

PARTNER COUNTRIES: Laos, Thailand, Cambodia

PROJECTS: Increased productivity of rice-based cropping systems in Lao PDR, Cambodia and Australia (CIM/1999/048); Plant-breeding strategies for rainfed lowland rice in Northeast Thailand and Laos (CS1/1995/100); Yield improvement of rainfed lowland rice in drought-prone areas of Thailand and Laos (CS1/1990/045)

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GRAIN GAIN FROM SKILLS LIFT

By building local research capacity, ACIAR-supported teams aim to boost rice production and improve crop tolerance to drought

BY GRAEME O'NEILL

Images of rural South-East Asia often show terraced paddies with verdant rice crops standing stem-deep in water. But large areas of Laos, Cambodia and Thailand often experience withering drought and low yields.

In Laos, for example, 90% of the nation's rice-growing area relies on rain rather than irrigation. The timing and quantity of rain is unpredictable, the soils permeable and leached of nutrients and traditional rice cultivars have low drought tolerance. Consequently, rice shortages are common.

Australian researchers have been working with colleagues and extension officers in the region for 15 years to help local breeders develop systematic breeding programs to make rice growing more reliable.

In 1990, University of Queensland plant

scientist Professor Shu Fukai led an ACIAR-funded project with the specific aim of capacity building in Thailand and Laos. "Capacity building rather than research has been our main focus," he says. "We've been successful in many ways, but particularly in postgraduate training. After graduation, young Laotian scientists are now leading rice research in South-East Asia."

Professor Fukai says when the team started its work, there was little infrastructure in Laos: "So for the first three years we did only one simple experiment each year. We tried to build an understanding with local rice breeders and develop their local research capacity."

However, this first project directed only 10% of its funding to Laos; 90% of the money and effort went into Thailand, where local researchers began improving varieties for the country's north-east, their goal being to find a higher-yielding cultivar with the same eating quality as the internationally renowned jasmine rice.

For the second project, starting in 1995, about 40% of the effort went into Laos. Professor Fukai says that by using the expertise developed in the first phase, and with Thai help, the project developed an effective method for screening Laotian rice varieties for drought tolerance.

Professor Fukai says that Laotian breeders have now screened hundreds of rice lines, many collected from local farmers. The breeders use this information to hybridise drought-adapted lines with higher-yielding exotic material, to increase yield and hardiness while maintaining good eating qualities.

Five lines with these characteristics have been identified and Professor Fukai and his team have asked farmers to evaluate them. "Only when they get the thumbs-up from farmers will I know we've been successful," he says.

The second phase of the project in Laos introduced the first experiments in broadcasting seed onto moist soil. Such direct seeding is starting to replace

transplanting of rice seedlings elsewhere in Asia as a consequence of labour shortages.

Researchers travelled widely in Laos, demonstrating direct-seeding techniques to farmers. "The idea was new to the Laotian farmers, but we've gradually developed techniques that work," Professor Fukai says. "One is to broadcast the seed by hand, another involves sowing into furrows. Both save on labour."

Based on related research in Cambodia, it was decided not to pursue a separate breeding program to develop direct-seeding varieties. "We concluded it was unnecessary because varieties that were good for transplanting were also successful when direct-seeded."

Professor Fukai predicts that, as in other countries, Laos's shortage of rural labour will inevitably see a large increase in direct seeding. "One of the last things we did in Laos was to develop maps of temperature and rainfall using geographic information systems technology," he says.

Professor Fukai explains that northern Laos is hilly with a lot of rice grown at 500 metres above sea level. Farmers traditionally grow only one rice crop—during the wet season, harvesting in November. About seven years ago, the Laos government developed irrigation schemes to allow farmers to grow a second rice crop during the dry season.

Irrigation delivered good results in central Laos, but in the north, cool temperatures in December and January caused poor germination and slow growth. After 40 days the seedlings were still only a centimetre tall.

The ACIAR-supported researchers used locally available materials to develop a plastic solar dome to warm the seed during germination, promoting seedling growth. When planted out in February, seedlings grew strongly.

Some Laotian farmers are now adopting this new approach, signalling the willingness of many farmers to be innovative when given the opportunity. ◀



Digital cameras: the latest tool for Laos agricultural extension workers such as Keow Sakhone.



Upland rice growing in Laos.

PHOTOS: BRAO COLUIS