

Multi- enterprise Agriculture System

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In India, the majority of farmers are small and marginal with land holding less than two hectares. They generally practice subsistence farming where they need to produce a continuous, reliable, and balanced supply of foods, as well as cash for basic needs and recurrent farm expenditure. It has been noticed that a farmer with a family of 5-6 persons and almost equal number of cattle is unable to bear daily expenditure from subsistence rice based cropping system. Rice based cropping system for over four decades in Indo-Gangetic alluvial plains has caused the degradation of natural resources of water, soil, climate, and biodiversity. Depletion of ground water table, declining of soil fertility with several nutrient deficiencies, increasing concentration of green house gases (GHGs) in the atmosphere due to huge burning of rice and wheat residues are some of the negative impacts of this farming system. Depleted ground water table has compelled the farmers to replace shallow cavity tube wells (centrifugal pumps) in Punjab and Haryana with deep bore wells (submersible pumps).

Due to intensive urbanization and industrial development, average land holding size is shrinking, making agriculture less profitable, thus causing migration of farmers to urban areas for employment, and also selling of agricultural lands. The recent National Sample Survey figures indicated that 40% farmers in India are reluctant in farming. Traditional rice based cropping system provides income to farmers only twice a year at the time of crop harvesting. To ensure the income throughout the year, there is need to reorient the present ways of agricultural practices and develop suitable multi-enterprise agriculture system for farmers as single crop production enterprises are subject to a high risk of natural calamities and seasonal, irregular, and uncertain income and employment of the farmers. Shifting from a crop, commodity and enterprise based agriculture to integrated multi-enterprise system will help to conserve natural resources and restore the farmers' confidence in agriculture besides increasing income of the farmer per unit land and water. The multi-enterprise farming systems will provide required proofing for climate change related aberrations such as drought, floods, heat, and cold waves etc. The governing idea behind multi-enterprise agriculture system is that a farmer can adopt enterprises such as dairy, horticulture, floriculture, bee keeping, vegetable, poultry, duckery, piggery, mushroom, fisheries, *gobar* gas plant and solar heater etc. depending upon resources and capital, marketing scope and processing options to improve family income and generate employment at farm level.

Multi- enterprise agriculture system has several components. A conceptual model with its component and resource flow has been depicted in Fig. 1. Grain Production component ensures household food security besides income, fodder production component helps to generate regular income, vegetable and horticulture based components, usually restricted to the dykes of the farm pond, provide nutritional security to the farm family, generate regular income throughout the year and help in carbon sequestration by the plants. Fish farming in the pond provides nutritional security, high seasonal income. Other components such as floriculture, bee keeping, poultry, duckery etc. could be added depending upon resources of the farmers' and expertise available in the village. The *gobar* gas plant could be added to provide clean fuel for cooking and light and in addition to organic manure and fish feed. The aim of taking up various enterprises should be to utilize the entire residue generated from all enterprises within the system. As the organic manure generated from *gobar* gas plant would be able to meet the nutritional requirement of vegetable and horticultural crops, the system will also pave the way for organic farming.

Multi-enterprise agriculture system helps to increase productivity and profitability through integrated use of water, nutrient, and energy in small farms. It has the potential to reduce cultivation cost by synergetic recycling of bi-products/residues of various components within the system and ensure a regular source of income and employment. The multi-enterprise agriculture system adopted on a small piece of land should help to improve the economic conditions of resource poor farmers and provide better opportunities for employment at farm level by producing food, feed, fodder, fibre, fuel, etc.

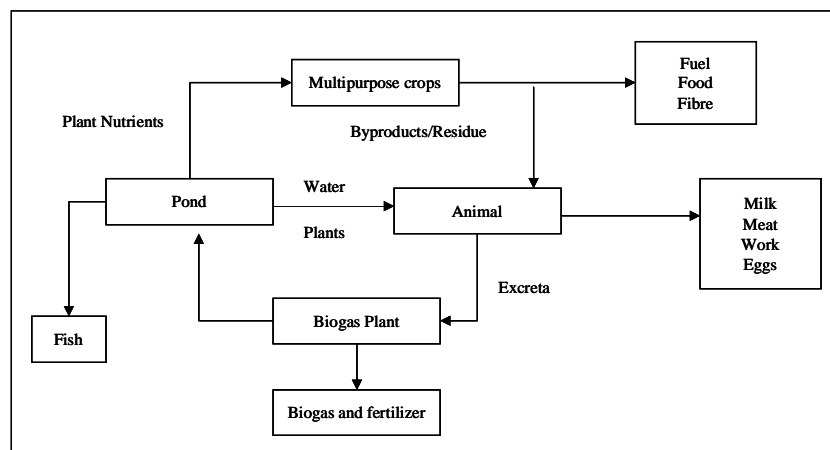


Fig 1: Different components and resource flow in multi-enterprise agriculture model

The entire philosophy of multi-enterprise farming system revolves around better utilization of time, money, resources, and family labor. The farm family gets scope for employment round the year thus ensuring good income and decent standard of living. Small size farms can earn a living provided the farmers do all the field operations as well as marketing themselves. The income can further be increased if the farmers can manage to harvest the produce during festivals. Timely harvest can also help to fetch high price.

A multi-enterprise agriculture model was initiated at the experimental farm of Central Soil Salinity Research Institute, Karnal in 2006 in 2.0 ha land (Singh, *et al.*, 2009). Main theme of this model was to develop farming options, which the small farmers can adopt to earn livelihood from his small land holdings and also the adopted practices contribute to the reversion in degradation of natural resources. An on-farm pond serves as the nucleus of the whole enterprise. The various enterprises were decided on the basis of agro-climatic conditions and enterprising nature of the farmer. Some of components yielded as much as Rs. 395 on per day basis with a total expenditure of about Rs. 179 per day (Table 1). All these programmes not only provide self employment to the family but also help to generate employment for landless in the village. Regular source of income saves the rural poor from the clutches of the moneylenders also.

Table 1: Average and per day revenue generation, expenditure and net income from (April 2007 to December 2009)

Multi-enterprise components	Revenue generation (Rs.)		Expenditure (Rs.)		Net income (Rs.)	
	Total	Per day	Total	Per day	Total	Per day
Milk+ compost +Biogas	145790	454	45657	143	100133	312
Fruits and vegetables on pond dykes	18339	55	*00	*00	18339	55
Fish	14127	45	2588	8	11539	36
Poultry and ducks	5052	14	8361	24	-3308	-10
Mushroom	1915	6	1333	4	582	2
Total	185222	575	57939	179	127284	395

* Nursery was managed from the vegetable component of the multi-enterprise model

The resources within the system will be recycled to increase water, nutrient, and energy use efficiency. The animal, fishery, poultry and duckery components should get feed and fodder from the crop components. Dung produced by the animals will be used in different ways like composting, fertilizing fruits and vegetables cultivated on pond dykes, for biogas generation to meet the daily energy requirement of kitchen and for 'feed' for fishes. Nutrient rich pond water can be source of irrigation for the crops around the pond and in the crop field during summers. All the resources are recycled within the system. Feed Concentrates for the animals also come from the crop component. Animal feed is prepared at site to reduce the cost of inputs and to ensure the quality of the feed.

Suitable farm planning is required for effective integration of several enterprises with crop production activities. Integration of farm enterprises depends on many factors such as soil and climatic features of the area,

availability of the resources (land, labor, and capital), present level of utilization of resources, income from present farming system economics of proposed multi-enterprise agriculture system, managerial skill of farmers and social customs prevailing in the area etc. Integration of different enterprises with crop activities as base will provide ways to recycle produces and waste materials within the system to bring improvement in soil health and reduce the cost of production which will raise the total income of the farm.

To mitigate risks and uncertainties of income from crop enterprises and reduce the time lag between investment and returns it is essential that farmers should include multi- enterprises in their production system to generate regular income throughout the year.

Interaction among the components in a farming system should be complementary with least competitiveness. Advantages of integrated farming system approach are pooling and sharing of resources, efficient use of family labor, conservation, preservation and utilization of farm biomass including non conventional feed and fodder resources, effective use of organics, regulation of soil fertility and soil health, income and employment generation for many people and increase in economic status by utilization of under utilized resources in an efficient and remunerative manner.

Several specific possibilities for integration of various livestock enterprises with crop production for small and marginal land holders under irrigated and dry land situations of semi-arid tropical regions of India were introduced and field tested over extended periods starting in the mid-1980s. However, actual adaptation rates of multi-enterprise agriculture are limited and unevenly distributed among the farmers. Major production constraints are labor and animal feed shortages throughout the year, and soil degradation. Long transition time may be required for implementation of multi- enterprise agriculture model. Disincentive from government subsidies in adopting multi-enterprise agriculture system, credits for fertilizers, and herbicides are the constraints. High start-up costs may restrain farmers from switching to multi- enterprise system and enjoy the benefits of resource integration.

Though, Indian farmers are raising crops and livestock together, there is a significant challenge in promoting and supporting the widespread adoption of productive, remunerative, eco-friendly and self-sustaining multi-enterprise agriculture model. A radical thinking of agricultural education, research, and extension professionals is required for shifting of traditional farming to multi-enterprise farming systems. Agricultural professionals, including farmers, require different types of orientation and training with emphasis on holistic concepts, cooperation, and utilization of natural resources, understanding existing farming systems, and indigenous knowledge of the local farmers. Government and financial institutions supports for subsidized loan towards the structural need for adopting integrated farming systems. Trainings and update of knowledge to farming professionals including farmers are needed for adoption and continuous monitoring of multi- enterprise farming system. In India, various State Agriculture Universities have introduced courses on holism and multi- enterprise farming system concept. Other training activities; like summer / winter school and short term courses on farming system concepts, should be carried out by various universities, institutes and other agencies to encourage teachers, scientists, extension workers and others involved in such programmes for knowledge updation..

Reference:

Singh, G. *et al.* 2009. Eco-friendly Integrated Enterprise Model for Livelihood Security in Samlla Farm Holdings. Bulletin CSSRI/Karnal/2009/05. Central Soil Salinity Research Institute, Karnal. Pp28.