FACTS ABOUT COOPERATION

Myanmar and IRRI

Rice research—which in the past had as its primary objective increasing yields and land productivity, to preserve the scarce land resources of Asia—had taken on an additional challenge: how to simultaneously increase the productivity of land, labor, water, and chemical fertilizers, while preserving natural resources and protecting the environment.

For the International Rice Research Institute (IRRI), the task was especially challenging: to spearhead a new "green-green revolution" in rice, the staple food on which over two-and-a-half billion people already depended. The number would increase by almost 50% to more than 3.5 billion people by 2025.

As the world population continued to increase by 85 million people a year, the developing world would be adding another 2.27 billion people over the first three decades of the 21st Century compared to an increase of 2.12 billion over the previous three decades.

Population growth would be higher in regions characterized by pervasive poverty and malnutrition such as South Asia and sub-Saharan Africa, where per capita grain consumption was expected to increase greatly.

The challenge to the scientific community was how to help maintain a continuous increase in food production despite limited natural resources and declining arable land and water supplies in a manner that protected the soil, water, and biotic resource base from which all food must come.

Meeting this daunting challenge required continuing investment in agricultural research and development. IRRI, its scientists, and its research partners in the developing and industrialized world, were in the forefront of such research.

IRRI was established in 1960 by the Rockefeller and Ford Foundations to conduct research that helped developing countries grow more rice. The first semidwarf breeding lines were developed in the mid-1960s; IR8 was released by IRRI in 1966. With the adoption of new varieties, average rice yields in South and Southeast Asia in 1995-97 were 95 percent higher than in 1964-66, the 3 years before the introduction of the first modern varieties. Total production rose by 141 percent, while land planted to rice increased by only 24 percent. The population of the region, however, grew by 82 percent during that period.

IRRI was one of the 16 international agricultural research centers supported through the Consultative Group on International Agricultural Research (CGIAR). The Institute's interdisciplinary approach was based on close collaboration with national agricultural research systems (NARS) and advanced laboratories worldwide, including several in France. Working together, these scientists sought new sources of genetic diversity, developing new biotechnology tools, seeking new knowledge on the impact of intensified cropping on the soil-resource base, improving the understanding of rice-pest co-evolution, and acquiring new insights into the effects of global climate change.

IRRI supported the world rice research community through the conservation, evaluation and dissemination of rice germplasm; accessible data bases and rice literature collections;

publication of results and applications of rice research; and training programs to strengthen the scientific and managerial capacities of national research institutes.

Myanmar and rice

Myanmar's population was increasing steadily with an average annual growth rate of 25.9 percent, and the estimated total for 1995 was 47 million. About 75 percent of the 47 million population lived in rural areas and most of them were engaged in agriculture.

Rice was the single most important crop, grown on 4.8 million hectares or 60 percent of the country's total cultivated area. Rice production employed 40 percent of the total labor force and consumed 70 percent of total commercial fertilizers. In turn, rice maintained its position as the main staple food crop, accounting for 97 percent of total food grain production.

The suitable area for rice in Myanmar was estimated at 6 million hectares. To meet the increasing demand for rice of the growing population, Myanmar had embarked on a program to increase rice production through area expansion, yield increase, and crop intensification. While the origins of rice had been debated for some time, there was good evidence that one of the earliest places for its domestication was the longitudinal upland valleys of Myanmar's Shan State.

Rice production began expanding beyond subsistence agriculture in the last half of the 19th century in the deltaic area with its favorable soil and weather conditions.

By the 1900s, Myanmar was a major rice-exporting country, and in the 1990s, it was the world's ninth ranking exporter.

About 52.8 percent of the country's rice area was planted in the rainfed lowlands. Eighteen percent was in irrigated, 14.3 percent in deep water, and 14.9 percent in upland areas. The average yield in the delta was 2.9 tons/ha.

Myanmar-IRRI collaboration

The first contacts between Myanmar and IRRI were in late 1965 when a trade delegation from what was then known as Burma visited the Philippines. A few weeks later, the Government of Burma requested a 45-kg sample of IRRI seed. IR8 was introduced in Myanmar in 1967. It was called "Ya Gyaw," meaning "more than a hundred," because it yielded more than 100 baskets of rice per hectare, equivalent to more than 5 tons/ha.

Dr. Robert Chandler, then IRRI director general, was invited to visit the country in 1968, which started the exchange of scientists between Myanmar and IRRI that had continued. A senior agricultural scientist, Dr. Kuang Zan, general manager of the Agricultural Research Institute, was a member of the IRRI Board of Trustees from 1975 to 1977. He served as the IRRI liaison scientist in Africa from 1978 to 1985.

Technical relations were formalized in 1977 when the Myanmar Agriculture Service (MAS) and IRRI signed a memorandum of understanding (MOU). This was followed by a letter of exchange in 1990 establishing an IRRI representative office in Myanmar.

The MOU opened the way for the two phases of the IRRI-Burma Cooperative Project and Myanmar (formerly Burma)-IRRI Farming Systems Project. These projects were for varietal improvement, rice farming systems, development of small-scale farm implements, and training through degree and nondegree programs.

Funding was provided by two Canadian agencies, the Canadian International Development Agency (CIDA) from 1979 to 1989 and the International Development Research Centre (IDRC) since 1989.

In 1993, the operating plan for a new Myanmar-IRRI Upland Farming System Project was signed by Dr. Mya Maung, managing director of MAS, and Dr. Klaus Lampe, then director general of IRRI. It was jointly funded by MAS, IDRC, and IRRI. The 2-year project was for research on low-cost, sustainable, rice-based farming systems in the hilly regions of the country.

In 1994, the German Freedom from Hunger Campaign (Deutsche Welthungerhilfe) provided additional support for improving farming systems productivity and sustainability in the uplands. Myanmar signed the agreement recognizing IRRI as an international organization through its Ambassador to the Philippines in 1995.

A three-year project on Community-Based Natural Resource Management jointly funded by IDRC,IRRI and MAS was approved in 1997. Furthermore, a Myanmar-IRRI Workplan agreement was signed in 1997 between IRRI Director General and the MAS Managing Director for collaborative research activities from 1997 to 2000. These activities included genetic resource utilization, agricultural mechanization, integrated pest and disease management, community-based natural resource management, geographic information systems and training.

Accomplishments

The close collaboration between scientists of Myanmar and IRRI had resulted in many achievements, thus benefiting the rice farmers and consumers of the country.

Improvement of rice varieties. Fifty-two modern rice varieties were released in Myanmar between 1966 and 1997 (Table 1), helping increase national production to 14 million tons in 1987 to 19 million tons in 1996. By 1988, modern varieties were planted on half of the country's ricelands, including 98 percent of the irrigated areas.

Germplasm conservation. Through the International Network for Genetic Evaluation of Rice (INGER), IRRI had made available 15,000 promising lines and cultivars of rice. In return, Myanmar had contributed 1,900 indigenous varieties, including 150 wild rices, to the IRRI gene pool.

Farming systems. Myanmar had collaborated in the Asian Rice Farming Systems Network of IRRI. Pre- and postrice upland crop testing led to recommending 9 varieties of peanut, 5 of soybean, 8 of maize, 6 of sorghum, 4 of mungbean, and 6 of cowpea, for intercropping with rice.

The farming systems project characterized seven cropping systems sites and organized their site working groups. Meteorological stations were established at four of the sites. More productive rice-based cropping systems were recommended for 16 agroclimatic sites.

Sesbania rostrata was introduced as a green manure crop for rice systems, reducing farmers' costs in fertilizer purchases. A rice-fish farming system was introduced and was subsequently widely adopted in Myanmar. The farming systems project also produced extension-level pamphlets, including *How to train single work animals* and *direct seeding method of rice crop establishment.*

Table 1. Rice varieties released in Myanmar, 1966 to 1997.

Variety name	Original name	Year
Ya Gyaw 1	IR8	1966
Ya Gyaw 2	IR5	1970
C4-63	C4-63	1970
Sein Lay	C4-113	1970
Ma Naw Ha Ri	MaShuRi	1971
Shwe War Hnan	IR20	1972
Lone Thwe Shwe War	IR22	1972
Shwe War Yin	IR24	1972
Shwe War Tun	IR5Mutant	1972
Sein Talay	X69-2-27	1976

Shwe War Lay	IR28	1976
Ma Naw Thu Kha	Mashuri-M	1977
Sin Shwe Thwe	IR34	1977
Sin Thein Gi	BR51-91-6	1977
Sin Thi Ri	BG90-2	1977
Pa Le Thwe	PelitaI-1	1979
Shwe Thwe Lay	IR751-592	1979
Kyaw Ze Ya	X70-18-38	1980
Shwe Thwe Tun	IR24Mutant	1980
Yenet 1	BKN6986-108-3	1980
Yenet 2	BKN6986-167	1981
Yar Saba 1	C22	1981
Yar Saba 2	KN96	1981
Yar Saba 3	KN117	1981
Yar Saba 4	LG240	1981
Yar Saba 5	IR1529-680-3-2	1981
IR36	BG12IR36	1983
Yar Saba 6	Yn91-45	1984
Yar Saba 7	Yn92-7	1984
Ye Net 3	RD17	1984
Ye Net 4	X73-20-19	1984
Sin Ekari 1	X72-8-22	1984
Ye Net 5	BH2	1985
Ye Net 6	RD19	1985
Ye Net 7	B922, C.MR.118	1985
Sa Ngan Khan 1	X78-3-9	1985
Sa Ngan Khan 2	X73-3-18	1985
Sa Ngan Khan 3	X73-12-8	1985
Sin Ekari 2	RD23-A	1985
Sin Ekari 3	RD23-B	1985
Sin Ekari 4	IR21843-65-3	1985
Thi Htat 1	X72-7-1	1985
Thi Htat 2	X72-7-10	1985
Thi Htat 3	X72-7-15	1985
Shwe Thwe Hmwe	IR50	1985
Lone Thwe Hmwe	KhaoDaukMali	1987
Pyi-Shwe-Thwe	IR42	1987
Theedat Yin	IR113240-108-2-2-3	1990
Yar 8	(C22/IR2153-26-3-5-2)	1990
Yadana Aung	IR41985-111-3-2-2 (PSB Rc4 in the Philippines)	1995
Aye Wan	IR59673-93-2-3-3	1996

Agricultural mechanization. Local manufacture of rice cultivation, harvesting, and postharvest equipment for small-scale farms had been encouraged. Private firms and the Agricultural Mechanization Department had produced 500 push weeders, 250 tillage tools and seeders, and 100 treadle pumps. IRRI-designed rice transplanters and threshers were introduced and private manufacturers were urged to build and sell them to farmers.

A shop was built at the Agricultural Research Institute and equipped with tools and shop facilities to fabricate prototypes. Engine-powered reapers and vertical-flow water pumps were modified to suit local conditions. The use of single work animals with attached implements was popularized. About 600 units of the IRRI-designed stripper harvester system (SG800) were produced by the Agricultural Mechanization Department in 1995.

Publications. In 1991, IRRI published the book, *A century of rice improvement in Burma,* by Dr. U. Khin Win. Six IRRI publications were translated into Myanmar and widely circulated to researchers, extension workers, and farmers: *Helpful insects, spiders, and pathogens: friends of the rice farmer; A farmer's primer on growing soybean on riceland; A farmer's primer on growing cowpea on riceland; A farmer's primer on growing rice; Field problems of tropical rice;* and *Illustrated guide to integrated pest management in rice in tropical Asia.*

Twelve training modules on socioeconomic skills for farming systems research were translated for use by agricultural technicians. *The IRRI hybrid rice seed production manual (1993)* was translated into Myanma language in 1995 and distributed to researchers, extension personnel, and farmers.

Training. Beginning in 1969, IRRI had provided a variety of training opportunities for Myanma agricultural scientists, most of whom were on the staff of the Agricultural Research Institute. Two persons earned doctorate degrees and 30 received master's degrees (Table 2). Nondegree courses and short-term group training courses at IRRI were attended by more than 200 persons. Several training programs for other researchers and extension workers were held in-country using IRRI-trained scientists as resource persons.

Table 2. Myanma participants in IRRI's training programs, 1969-97.

Category	Participants (no.)
Ph D degree scholars	2
MS degree scholars	30
Nondegree/On-the-job trainees	26
Short-term group trainees	265
Total	323

IRRI in Myanmar

The office of the IRRI representative in Myanmar was located in Yangon. Contact addresses and numbers were Office location : Seed Division Compound Myanmar Agriculture Service Gyogon-Insein Yangon

Mailing address : IRRI Representative Office
P. O. Box 1369
Yangon
MYANMAR
Phone (Office) : (95-1) 661362
Fax : (95-1) 667991
(95-1) 642341

E-Mail : GARCIA%REMOTE.UNDPMYA@
NYLAN1.UNDP.ORG
Telex : 21311 AGRICO BM