Pemba is characterised by two rainy seasons. Cassava is the staple food, although rice, grown twice a year under irrigation, is preferred. In the 1980s, to reduce dependence on imported rice, the Ministry of Agriculture introduced irrigation schemes for resource-poor farmers. Local rice variety yields were low under rain-fed conditions, but showed tolerance to prevailing pests and diseases. Irrigated rice yields were not much better, however, because of low soil fertility, water management problems, and such pests and diseases as Hispa (Trichispa sericea), Rice Yellow Mottle Virus (RYMV) and stem borers.

IPM in irrigated rice for smallholders on Pemba, Zanzibar

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During the 1970s and the 1980s, clove prices were good and there was enough money for the Plant Protection Service (PPS) to offer farmers a variety of chemical pesticides and spraying services almost free of charge. Little consideration was given to environmental effects.

In the early 1990s, clove prices fell and a cheaper IPM approach was adopted. Research into harmful organisms and crop protection practices had provided insights into pest and disease management. Chemical pesticides not only presented a health hazard, they also killed off natural enemies, and pests had become resistant to them.

Farmers proved reluctant to adopt these extension messages. Changing from a conventional research and extension approach to IPM proved difficult. Technicians have to learn when and how to cooperate with farmers, and farmers have to rely more on themselves. Participation did increase during the course of the PPS-IPM programme, although mistakes were made because farmers had not participated enough in the early stages of programme development.

The history of the IPM programme

The IPM irrigated rice programme was developed in three stages. First, on-farm research into Hispa and Rice Yellow Mottle Virus. Second, the results of the trials were used to train farmers, and third, participative training and a research programme were designed.

Stage one: on-farm research

The problems with Hispa (*Trichispa sericea*) and RYMV came to the attention of the PPS in 1990. Farmers were not involved in initial on-farm research trials, where synthetic and botanical *Tephrosia vogelii*) pesticides were used against Hispa. Common rice varieties were screened, and RYMV tolerant varieties were recommended. The rice technology package presented to farmers suggested early planting to reduce Hispa and RYMV incidence; simultaneous planting by all the farmers in the valley to diminish the risk of Hispa infestation and minimise RYMV problems; keeping the bonds clean to reduce multiplication of Hispa on alternative host plants around the rice fields; controlling water levels in the fields as the Hispa beetle readily attacked tender plants too deeply immersed in water; the continual monitoring of fields to enable the farmers to detect and solve field problems as early as possible; and the use of *Tephrosia vogelii* to control Hispa.

Stage two: conventional training

In 1996, this new package seemed effective and a training curriculum was designed which aimed at overcoming farmers' reluctance to introduce new cultivation techniques. In March 1997, the first group of farmers was selected, and seven women and eight men met every two weeks. Training on crop husbandry was given in the farmers' own fields, and field tours were organised to the irrigated rice valleys.

The training programme involved very limited farmer participation and demonstrations were the main teaching tool. However, farmers were more interested in solving their soil fertility and irrigation management problems. Training programme evaluations also showed that farmers had not understood some of the topics and, therefore, rejected some of the recommendations.

Stage three: Farmer Field Schools

The training approach was changed. The Southeast Asian Farmer Field School approach was adopted and agro-ecosystem analysis (AESA) was introduced. Farmers were encouraged to make a detailed analysis of their crop, looking at the numbers of insects per plant, water, weeds, number of tillers and general crop health. They learned to formulate research proposals themselves and, on the basis of group analysis, came to decisions on crop, disease and pest management.

As a result of farmer initiatives, a new rice variety gained increasing popularity. In 1994, farmers received rice from Pakistan as food aid. The farmers who sowed some of this as seed found that one variety showed promise. They asked Ali Badru, a technician from the Irrigated Rice Department, to verify their findings. He compared the variety to recommended hybrids and local varieties. Highly productive, it yielded only a little less than the hybrids. It also required less fertiliser than hybrid varieties, and farmers could produce their own seeds. The variety proved tolerant to Rice Yellow Mottle Virus, had a good taste and was easy to harvest because of its height. The new variety took Ali Badru's name and is extremely popular today.

More participatory research focusing on alternatives to chemical fertilisers is planned. Trials will be conducted with green manure, and farmers will use the AESA method to assess their crops. ■

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