Sri Lanka the living laboratory

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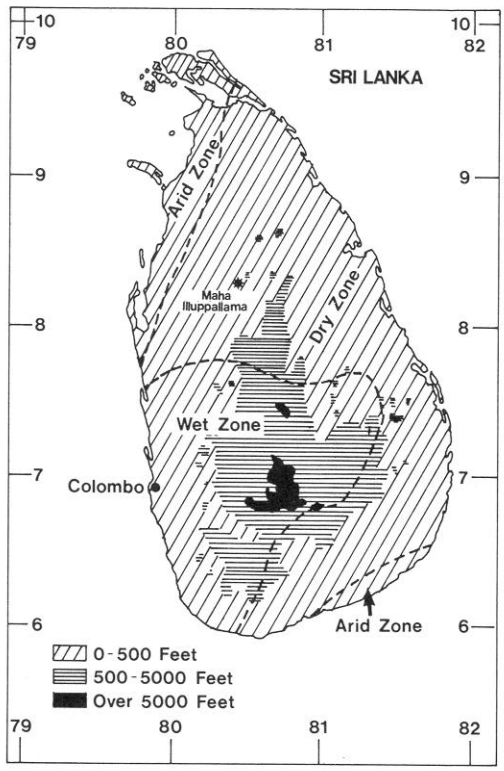
For the past 2,000 years or more Sri Lanka's traditional farmers have worked the land in much the same way — providing in a good year enough food to feed their families, maybe even enough to store some away for a bad year.

But times have changed. In the past 100 years most of the best land has gone to cash crop plantations producing valuable exports such as tea, rubber, and coconut. Sri Lanka's population has grown too, and the traditional farming systems, that exploit at best only 50 percent of the land's potential, can no longer provide enough food to meet the people's needs.

That, in simple terms, is the reason why some of Sri Lanka's top agricultural scientists have recently become very interested in something called cropping systems research, also known as multiple cropping, or multi-cropping for short.



Above: Traditional rice farming in Sri Lanka — dry planting of rice before the monsoon could speed up the paddy cultivation and permit a second or even a third crop to be grown. Top right: Sweet potatoes planted after rice in an experimental plot at IRRI, the centre of the Asian Cropping Systems Network of which Sri Lanka is now a member.

In fact the problem is not that simple. It is considerably complicated by the country's uniquely varied soil and climate conditions — its agroecology. Scientists have classified the world's soils into 10 major types; nine of those 10 soil types are to be found in Sri Lanka. The island's annual rainfall varies from a soggy 250 inches in the south, to a measly 25 inches in the north. And unlike most of its Asian neighbours, Sri Lanka experiences not one but two monsoon seasons — the *Maha* from October to January, and the *Yala* from March to May — which give their names to the year's two rice crops. Finally there is the nature of the land itself, with coastal plains almost at sea level contrasting with mountains that peak at 8,000 feet, creating mini climate zones of their own.

All these factors combine to make Sri Lanka something of a living laboratory from the agricultural scientist's point of view. Which is where multicropping comes into the picture.

The acknowledged centre of expertise on cropping systems research in Asia is the International Rice Research Institute in the Philippines. Founded by the Ford and Rockefeller Foundations in 1962, IRRI is today one of 10 international agricultural research centres that are supported by a worldwide consortium of donor agencies, the Consultative Group on International Agricultural Research, of which the IDRC is an active member. IRRI was instrumental in developing many of the new high-yielding rice varieties in the Sixties, and has been engaged in cropping systems work for the past decade.

Today IRRI's cropping systems work is so widely accepted that it has become the centre of an Asian Cropping Systems Network, of which Sri Lanka is a member, along with Bangladesh, Indonesia, Malaysia, Nepal, Philippines, and Thailand. People working directly in national programs meet every six months to compare results and discuss mutual problems.

A major cropping systems project is currently underway at the Maha Illuppallama Agricultural Research Station in Sri Lanka. The project is supported by the Ministry of Agriculture and the IDRC, and it is of particular interest to the Asian Network because the wide variety of conditions found in Sri Lanka means the results of the research may be widely applicable in other Asian countries.

In cropping systems research the emphasis is on crops, but the keyword is systems. The goal is to make the most efficient use of the farmer's total resources — land, animals, water, and people. This is usually achieved by growing additional crops (either together or in sequence) and by increasing the yield of existing crops.

This is what is happening in the Maha Illuppallama project, which began in 1976. Around Walagambahuwa, an area where rice growing depends on irrigation from minor tanks, 45 farmers were selected to take part in the project. A similar number was selected in the Katupota region, where rice is grown under rainfed conditions and irrigation is not a major factor.

The development of cropping systems on the farms is important — systems that will work only under laboratory conditions will be of no use to the farmers. So the researchers spend most of their time out of the research station, working alongside the farmers in the fields. This way the farmer becomes a partner in the research: he supplies the land and most of the labour, and he is free to reject any idea that he feels will not help him, and to add his own suggestions.

This approach has practical value, but just as important is its psychological impact on the farmer. As W.B. Medagama, an extension officer with the Ministry of Agriculture, told participants at a cropping systems workshop in the early days of the project, the dry zone farmer has been viewed for the past 50 years as a "poor, miserable human being living in misery". The result was that the farmer felt he should get away from farming in order to be socially accepted. He was a farmer only because he had nothing better to do.

It was necessary, said Mr Medagama, not only to accept the dry zone farmer and give him pride of place in society. "The technology we preach and want them to adopt should be developed from within the resources available...with what resources the farmer is capable of acquiring and using," he said.

So the researchers are encouraging the farmers to try new methods. Dry planting of rice before the monsoon, for example, makes for better use of available rainfall than does the traditional method of simply waiting until rains have filled the ancient irrigation tanks to overflowing.

These tanks are the remnants of a remarkable irrigation system that once kept the northern part of the country green and prosperous. Years of war and successive colonial administrations led to neglect, however, and today many of the tanks are disused. Those that remain, or are capable of repair, could still play a vital role in a multicropping system. By speeding up the paddy cultivation and making better use of the rains, the water that collects in the tanks can be used for a second, even a third crop.

Careful records are kept of all the participating farmers' activities, and for comparison the researchers also monitor the work of a number of farmers in the same area using the age old traditional methods of paddy cultivation. At the Research Station the scientists experiment with short season rice varieties and varying combinations of crops to follow the rice harvest, such as chillies with soybean, black gram or groundnuts.

Another joint project of the Ministry of Agriculture and the IDRC began in 1977. It is designed to complement the cropping systems work already underway. With improved cropping practices comes the need for improved crops, especially in the northern dry zone. Traditional farmers in this area have for millenia practiced the form of shifting agriculture known as *chena* — but population pressures are rapidly making this relatively inefficient system both impractical and potentially destructive of the land. Shifting agriculture depends on long periods during which the land can lie fallow, allowing the soil to recover from a short period of intensive agriculture. If there are too many people then the fallow period becomes shorter, and the soil begins to deteriorate.

Mung bean, cowpea, black gram, and sorghum are among the most common crops grown under these traditional systems. So the aim of the food grain improvement project is to develop improved varieties of these crops that can be grown in rotation with the rice crop, encouraging a more settled and more productive kind of agriculture in the upland areas. The training of additional researchers in plant breeding techniques will also be an important part of the three-year project.

By participating in international networks for cropping systems research and sorghum and cowpea improvement, the Sri Lankan scientists are able to draw on the advice, experience and material available from other countries tackling similar problems. And the knowledge gained here in the "living laboratory" is passed on to other Asian scientists who are also working to provide more food for their people.

Says Mr E. Abeyratne, Director of Agriculture for the Department of Agriculture, "We are at the beginning of a change in our whole approach to agricultural development. What we are looking at here now is an attempt to bring all the resources together and make full use of these resources.

"This cannot be done without a complete team approach.... on the one side the understanding of the environment involving climatologists and soil scientists, and on the agricultural side plant breeders, agronomists, physiologists, and the whole works, all focussing in a given area."

Working together with the scientists, Sri Lanka's small farmers can not only regain their self-respect, they can help to reduce the amount of food that must be imported, and thus improve the standard of living of the entire population. □