

ORGANIC AGRICULTURE

A Workable Path for Sustainable Agriculture

Introduction

Organic agriculture is a production system that avoids or largely excludes the use of synthetically compounded fertilizers, pesticides, growth regulators and livestock feed additives. To the maximum extent feasible, organic farming systems rely on crop rotations, crop residues, animal manures, legumes, green manures, off-farm organic wastes and aspects of biological pest control to maintain soil productivity, to supply plant nutrients and to control insects, weeds and pests (CDD, 1998). This alternative system of production is now recognized worldwide as a answer for sustainable agricultural production and enhanced productivity.

Organic farming/agriculture approach is an integrated living system where one develops and enhances the biological cycles involving micro-organisms, soil life, plants and animals. The main principles of organic agriculture are; produce food of optimum quality and quantity, *work with rather than dominate natural systems*, sustain soil fertility, minimize damage to the environment and minimize the use of non-renewable resources.

Benefits of Organic agriculture

Balanced Environment

Indiscriminate use of agro-chemical has negative effects on beneficial insects creating a natural imbalance in the ecosystem and thus destroying biodiversity of an area/land. It has been realized that for agricultural sustainability biological diversity is a must. Like in the Western world and more developed nations Sri Lanka too has recognized the danger of chemical farming stating that "agrochemical (insecticides, fungicides and herbicides) which are widely used, of-

ten in excess in the country, causes serious environmental and health hazards with long term consequences. For instance, rice (being the main/staple food of Sri Lanka) pests are controlled by highly toxic organophosphorous systematic formulations (National Policy framework, 1995). In the recent past, the indiscriminate use of agrochemicals in gherkin cultivation also created a debate with regard to increased, frequent and over high use of strong pesticides, occurrence of new pests and disappearance of predators and health hazards to the farmers. But this has not been curtailed or banned, as there is no recog-

Sharmini Dharmalingam *
&
Renuka Weerakkody **

nized policy. Pest and disease control in organic farming completely relies on natural measures, which balance the environment, protect the predator populations and reduce the susceptibility of the crop through maintaining diversity in the environment.

Healthy Foods for Consumers

Provision of non-poisonous foods for the people is the most noteworthy feature of the organic production system. Evidence proves that most of the food products available in the market are contaminated with poisonous residues i.e. in Sri Lanka over 90% of vegetables and grain contain poisonous agro-chemical residues and are unsuitable for consumption (Upawansa, 1998). In the organic production system pest and disease control is accomplished through maintaining healthy predator populations in the balanced environment while using some natural extracts which work by contact action and breakdown rapidly leaving no residues. This process assures the healthiness of the food products.

Sustained Soil Fertility

While the traditional practice of using organic manure has disappeared with adverse effects, intensified agriculture without conservation measures has led to degradation of soil gradually through the years leading to decline in productivity. In organic agriculture, the basic concern is to "feed the soil but not the plant". Manure and other crop residues that has been composted and nitrogen fixing legumes are the main sources of organic fertilizers. Unlike in chemical fertilization where fertilisers bypass the soil life, nutrients contained in organic sources are slowly discharged to the soil due to microbial action in naturally balanced proportions. The better soil structure, which results due to above biological process, ensures water retention, drainage, and aeration and a much greater resistance to erosion (Blake, (1993)). Such a soil environment is highly conducive for better root development as well as for a healthier growth of the plant.

Market Choices and Economic Gains to the Producers

Organic agriculture is a difficult production system since it is largely labour intensive. But in the countries where organic agriculture is more developed demand for organic products is very significant. In Europe the demand for organic products outstrips supply, so that prices tend to demonstrate a significant premium. It is recognized that the market can stand 20% premium without causing any significant resistance from the consumers. (Blake, 1993). In developing countries like ours, organic farming is yet to be developed to that an extent so as to occupy a large market, which could ensure premium prices. However, rising cost of production and low profitability due to increasing cost of inputs, in particu-

* Research Associate, Agricultural and Environmental Resource Management Division, HARTI.

** Senior Research Officer, Agricultural and Environmental Resource Management Division, HARTI.

The GSS has a model farm where organic farming techniques such as compost production, biogas utilization, soil and water conservation and crop livestock integration are demonstrated. Other functions of the farm are conducting of training programmes and the production and distribution of natural pesticides and bio fertilizers. The GSS have organized their organic tea and vegetable producers to form small farmer groups, these groups are provided with loans for cultivation and other self-employment projects such as animal husbandry and bee keeping. The GSS facilitates vegetable marketing locally and finds export market for organic tea. The GSS has established a network with other organizations and individuals involved in organic farming at different localities in the country. The network has monthly meetings at which future programmes and activities are discussed and an annual workshop, which aims at knowledge dissemination and exchange of experience among members.

lar agrochemicals is a big burden for the local farmers (category of small farmers) involved in conventional farming. To them organic farming is a possible option to be self-sufficient in agricultural production process. Moreover, in the present day scenario when local farmers are adversely affected by unpredictable market prices and when they have less control over market choices with the implementation of regional trade arrangements (South Asian Free Trade Area) (SAFTA), production of healthier food items could contribute to ensure the market share for local products.

Organic Movement in the Country

In Sri Lanka, our traditional farming system involved nature friendly techniques. With the introduction of green revolution in the '60s, there was a push for intensified and export oriented agriculture and therefore the use of inorganic chemicals for farming increased. The present day concerns of the 21st century are for more healthier and environmental friendly food/products thus there is a search for an alternative agriculture system which is organic farming.

Development NGOs in Sri Lanka have played a key role towards the development of organic farming for the last two decades. Gami Seva Sevana (Box 1) and Eco conservation based in Kandy, PALM Foundation (Participatory Action and Learning Methodology) and Future in Our Hands (Badulla) are such organizations. These organizations are involved

in a variety of activities pertaining to promotion and popularization of organic farming among farmers within the vicinity of their establishments. The laborious procedure involved in organic farming and the constraints faced by organic farmers in organic vegetable gardens in Nuwara Eliya illustrates the shape of organic farming system in the country (Weerakkody, 1999).

Crop Diversification

Multiple cropping is one of the distinguishable features of organic vegetable gardens. Instead of monocropping which is characteristic to upcountry vegetable gardens, organic farmers grow several crops. Crop diversification has provided them with several advantages, the most important of which is risk aversing due to pest and diseases. Meanwhile different crops planted at different times provide the farmers a continuous income and variety of food items for family consumption while ensuring the optimum utilization of manure, labour and water. Variety in the supply of vegetables to the market has helped farmers to derive benefits of price fluctuations through the supply of vegetables at higher prices when demand increases. They have also been able to minimize the variation in farm income when there is a failure of a particular crop, which is then, compensated by other crops they have grown.

Crop Rotation

Another distinct feature of the system is the practice of crop rotation. Instead of planting the same crop, as usually done in the market gardens, the farmer

has learnt to achieve maximum utilization of resources such as soil nutrients and water existing in different soil depths through crop rotation. The four year crop cycle employed by the farmers includes 8 cropping seasons at the frequency of 2 seasons/year, as one particular crop comes on the same field after 4 years. According to some farmers they have practised crop rotation for last two seasons depending on the soil characteristics of the farm, weather condition and the availability of water and labour.

Fallowing

In general, farmers keep 3-4 plots fallow every season mainly for the purpose of providing a habitat for natural predators such as frogs, birds, and garden lizards (*Sceloporus undulatus*). Weeds grown on fallow plots are utilized for animal feeding and manure production as well. In certain seasons farmers find difficulties in cultivating the whole farm due to scarcity of resources such as labour, water and in particular manure, therefore leaving 2-3 plots fallow. Unlike in market gardens, which practice intensive land utilization, fallowing has only permitted the cultivation of two crops per year in each plot. This avoids soil fertility depletion due to intensive cropping and provides time for rehabilitation of soil.

Soil Conservation

The initial operation for soil conservation is the preparation of contour terraced plots in steep lands. Each plot is surrounded by pasture that prevents soil erosion from the particular plot. The main drainage channel with silt pits serves the purpose of collecting soil washed away from the land. The water is diverted from the channel to the fishpond. Few large trees in the lowest portion of the farm also serve as a source of soil and water conservation purposes. Unlike market gardeners, these farmers refrain from weeding, land preparation and harvesting during rainy seasons. Wherever possible, minimum tillage is practised using only mamoty forks instead of mamoties

in order to protect both soil organisms and soil structure. Through a well-distributed cropping pattern farmers have been able to cover most of the plots with vegetation which avoids exposure of soil to the direct rainfall. Harvesting schedule based on clients demand, restricts harvesting of whole produce of the farm at once, therefore at a given time the entire land is not exposed to rain, wind and sunlight thus leading to both soil and water conservation. Live fence around the farm and hedgerows around plots have provided the overall protection to whole farm.

Organic Fertilization

The use of organic fertilizers varies. Liquid fertilizer prepared with herbs, compost produced with farm yard manure using different methods of production, bio slurry taken from the bio gas unit, crop residues and green manure harvested from live fence and trees are some of the organic manure that have proven to give the best results.

Pest Management and Bio Diversity Conservation

All possible biological interactions are adopted for the control of pests. Discontinuation of spraying of chemicals has enhanced pest predator relationship ensuring the environment required for the growth and behavior of natural enemies. The trees, live fence, hedge rows and fallow plots providing habitats for natural enemies serve this important purpose. Cultivation of plants such as Marigold and Coriander which have pest repelling qualities when leaves are crushed are found sometimes. Colorful flowers of the Marigold plant also encourage the behavior of useful insects in the field. Manual destruction of pests such as snails and slugs and use of sound making instruments for Bandicoots (*Perameles nasuta*) have been ef-

The main problem of organic growers attached to PALM foundation is transport and limited demand from the ECOSHOP which is the retail outlet of the organic products situated in Nuwara Eliya. Only 8.5% of the total harvest was sold at ECOSHOP while the rest was sold as inorganic products in 1997 (PALM Foundation, (1998)). In 1999 only 12% of organic growers are involved in the ECOSHOP accounting for the collection of 50% of the total produce. Therefore the current arrangements in this regard seem extremely unsatisfactory.

fective techniques in pest control. Once the above methods are not practicable, farmers use organic pesticides prepared with margosa (*Azadirachta indica*), and garlic. Bordure mixture is the mainly used fungicide.

Constraints for Farmer Adoption

Even though this difficult production system provide many socio-economic and cultural benefits it is unfortunate that the number of farmers involved in organic agriculture in developing countries is very few. Many constraints appear to contribute to the lack of interest and enthusiasm of farmers in adopting this farming system.

Organic Market

Marketing is the main constraint that has contributed to poor adoption of farmers.

Poor consumer awareness is a major setback for marketing of organic produce. This factor has led to farmers not obtaining the premium prices for organic products when compared to prices obtained on conventional products. The 'Future in Our Hands' currently has three sales outlets for organic products operating in Badulla, Badalkumbura and Malambe. Even though these outlets are operating for a period of more than one year, marketing is still a constraint. At the Malambe outlet the prices are higher but there is very little gain to farmers due to cost incurred in transportation from producing areas based in Badulla.

Certification and Labeling

Certification and labeling are two important aspects in the production and marketing of organic products, which build consumer trust towards particular food, which is found in countries favoring organic products. Organic producers in developing countries have limited access to such guaranteed certification service which lead to lack of consumer trust towards organic products.

Attitudes

Farmers view conventional farming as far superior to organic farming as the produce obtained from organic farming is generally sufficient for household consumption with a small quantity as surplus for marketing. This attitude and lack of knowledge has curtailed the spread of this system of farming. In addition, another factor is the huge investment of multinationals dealing in agrochemicals in the advertisements and promotion of the use of agrochemicals coupled with policies of fertilizer subsidies which have established the "chemical message" in the minds of farmers.

Labour Intensive Practices

Involvement of time consuming practices such as production of organic manure and bio pesticides and the need for live stock rearing in the farming system has caused a decrease in farmer interest. In Sri Lanka, most of the households in the farming community depend on both farm and off farm sources of income. Therefore, when household labour is allocated for other sources of employment, the labour intensive practices in organic farming become less profitable.

Non-availability of Organic Manure

Organic manure is not abundantly available in many areas. In such circumstances, integrated farming has

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been seen as essential for organic farming to be a success. However, in areas like Nuwara Eliya where land scarcity is severely experienced, organic farming is not a feasible option for every household. Shortage of labour further aggravates the situation.

Another constraint specific to some farms is scarce availability of suitable leguminous varieties for green manure purposes, which has restricted the production and utilization of high quality organic manure. Farmers also find difficulties in obtaining particular raw materials such as ash, dried leaves and poultry manure in the process of organic manure production.

Pest and Diseases

In general pest and disease problems are supposed to be comparatively less in this farming system. However, difficulties in the management of some uncontrollable pests, for instance bandicoots and some soil borne fungal diseases with available bio pesticides has caused a decline in farmers interest.

Unlike in chemical fertilizers which when applied to soil are rapidly releases nutrients to the soil solution, nutrients from organic manure are gradually released to the soil solution due to the microbial action which has to take place. Therefore farmers

do not derive the best results possible from organic farming when farms are converted from chemical to organic methods. This has resulted in negative effects on the farmer adoption.

All these constraints have contributed to low income from organic farming, which has been the major cause for poor farmer adoption for this nature friendly farming system. For the promotion and adoption of this farming system developing countries like Sri Lanka has to come up with more effective strategies and methods.

Concluding Remarks

Significance of sustainable systems such as organic farming is becoming more and more important in Sri Lanka due to adverse consequences of conventional farming. Except for the role played by development NGOs in the promotion of this system, policies and programmes of the government sector to develop a viable organic farming system is insufficient.

Some innovative farmers, though in minority, have succeeded in achieving the environmental, health and economic benefits through the integration of organic concepts and practices in their farming systems. However, despite proven aspects of sustainability, the progress in farmer adoption has been constrained by several factors. Discouraging attitudes, information gap, scarcity of resources such as labour and land, less productivity of current organic farming systems, pest and diseases, lack

of certification services, marketing problems and poor consumer awareness are among such constraints.

Research, information and communication, training, certification and raising consumer awareness are all crucial for further development of the organic sector. Therefore, holding consultations with various government and private sector agencies and individuals to assess and evaluate how present efforts could be improved and made more effective may have a significant impact in this regard. Moreover, coordination of all existing efforts and giving organic farming a strong emphasis through the declaration of policy of the government to promote, propagate and assist the practice has been timely need in the context of sustainable agriculture development.

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