

Enhancement of production, income and employment generation

through integrated farming system: a case study

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Conventional agriculture is known to cause soil and pasture degradation because it involves intensive tillage, 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 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 Integrating crops and livestock serves primarily to minimize risk and not to recycle resources.

Key words: Employment, Income, Integrated farming system, Production

IN Panna district of Madhya Pradesh, majority of the farmers are either small or marginal, and the income from agriculture sector is not sufficient to run their families. Due to fragmentation of land holdings, even after adoption of improved agricultural technology and practices, their economic condition has not improved. From the last few decades, agricultural scientists in the developed and developing countries are looking for an alternate agriculture system to increase the net income per unit area for these farmers and improved their living standard. Agriculture production has reached 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 livelihood of the marginal and small farmers. 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 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. To overcome these problems the study has taken module of integrated farming system in two hectare area (2.0 ha) during formal and informal meeting with farming

community to minimize the risk and maximize the profit and employment for the progressive farmers.

Methodology for technology dissemination

The study was conducted in selected farmers' fields with pond used for production of horticultural and vegetable produce under rainfed region. Pond was an essential and viable component of the trial with vegetable production system. The trial was formulated in terms of 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 horticultural crops, vegetable 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 farmers in 3 villages of Panna and Ajaygarh block of Panna district. The standardized unit size of each farmers having 2.0 ha of land was only following monotomy cropping system. However, after KVK's intervention through on-farm testing (OFT), front line demonstrations (FLD) and training programmes. The farmers were motivated to follow the integrated farming system involving various enterprises.

Integrated farming system was adopted by progressive farmer Sri Laximan Das and Sri Manmohan Kuswaha, village Janwar, Block and District- Panna and Sri Hanumant Pratap Singh, village Visaramanj, Block-Ajaygarh, District-Panna during 2013-16. Under this module, farmers had 2 buffalo (*Murrah/desi*), 2 cow (*Sahiwal/desi*), 17 hens (*Kadaknath*), one portable biogas and remain (2.0 and 1.0 acre) area under vegetable cultivation and horticulture crop i.e. guava and papaya orchards under progress. Their farm is nearest to district/block head quarter where market is available to sell the vegetables at appropriate rate. Under this situation

scientist of Krishi Vigyan Kandra (KVK) Panna provided crop calendar for cultivation of vegetable around the year (pea-bottle guard-okra and tomato/chili-brinjal) and demonstrated fodder crops (maize and barley and perennial grass Napier) on their own field for animal feeding (Fig. 1). In this regards, KVK, Panna evaluated 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 farmer's 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 (RAEO), *Krishak Sangoshthi* and field days about good yield attributes of the crop and livestock. In addition, 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 term of gross and net return and cost benefit ratio, the prevailing rates for input, labour and produce were utilized.

Field performance: The crop yield was 32-35% more, net income ₹ 55,000/ha and B:C ratio 3.2 and ₹ 93,800/year from livestock (without purchasing cost) and additional ₹ 16,600 from sale of 41

hens as compared to traditional farming system with ₹ 20,000-35,000 net income and 9,880 and their B:C ratio 1:2.2 and 1:3.1 respectively. 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 365 man days/year/ha in traditional farmer's practices.

Impact of technology: Integrating crops and livestock serves primarily to minimize risk and not to recycle resources. In an integrated system, crops and livestock interact to create a synergetic effect, with recycling allowing the maximum use of available resources. Crop residues can be used for animal feed, while livestock and livestock by-product production and processing can enhance agricultural productivity by intensifying nutrients that improve soil fertility, reducing the use of chemical fertilizers by 50% cereals crops/nutrient exhaustive crops and 100% of pulse crops (saved ₹ 2,240/ha of both crops). If biogas is installed at homes, the family has to spend only ₹ 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 a 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 RAEO of the

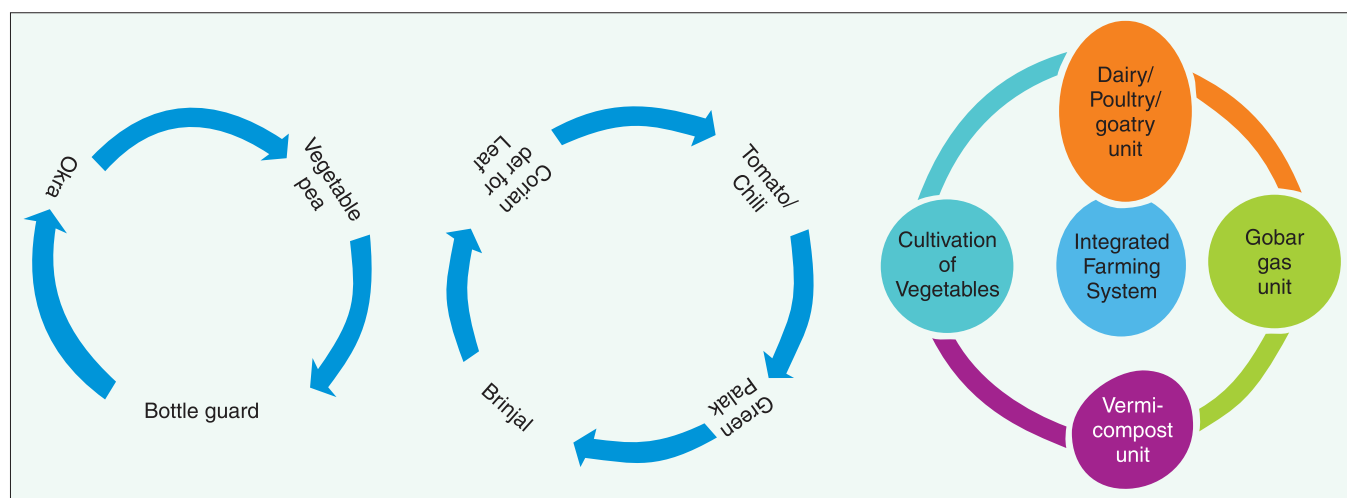


Fig. 1. Crop calendar provided by KVK, Panna.

Table 1. Economic analysis of the technology

Particular	Economic parameters	Improved production practices	Farmers practices
Improved production technique of vegetables crops	Cost of cultivation (₹/ha)	575,00	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
Live stock management	Cost of cultivation	175,000	110,000
	Gross income (₹/unit)	268,800	145,000
	Net income (₹/unit)	93,800	35,000
Poultry	Cost of production	6,800 (17 hens unit)	4,500 (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

generate income employment for around the year. This will be significantly influenced on level of farmer's knowledge and their standard of living pattern. IFS are economically viable, technically sound and practically feasible under changing climatic situation benefited to utilize this type of module to enhance production, income and save hazardous pesticides and chemical fertilizers to save the natural climate. Over all, this system will help to achieve more income and escape of poverty. The long-term impacts of this technology on ecofriendly food production, natural resources (land and water) and linkages with poverty alleviation should be further explored.

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village through various field oriented activities, training programme and availability of literature.

Future prospects

This technology is applicable to whole agroclimatic zone of Kymore Plateau & Satpura hills zones of

Madhya Pradesh. Monotony cropping system was adopted for four decade by farming community of this zone. 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

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