

SMALL-HOLDERS ARE RATIONAL OPERATORS

The impression held earlier that small-holders are conservative and do not apply modern technology to improve productivity from their holdings is no longer valid. They are generally rational and efficient operators, but when inappropriate technology is passed on to them without giving due consideration to their constraints, they are reluctant to follow new techniques.

They work under difficult personal circumstances, different priorities and values compared to estate owners. Food supply and risks play a major role in their decision making: risks arising from crop failures due to unfavourable weather or farm gate prices falling below cost of production. Any new technology introduced should meet these and other requirements adequately.

A good example of wrong technology pass on to the small-holders has surfaced recently in a S E Asian country. Some years ago, a new coconut variety was introduced to the small-holders, in order to boost their income from the high yields expected from that variety. Now they find the nuts harvested are not readily marketable for domestic consumption; too small to be scraped, too oily and lacking in the right flavour.

The general thrust of the researchers to increase production is based on a seed-fertilizer-pesticide technology. High yielding varieties that require high inputs have been bred, artificial fertilizers are recommended and chemicals are used to destroy pests and diseases. This technology is suitable for the estate owners who wish to maximize income, but not for the small-holders. However, this chemical system of farming does not improve the soil fertility over the years, and the eco-system is destabilized.

The small-holders require improved varieties that will give a better yield - not necessarily very high yields - with low cost management practices.

Application of chemical fertilizers and cultural practices are major items in the cost of production for small-holders eg. in coconuts 60 and 14 percent respectively from the total expenditure on the maintenance of one acre. The raw material required to produce nitrogen is derived from fossil energy which is becoming more expensive yearly and is a diminishing resource. Those requiring to make phosphorous and potassium are mined and the economically workable deposits are unlikely to last indefinitely.

Hence policy makers and researchers should give priority to develop techniques to reduce the cost involved in fertilizer application to crops and to find other sources to provide the nutrients. Otherwise, it is possible that the small-holders may be out of business by the year 2000.

Renewable resources to make nitrogen, phosphate and potassium are available and within the reach of the farmers. Nutrients necessary for the growth of plants and animals are passed from soil-plant-animal-soil again. This sequence of transfers through well managed systems constitute bio-farming. A system known for decades, but not popularized amongst farmers due to commercial interest and other reasons.

Important phases in bio-farming are building up fertility of the soil by incorporating organic material, integrating animal husbandry with crop cultivation and integrated pest control measures.

An efficient way to maintain organic matter and increase soil fertility is by planting leguminous creeping covers and quick growing trees and incorporating the biomass into the soil. The cover crops provide about 200 kg of nitrogen and 10 to 15 tonnes of biomass (dry weight) per ha/yr. In field trials conducted at the

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Coconut Research Institute, Lunuwila to evaluate different cover crops, 'Waduru Me' (*Mucuna utilis*) produced 130 tonnes of wet leaf litter in six months per hectare during the first year the cover was planted.

Integrating animal husbandry with crop cultivation where applicable is appropriate for the small-holders: raising cattle, goats and chicken without over-stocking. The animal dung will provide nitrogen in fair quantities, phosphate and potassium in smaller amounts. Hence the last two minerals have to be supplemented with artificial fertilizers depending on the crop and soil type.

The tendency today is to control an outbreak of a pest by spraying insecticides. These are not selective, both beneficial and destructive insects are killed in the process of spraying, disrupting the eco-system.

These disadvantages could be overcome by adapting an integrated programme of pest control: minimal use of insecticides combined with the introduction of selected parasites that attack the pest. A good example is the control of the Philippine coconut beetle inadvertently introduced into Sri Lanka in 1970 and controlled within two years by the Coconut Research Institute, Lunuwila.

The earth worms by their constant burrowing, mixing and digesting, keep the soil loose giving it a better capacity to retain air and water, increasing water absorption by about 350 percent. Earthworm excreta contains twice the

amount of phosphate and eleven times potash than present in the surrounding soil.

Bio-farming creates a living soil teeming with bacteria, fungi and earth worms that help the plants to absorb nutrients. If the small grower could be encouraged to follow bio-farming, coconut application of fertilizer and cultural practices could be reduced considerably. For coconuts the saving on these two items will be about 70 percent. Further, the fertility of the soil maintained for successive generations to grow crops successfully.

With this system of farming, the smallholder could provide most of the inputs necessary for increasing coconut production from the farm itself at a low cost and also receive an additional income by selling the produce from the animal. The cost on application of fertilizer and cultural practices per hectare could be reduced from 70 per cent to about 30 per cent.

It is essential that the animals should be raised on the small-holdings for bio-farming to succeed. This is a field where more research has to be done, and different models developed to meet the requirements of crops, environmental factors and the socio-economic conditions of the growers.

The objectives to develop small-holdings should be to produce more with low cost management practices, not necessary to maximize production with high inputs. As the small-holders are rational and efficient operators they are likely to accept a simple technology of this nature to develop their holdings.

(The contents of this article, written by Vidya Nidhi Dr D V Liyanage in 1985 and published in the *Daily News*, are still appropriate.)