



An Australian aid project helped to transform Sam Vesha's farm from a paddy field to a profitable market garden.

Rice is life

In 1987, an urgent lift in rice production was needed to avert widespread famine in Cambodia.

Brad Collis traces the contribution of Australian aid and Australian scientists.

In the mid-1990s Sam Vesha's 2.4-hectare farm could barely feed his extended family. In Cambodia's Svay Rieng district near the Vietnam border its agriculture was antiquated, its rice yields low, and its future bleak.

That's when Sam's father agreed to let him take over. Five years later the land is an intensively worked enterprise based on new high-yielding rice varieties that have allowed some of the farm to be turned over to horticulture and aquaculture.

It has been transformed from a paddy field to a market garden; from subsistence agriculture to an intensive operation producing a surplus that actually earns a substantial income.

The difference between the past and the present has been Sam's willingness to grasp the opportunities provided by a little-known Australian agricultural aid program, CIAP: the Cambodia-IRRI-Australia-Project.

Sam is still a rare exception to the country's endemic poverty, but he is regarded by agricultural extension workers as a symbol of hope for Cambodia's farming future. While his father's generation is still subdued by the horrors inflicted during the Khmer Rouge reign from 1975 to 1979, Sam has been willing to risk new methods, technologies and rice varieties.

Consequently, his yields have risen from 800 kilograms a hectare to two tonnes a hectare. This has allowed him to allocate land to alternative high-value enterprises, particularly fish ponds for intensive aquaculture, and horticulture. This year the fish fingerlings he breeds for other farmers to raise in their rice paddies as an additional food source will earn the family about US\$250, which in Cambodia is a sizeable sum.

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AusAID, decided to defy the United States, and send in a team of agricultural scientists to help rebuild Cambodia's farming infrastructure. An urgent lift in rice production was needed to avert widespread famine, but the US was still hostile towards Cambodia in the lingering aftermath of the Vietnam War.

To minimise the political backlash, the Australian funding was channelled through IRRI – the International Rice Research Institute, based in the Philippines.

The program was run by two agronomists, Harry Nesbitt and Glenn Denning. Nesbitt began an urgent rice-production program using Cambodian seed collected before the war and stored in the IRRI germplasm bank in the Philippines. He also started training a local support team. Denning's job was to direct

the overall science from his existing base at IRRI. With no time to breed new rice varieties through genetic crossing, it was a case of identifying the best traditional varieties, planting them out, and selecting the highest yielding plants from each crop.

This had to be done concurrently with other equally mammoth goals.

'We basically had to build a whole new farming infrastructure, including a system of national agricultural research for the Cambodians to later take over,' Nesbitt says. 'This meant training people up to PhD level. But the most urgent need of all was to raise basic household food production.'

With the help of the Department of Agronomy in the new Cambodian Government, Nesbitt assembled a small team of local trainees and started trialling the most promising Cambodian rice

varieties assessed at IRRI, as well as the high-yielding IRRI-developed IR66 variety which allowed two crops a year.

While growing the new varieties to determine how to farm them under the varying Cambodian soil and climatic conditions, the CIAP team also had to start working with farmers to prepare them for the changes and new technologies, such as modern fertilisers and their application, irrigation, new harvest and post-harvest technologies, and Integrated Pest Management – the non-chemical control of insects.

The team was expanded to include a prominent Indian plant breeder, Ram Chaudhary and an American social scientist, Richard Lando, who had to pretend he was Dutch. It was an unceasing race against time; keeping bellies full while engendering an agricultural revolution, which was greeted by the bulk of the population with anxiety.

Most, like Sam Vesha's father, were traumatised still by the events of the previous two decades, and lacked the confidence to experiment with new methods or rice varieties in case the crop failed.

Nesbitt and Denning immersed themselves into people's personal stories; to understand their state of mind: 'When people started to tell you a bit about themselves the constant phrase was, 'I'm the only one left'.'

The basic formula for kick-starting Cambodia's economic and social recovery was to lift its rice production from subsistence to sustenance to surplus. This arrived at the real starting point from which to build a diversified agricultural economy. The key was the introduction of the high-yielding rice varieties, the best of which required irrigation, something that farmers accustomed to rain fed conditions hadn't used before.

Not long after Nesbitt and Chaudhary started they were joined by two young local graduates from Russian universities, Chan Phaloeun and Men Sarom, who represented the start of the Cambodian Government's long-term aspirations of having its own institute of agricultural research. Survivors of the past, they were to be trained to set the future.

Phaloeun, who was assigned to work directly with Nesbitt, recalled the early pressure to just grow enough rice to fill

stomachs: 'People's priority when we started was to stay alive.

'And that was just one job. We also had to plan a long-term research program and set up training courses, for farmers and for agriculturists. For example, farmers didn't know how to purify seed – to only select seed from the highest yielding plants. Farmers were simply putting aside a certain amount of grain for seed when they harvested. We showed them how to choose seed plants at the early tillering stage by recognising the yield indicators from the panicle, the growing points on the plant. The panicle can tell you in advance how productive a plant it is.

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'We also taught farmers how and when to apply fertiliser. Some fertilisers were chemical, like urea, but many farmers couldn't afford this so we introduced green manure – nitrogen-fixing legumes that could be grown and dug into the soil with bullock manure.'

By 1994 the CIAP team had grown into a sizeable force of international specialists and the signs of recovery grew steadily stronger. An increasing range of improved rice varieties became available; their adoption helped by a simple, innovative soil assessment technique developed especially for Cambodia by a scientist from the University of Western Australia, Peter White.

The adoption of new farming practices and technologies was further boosted by the establishment of farmer field schools run by the Food and Agriculture Organisation (FAO). By the end of the 1990s more than 30 000 farmers had passed through the schools and on the way the national rice harvest achieved a small, ongoing surplus.

The field schools were organised by another Australian, Bob Nugent, who also introduced Integrated Pest Management, which had been promoted throughout South-East Asia since the 1960s by CSIRO, beginning with the efforts of prominent entomologist Doug Waterhouse.

Nugent put a lot of work into marrying IRRI science with problem-based learning programs.

'Rather than tackle chemical miss-use by going in head-on and saying you're making a mistake, we'd point out the ecological consequences and work back from that,' he says.

'It was aimed at empowering farmers to work towards us . . . to push questions at us rather than us pushing answers at them.'

This approach is regarded as one of the reasons why farming systems have been able to be changed comparatively quickly, and has further led to the program

broadening into 'farmer life schools'. These integrate rice production and farming culture with issues governing health, poverty and HIV. Health is a critical factor in the Cambodian farm economy because the high cost of medical treatment means farmers are usually forced to sell their farms if they become ill.

Nugent likens the schools network to Australia's Landcare movement, except the issue in Cambodia is poverty rather than land degradation.

As Nugent put it: 'rice is life'.

'The people here aren't looking to hook into global, vertically-integrated agriculture. They are looking for something they can control and which gives them security. A modest, reliable rice crop every year gives them that. They won't get rich, but they know they will live.'

The CIAP program which provided the knowledge for achieving this modest, but sustainable foundation, wound up at the end of 2001, replaced by Cambodia's own agricultural research and development institute, CARDI.

CARDI, designed by Harry Nesbitt and funded initially by AusAID, has the job now of taking Cambodian agriculture to the next stage – to make further advances in local plant breeding, to step up soil and water research, agricultural engineering and training. The former CIAP trainees, Men Sarom and Chan

Phaloeun have been appointed its inaugural director and deputy director.

CARDI has been structured to offer the same type of research support that Australian farmers receive from agriculture departments and the CSIRO.

Men Sarom, who through CIAP gained a PhD in plant breeding from the University of Western Australia, is under no illusions about the task ahead.

'We have become self-sufficient in rice production as a nation, but at the local level 10-20% of farmers are still hungry. So that remains a major challenge. Also the surplus that is available for export has to compete against rice from Thailand and Vietnam, which means we have a lot of work to do to raise the quality of Cambodian.

'And even the successful rice farmers are still very poor and that has to be addressed by integrating diversification such as horticulture and fruit growing. Increased research into tropical fruits is going to be an important next step. However, when we started we had no research infrastructure at all. The establishment of CARDI is something to be proud of already.'

Men Sarom hopes one measure of success in the future will be the appearance of high-quality Cambodian rice on supermarket shelves in Australia. Chan Phaloeun hopes another measure of success will be farmers like Sam Vesha being less of a minority.

Brad Collis travelled to Cambodia with the help of the Crawford Fund.

Abstract: CIAP – the Cambodia-IRRI-Australia-Project – began in 1987 when the Australian Government, through AusAID, sent agricultural scientists to help rebuild Cambodia's farming infrastructure and agricultural research in the aftermath of the Vietnam War. The project has identified and selected high yielding rice varieties, and worked with farmers to introduce modern fertilisers and their application, irrigation, new harvest and post-harvest technologies, and integrated pest management. Rice yields have more than doubled on some farms, enabling diversification into high-value enterprises including intensive aquaculture and horticulture. The CIAP program was replaced in 2001 by Cambodia's own agricultural research and development institute, CARDI.

Keywords: rice farming, aquaculture, agricultural systems, diversification, Cambodia-IRRI-Australia-Project (CIAP).