

Enhancement of production, income and employment generation through Integrated Farming System

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The study was conducted in selected farmers' fields with pond used for production of fruits and vegetables produce under rainfed region. Pond was an essential and viable component of the trial with vegetable production system. The trial was formulated in two treatments in which the first treatment or technology option was disintegrated farming practices i.e. monoculture of soybean or paddy/wheat or chickpea cultivation only without integration with agri-horticultural crops or no systematic utilization of resources without appropriate combination of vegetables round the year. The second technology was integrated farming system in which various enterprises like fruits and vegetables crops, dairy along with poultry and fish-farming were taken. This was compared with the conventional monoculture. The data were taken in the standardized unit fields of 3 different villages from Panna, and Ajaygarh block of Panna district.

Key words: Employment generation, Income, Integrated Farming System, Production

FROM the last few decades, agricultural scientists in the developed and developing countries were looking for an alternate agriculture system to increase the net income per unit area of these farmers and improved their living of standard. Because currently agriculture production has stagnation after paying all input (seed, pesticide and fertilizers) in this area due to dominance of monoculture and adoption of monocropping system. Under this situation integrated farming system provides good opportunity to improve the economic levels of the marginal-and-small-farmers as an appropriate alternative innovation in this region.

Integrated farming system is one of the important tools to increase the production, income and employment generation of the nation. This system increases effective recycling of residue waste for better management of available resources and to generate

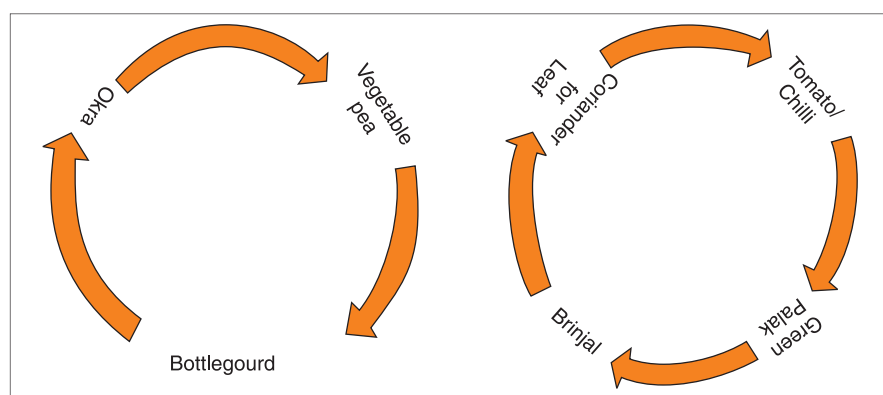


Fig. 1. Crop calendar provided by KVK Panna

more income and employment for family labourers during on/off seasons. Conventional agriculture has caused economic problems associated with increased costs of energy-based inputs and decreased farm incomes day-by-day of the farmers.

Technology dissemination

To overcome these problems by new module of integrated farming system in 2 ha area during formal and

informal meeting with farming community to minimize the risk and maximize the profit and employment for the progressive farmers.

However, after KVK's intervention through on-farm testing, front-line demonstrations and training programmes few farmers were motivated to follow the integrated farming system involving various enterprise. Integrated farming system was adopted by

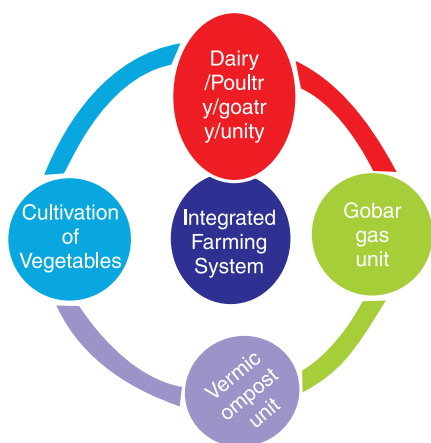


Fig. 2. Module of Integrated farming system developed by KVK, Panna

progressive farmers between 2013 and 2016. Under this module farmers have 2 buffalo (murrah/*desi*), 2 cows (Sahiwal/*desi*) and 17 hens (Kadaknath) one portable bio-gass and remain in 2.0 and 1.0 acre area under vegetable cultivation and horticultural crop (i.e. guava and papaya, orchards) respectively under progress. Their farms were nearest to district/block headquarters where market is available to sell vegetables at genuine rate. Under this situation scientists of KVK, Panna provided crop calendar for cultivation of vegetable around the year (vegetable pea-bottlegourd-okra and tomato/chili -brinjal) and demonstration of fodder crops (fodder maize and barley and perennial grass Napier) on their own field for animal feeding. In this regards KVK, Panna evaluated of this module through comprehensive questionnaire to obtain information for more yield, net income and employment generation under this module. The yield data from demonstration field and farmers' crop was collected time-to-time as per need. In subsequent years (2013-2016), the horizontal spread of the Integrated farming system in the district was made through frequent farmers contact, interface with farmers, training to farmers and Rural Agricultural Extension Officer, *Krishak Sangoshthi* and field days about good yield attributes of the crop and livestock. Besides, some progressive farmer also disseminated the information about integrated farming system among the farming

community through personal contact in subsequent years of study. For economic evaluation in gross and net return, and cost: benefit ratio, the prevailing rates for input, labour and produce was utilized.

Field performance

Integrated farming system is a good tool to increase the production, income and employment generation through integration of crop-livestock-fisheries and poultry. Integration is one which focuses on judicious combinations of anyone or more of such enterprises and effective recycling of residue waste for better management of available resources to generate more income and employment for family labourers during on/off seasons. The crop yield was more 32 to 35 %, net income and B:C ratio ` 55,000/ha and ` 3.2 obtained from one rupees invested from vegetable, and ` 93,800/year from livestock (without included purchased cost) and after selling of additional 41 hens will be received more money ` 16,600 as compared to traditional farming system net income ` 20,000, 35,000 and 9,880 and their B:C ratio 1:2.2 and 1:3.1 respectively (Table 1). The highest level of employment (365 man-days/year) was achieved in livestock and total employment of 523 man-days/year/ha under integrated farming system as compared to traditional farmers' practices 365 man-days/year/ha.

Impact of research and technology

In this system more cash income

could significantly influenced on level of farmers' knowledge and their standard of living pattern. Integrated Farming System is economically viable, technically sound and practically feasible under changing climatic situation. Therefore farmers will benefit to utilize this type of module to enhance production, income per unit and also saving hazardous pesticides and chemical fertilizers with to save the natural climate. Over all this system will help to achieve more income and escape of poverty from their own side.

Thus, this technology reasonably brings down the risk and maximized the utilization of resources through judicious use of all enterprises. Because this system increases effective recycling of residue waste for better management of available resources and to generate more income and employment for family labourers during on/off seasons. Conventional agriculture has caused economic problems associated with increased costs of energy-based inputs and decreased farm incomes day-by-day.

Conventional agriculture is known to cause soil and pasture degradation because it involves intensive tillage, in particular, if practised in areas of marginal productivity. An integrated crop-livestock farming system represents a key solution for enhancing livestock production and safeguarding the environment through prudent and efficient resource use. The increasing pressure on land and the growing demand for livestock products makes it more and more important to ensure the

Table 1. Economic analysis of the technology

Particulars	Economic parameters	Improved production practices	Farmers practices
Improved production technique of vegetables crops	Cost of cultivation (₹/ha)	57,500	53,800
	Gross Income (₹/ha)	185,000	117,800
	Net Income (₹/ha)	55,000	20,000
	B:C Ratio	1:3.2	1:2.2
Livestock management	Cost of cultivation (₹/unit)	175,000	110,000
	Gross Income (₹/unit)	268,800	145,000
	Net Income (₹/unit)	93,800	35,000
Poultry	Cost of production	6,800	4,500
		(17 hens/unit)	(17 hens/unit)
	Gross income (₹/unit)	23,400	14,350
	Net Income (₹/unit)	16,600	9,850
	B:C Ratio	1:3.4	1:3.1
Employment generation	Man-days/year/head	523	365

effective use of feed resources, including crop residues. An integrated farming system consists of a range of resource-saving practices that aim to achieve acceptable profits and high and sustained production levels, while minimizing the negative effects of intensive farming and preserving the environment. Based on the principle of enhancing natural biological processes above and below the ground, the integrated system is the combination that reduces erosion, increases crop yields, soil biological activity and nutrient recycling intensifies land use, improving profits can therefore help reduce poverty and malnutrition and strengthen environmental sustainability. The waste products of one component serve as a resource for the other. For example, manure is used to enhance crop production; crop residues and by-products feed the animals, supplementing often inadequate feed supplies, thus contributing to improved animal nutrition and productivity. Integrating crops and livestock serve primarily to minimize risk and not to recycle resources. In an integrated system, crops and livestock interact to create a synergetic, with recycling allowing the maximum use of available resources. Crop residues can be used for animal feed, while livestock, its by-product production and processing can enhance agricultural

productivity by intensifying nutrients that improve soil fertility, reducing the use of chemical fertilizers of 50% of cereals crops/nutrient exhaustive crops and 100% of pulse crops save their expected cost ₹ 2,240/ha of both crops. If biogas is installed in homes, the family only has to spend ₹ 2,400 on the first 6 cylinders of LPG with subsidized rate according to the new government provisions, the remaining 6 is taken care by biogas, resulting in an average savings of ₹ 4,800/year of each small family. This technology will be horizontally spread mainly due to effective dissemination of integrated farming system by bringing awareness among farmers and farm-women along with Rural Agricultural Extension Officer of the village through various field oriented activities, training programmes and availability of literature related to package and practices of soybean crop.

FUTURE PROSPECTS

This technology is applicable in agro-climatic zone of Kymore Plateau and Satpura hills zones of Madhya Pradesh. Since monotonomy cropping system was adopted for four decade by farming community of this zone, which do not fulfill all requirement of their family due to uncertainty of weather and open grazing by domestic and wild animals. In this

situation integrated farming system is boon for farming community to generate income employment for around the year. This will be significantly influenced on level of farmers' knowledge and their standard of living pattern. Integrated farming system is economically viable, technically sound and practically feasible under changing climatic situation. Therefore farmers will be benefited to utilizing this type of module to enhance production, income and also save hazardous pesticides and chemical fertilizers.

SUMMARY

Over all above discussed system will help farmers to achieve more income and overcome from poverty. Popularity of this technology will increase day-by-day among the farming community in Panna district. The long-term impacts of this technology on eco-friendly food production, natural resources (land and water) and linkages with poverty alleviation should be further explored. The participatory research at farmers' field could play pivotal role in technology improvements and dissemination.

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