (Malawi); germplasm lines IS 2391 as SDS 1513, and IS 3693 as SDS 1594-1 (Swaziland); pearl millets ICTP 8203 as Okashana 1 (Namibia), ICMV 82132 as Kaufela (Zambia); finger millets IE 2929 (Zambia); chickpeas ICCV 2 as Swetha, and ICCC 37 as Kranthi, (India), ILC 482 as Janta 2 (Lebanon), ILC 5566 as Elmo and FLIP 85-17C as Elvar (Portugal); pigeonpea selection ICPL 322 as Abhaya, and ICPL 151 as Jagriti (India); and groundnuts ICGV 87141 (ICGS 76), (India), and BARD 699 (Pakistan).

1990 – Inauguration of EARCAL program facilities at Kiboko Research Station, Kenya Agricultural Research Institute (KARI), 25 June.

President Seyni Kountché of Niger (extreme right) in discussion with ICRISAT scientists R.W. Gibbons, Executive Director, ISC (Centre) and C. Renard, Team Leader, Resource Management Program, (2nd from right) during his visit to ISC, 7 October 1986.



C.L. Paul (IASIP) and L.D. Swindale with award presented to ICRISAT by Agroconsultures, S.A. de C.V., for help in the development of Agroconsa I, 1988.

F.V. McHardy, Chairman, ICRISAT Governing Board (April 1986-March 1989), at the inauguration of ICRISAT Sahelian Center, 7 March 1989.

Field day to commemorate inauguration of EARCAL facilities at Kiboko, Kenya

- Establishment of West and Central African Millet Research Network (WCAMRN).
- Release of sorghum varieties Pacifico 301 (Mexico), Pinolero 1 (Nicaragua), germplasm selection E 1966 as NTJ-2 (India); chickpea varieties ICCV 6 as Kosheli, and ICCV 82108 as Kalika (Nepal), ILC 482 as Jubeiha 2 and ILC 3279 as Jubeiha 3 (Jordan); FLIP 85-7 as Damla 89, FLIP 85-135C as Tasova 89 (Turkey) pigeonpea variety ICPL 87 (Myanmar); groundnut varieties ICGS 37, ICG(FDRS) 10, ICGS 1, ICGS 5, (India), germplasm line ICG 7794 (Ethiopia), ICGMS 42 (Malawi).

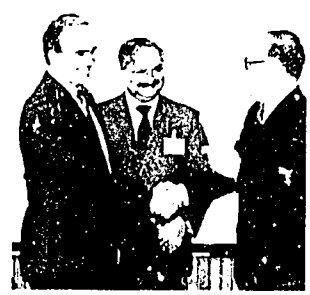
1991
- Release of world's first pigeonpea hybrid ICPH 8 (India).
- Inauguration of West Africa Sorghum Improvement Program (WASIP) building complex, Samanko, Mali, by Hon. Moulaye Haidara, Malian Minister of Agriculture, 14 February.
- The 2000th participant in ICRISAT Center Human Resources Development Programs arrived, 1 April.
- Memorandum of Understanding signed with USSR, April.
- L.D. Swindale honored with Padma Bhushan by H.E. R. Venkataraman, President of India; and with a golden *Ciwara* (Great Cultivator), by the agricultural researchers of Mali.
- Preparation of *Pathways to Progress*—ICRISAT's Strategic Plan for the Nineties.
- Establishment of monoclonal antibodies laboratory at ICRISAT Center funded by Asian Developement Bank (AsDB).
- Establishment of insecticide-resistance testing laboratory at ICRISAT Center in collaboration with Natural Resources Institute (NRI), UK.
- Development of Vertisol watersheds collaborative project with International Livestock Centre for Africa (ILCA) and Institute of Agricultural Research (IAR) in Ethiopia.
- Malian Government and USAID express gratitude for ICRISAT's contribution to Malian agriculture, upon termination of ICRISAT/Mali Bilateral Program, May.
- Release of *Striga*-resistant sorghum varieties Mugawim Buda 1 and Mugawim Buda 2 (Sudan), M 90812 as Tropical 401, and PP 290 as Perlita (Mexico); pearl millet variety IKMV 8201 (Burkina Faso), ICMV 155 (India); chickpea lines FLIP 82-105C as Ghab 3 (Syria), 87 AK 71115 as Akcin (Turkey), FLIP 84-79C and FLIP 84-92C (Algeria and Tunisia), FLIP 84-92C (Morocco), ILC 3279 and ILC 482 (Iraq); pigeonpea ICPL 34045 (Sri Lanka); groundnut varieties ICGV 86590 with multiple-diseases and insect-pests resistance, and ICGS 1 selection Konkan Gaurav (India), ICGS 114 as Sinkarazei (Ghana).
- Long-term genebank inaugurated, ICRISAT Center, 10 May.

1992
- V. Rajagopalan, Chairman, CGIAR, visited ICRISAT Center, 7 February.
- Pigeonpea varieties ICP 11384 released as Bageswari, and Rampur Local as Rampur arhar (Nepal), ICPL 87119 (India).
- Establishment of Cereals and Legumes Asia Network (CLAN).

L.D. Swindale receiving the Padma Bushan award from His Excellency R. Venkataraman, President of India, 23 March 1991.

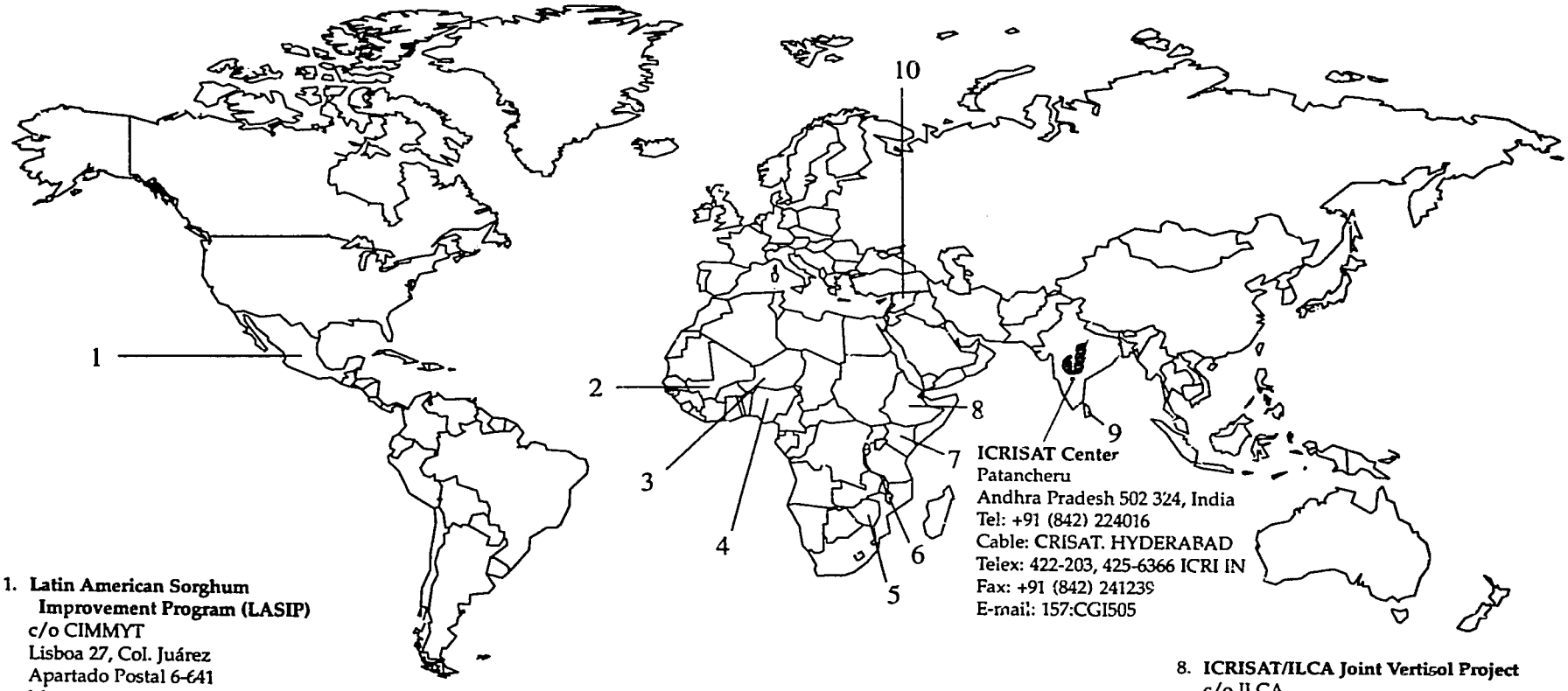
Hon. Moulaye Haidara, Minister of Agriculture, Mali (center) during his visit to inaugurate WASIP buildings, Samanko, 14 February 1971. Extreme left, S.N. Lohani, Team Leader, WASIP-Mali.

J.G. Ryan accepting the Director Generalship of ICRISAT from W.T. Mashler, Chairman, ICRISAT Governing Board (April 1989-March 1992). 19 August 1991. (Center Y.L. Nene, Deputy Director General.)



E.H. Roberts, Chairman, ICRISAT Governing Board, (from April 1992) and L.R. House, Executive Director, Southern African Programs, during Governing Board meetings in SADCC, March 1991.

V. Rajagopalan, Chairman, CGIAR during his visit to ICRISAT Center, 1992, with J.G. Ryan, and S.B. Sharma, Nematologist.



1. **Latin American Sorghum Improvement Program (LASIP)**
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   Mexico 06600, D.F. Mexico
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   +1(905)761-3311/3865
   Cable: CENCIMMYT
   Telex: 177-2023 CIMTME
   E-mail: 157:CGI201 or CIMMYT
   Fax: 52 (5) 95 41069

2. **ICRISAT West Africa Sorghum Improvement Program (WASIP-Mali)**
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   Telex: ICRISAT 2681 MJ

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   Fax: +227-734329
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4. **ICRISAT West Africa Sorghum Improvement Program (WASIP-Nigeria)**
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6. **SADCC/ICRISAT Groundnut Project**
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   Telex: 44466 UNDP MI
   Fax: +265-730734 UNDP MLW

7. **Eastern Africa Regional Cereals and Legumes Program (EARCAL)**
   c/o OAU/STRC
   P.O. Box 39063
   Nairobi, Kenya
   Tel: +254 (2) 741264, 747557
   Cable: ICSAT KE
   Telex: 22795 Nairobi
   E-mail: 157:CGI113
   Fax: +254 (2) 747554

8. **ICRISAT/ILCA Joint Vertisol Project**
   c/o ILCA
   P.O. Box 5689
   Addis Ababa
   Ethiopia
   Tel: +251 (1) 613215
   Telex: 21207 ILCA ET
   Fax: +251 (1) 611 892
   E-mail: 157:CGI 070 or ILCA

9. **ICRISAT/ADB–Department of Agriculture, Sri Lanka, Pigeonpea Production Project**
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   Sri Lanka
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10. **ICRISAT/ICARDA Chickpea Project**
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    Cable: ICARDA, Syria
    Telex: 331206 ICARDA SY,
    331208 ICARDA SY
    Fax: 963(21)225105 or 213490