Plant Archives Vol. 19, Supplement 2, 2019 pp. 515- 518 **e-ISSN:2581-6063 (online), ISSN:0972-5210**

INCOME AND EMPLOYMENT GENERATION AND RESOURCE PRODUCTIVITIES OF DIFFERENT FACTORS IN INTEGRATED FARMING SYSTEMS IN VINDHYAN PLATEAU OF MADHYA PRADESH

Pandey, P.R.; Gupta, J.K.; Narvariya, R.K.; Meena, S.C. and Narwariya, D.
M.G.C.G.V., Chitrakoot, Satna , (M.P.), 485334, India

Abstract

Agriculture in India has a long history dating back to nearly ten thousand years. In ancient times, farming means not just for food production or income generation but it was a source for community development. Agriculture is not only the main source of livelihood but also a tradition and the most common way of life. It has been enjoying since times immemorial a place of pride in our economic and social life. Indian agriculture has accountability of providing national as well as household food and nutritional security to its spilling over millions. However, in the course of development agriculture, the means of livelihood of almost two-thirds of the work force in the country has been revolutionized by the *Green Revolution*. That has also changed India's status from a starving nation to one of the world's leading agricultural nation. Though, the green revolution proved a boon for hungry India, it has created severe consequences on our ecosystem and its sustainability.

Keywords **:** Integrated Farming Systems, Vindhyan Plateau, employment generation

Introduction

Agriculture has a large potential to contribute to the national income while at the same time provide direct employment and income to the numerically larger and vulnerable sections of the society and to increase the exports to earn the much needed foreign exchange. Agriculture continues to hold the key to the progress of the country. Agriculture has also importance due to that it produces raw material for the industries. Some of the biggest industries, e.g., cotton, jute and sugar for their raw materials, depend on agriculture. Again, agriculture provides the bulk of the demand or the main market for industrial goods. Therefore, for food and clothing, the two primary necessaries of life, we have to depend on cultivation, It is serious challenge for agriculture planner that the Indian farmers poses a serious problem that majority of them are have dry lands, which depend on erratic monsoon rains. The farmers concentrate mainly on crop production, which is invariably subjected to a high degree of uncertainty in income and employment.

So as to relieve dangers and vulnerabilities of salary from harvest endeavors and to diminish the time slack among venture and returns, it is fundamental that the ranchers incorporate such of those enterprises in their production programme that yield regular and evenly distributed income throughout the year and are not subjected to vagaries of nature. Further the income from farming alone is hardly sufficient to sustain the farmer's family and therefore the farmers are to be assured of a regular income by adopting other allied enterprises which will complement their cropping activity. The adoption of enterprise must be based on the principle of minimizing the competition and maximizing the complementarities among the enterprises.

Agriculture in Madhya Pradesh is also characterized among other things, by the problem of wide year-to-year fluctuation in production and hence, the farm income also varies. The absence of assured irrigation in most of the areas of the state and lack of appropriate technology for dry land and drought prone areas further compound the problem. The low crop yield and high year-to-year variations continue to be a major problem in the state. Further the variation in fertility status of soils is quite high and so is the vegetative cover across the agro-climatic zones.

Cost effectiveness and efficiency of production are the basic principles of globalization. Cost effectiveness, efficiency and profitability can be realized by (a) improving efficiency of inputs, (b) enhancing genetic productivity, (c) harnessing complentarities of enterprises through systems approach and (d) capacity building and creation of enabling environment through organization and management reforms. The unique farming situation of small fragmented holdings, lack of capital investments, and necessity of recycling, year round employment and risk avoidance is not suitable for single commodity farming.

Studies of farming systems determine that it is important not only from the view point of planners but from the view point of farmers also. The planners are mainly concerned with the farming of policies in the national interest while the farmers are interested in maximizing their profit. Sound resource base and unmatched development in technical breakthrough are obvious reasons behind the efficiency of any farming system.

In the economic point of view the importance of farming system can be determine that agriculture, as in any other business, the efficiency is achieved by an optimum utilization of resources. Resources include land, labour, capital, irrigation facilities etc. Optimum allocation of land and other resources is defined as what crops to undertake, how much land to allocate to each crop activity and what method and combination of inputs to use for each crop so that the farm returns are maximum. In a traditional agriculture, little allocative inefficiency is reported. Increasing cost of farm inputs and decreasing profitability of production of farm commodities has been making, agriculture a losing proposition. In view of this, it is necessary that the available inputs should be used economically and efficiently. The efficiency of farming depends on such combination of resources that is most economical to secure a given output. The relation between the money value of outputs and inputs is thus a measure of efficiency. The higher the output per unit of input, the greater

is the efficiency of a given resource and conversely, the greater the efficiency of resources, the greater would be the output. The maximization of efficiency is therefore a condition for the maximization of income.

Materials and Methods

The present study confined to Vindhyan Plateau agro-climatic region of Madhya Pradesh. This Plateau has been selected randomly which are friendlier to adopt Integrated Farming System. In selection process out of seven districts in Vindhyan Plateau, 3 selected districts Bhopal, Vidisha and Sehore. Bhopal district comprises of 2 development blocks namely Berasia and Phanda. The Vidisha district comprises of 10 development blocks namely Vidisha, Ganjbasoda, Gulabganj, Gyaraspur, Kurwai, Lateri, Nateran Shamshabad, Sironj and Tyonda. On, the other hand, the Sehore district is comprises of 5 blocks, namely Astha, Budni, Ichhawar, Nasurallaganj and Sehore. One block from each selected district has been selected on the basis of adoption of Integrated Farming System prevailed in the area. For economic analysis cost concept and profitability concepts have been used, on the other hand, Cobb-Douglus production functions was used to find out the resource productivity. The resource productivity was measured using Cobb–Douglus production function with the help of least square technique and coefficients of elasticities of major resources along with value of R^2 and F ratio.

Results and Discussion

Due to fragmentation of land holding and small area under crops the general farmers were become weak in terms of generating adequate income and sustaining their own livelihood. In process of crops cultivation the general farms does not generate enough income to keep a farm family out of poverty despite high productivity and higher management due to uneconomic size of holding. On the other hand, the higher number of family members (family labours) were found under employed during a year of prevailing farming system or cropping system. The prevailing farming situation (crop husbandry alone) in general, calls for an integrated effort to address the emerging issues . The integrated farming system approach is considered to be the most powerful tool for enhancing profitability in respect to farm income and farm employment generation in farming community.

- The detail of income and employment generation during the year under Integrated Farming Systems over to crop husbandry (Farming system I) had presented in table 1.
- Beside the crops production in a year, in study area 3 most important farming systems were also prevailing at farm level. The data of relative change in income and employment generation from farming system IInd (Crops + Vegetables), IIIrd (Crops + Dairy) and IVth (Crops + Poultry) over to crop husbandry in study area found to increase in positive way. Accordingly, overall the income generation in these farming system were increased by (188.87%) over base farming system i.e. crop husbandry alone Ist. On the other hand, in respect to overall relative change in employment generation of these farming system were increased by (128.10%) over base farming system i.e. crop husbandry alone Ist. It can be concluded that the Integrated Farming System provided additional (188.87%) farm income and additional (128.10%) family labour to the farmers over crop husbandry alone.

It is known that the main components of Integrated Farming Systems in study area were found to vegetable production, dairy production and poultry production along with crop production. Hence, the production function of these enterprises had been estimated separately due to different resources were used in production of these enterprises.

Production function analysis of vegetable:

The detail results of production function for estimation of resource productivity in vegetable cultivation had been presented in table 2

The values of coefficient of multiple determination of R^2 were found to be high (98.50%) in vegetable cultivation which indicated that the selected resources in the production function were the best fit.

In vegetable cultivation the values of regression coefficient of overall average holding expenditure on human labour (β=0.486**), seed (β=0.561**) and plant protection measure (β=0.236**) were found to be positive and highly significant.

On the other hand, values of regression coefficient of fertilizer application found to negative and significant (β=-0.152*). It is also found that values of regression coefficient of irrigation charges also found to negative and non significant (β=-0.132 N.S.).

This showed that the utilization of resources except fertilizer application and irrigation charges was being done properly. It is also concluded that vegetable growers used human labour, seed and plant protection measure inputs more efficiently as these inputs independent variables shown positive contribution on gross return of vegetable cultivation. On the other hand, they used higher dose of fertilizer and irrigation.

Production function analysis of dairy:

The detail results of production function for estimation of resource productivity in dairy production had been presented in table 3.

The values of coefficient of multiple determination of R^2 were found to be high (98.30%) in dairy production which indicated that the selected resources in the production function were the best fit.

In dairy production the values of regression coefficient of overall average expenditure on human labour (β=0.871**) and green fodder (β=0.131*) were found to be positive and significant. On the other hand, values of regression coefficient of dry fodder was also found to positive and non significant (β=0.054 N.S.). This showed that the expenditure on human labour, green fodder and dry fodder were positive contributed to gross income from milk production.

It is also found that values of regression coefficient of concentrate found to negative and non significant (β=-0.018 N.S.).

This showed that the utilization of resources except concentrate charges was being done properly. It is also concluded that dairy farmers used human labour, green fodder and dry fodder inputs more efficiently as these inputs independent variables shown positive contribution on gross return from dairy production. On the other hand, they used higher level of concentrate.

Production function analysis of poultry:

The detail results of production function for estimation of resource productivity in poultry production had been presented in table 4.

The values of coefficient of multiple determination of R^2 were found to be high (99.80%) in poultry production which indicated that the selected resources in the production function were the best fit.

In poultry production the values of regression coefficient of overall average expenditure on layer feed (β=1.174**) was found to be positive and highly significant. On the other hand, values of regression coefficient of Grower feed was also found to positive and non significant (β=0.085 N.S.). This showed that the expenditure on layer feed and grower feed were positive contributed to gross income from poultry production.

It is also found that values of regression coefficient of human labour (β=-0.014 N.S.) and chick feed (β=-0.248*) found to negative.

This showed that the utilization of resources layer feed and grower feed were being done properly. It is also concluded that poultry farmers used layer and grower feed inputs more efficiently as these inputs independent variables shown positive contribution on gross return from poultry production. On the other hand, they used higher level of human labour and chick feed.

As per the null hypothesis III "farmers are not properly allocating the different factors of production in prevailing farming system", it is concluded that in different farming systems the few resources were allocated efficiently and on the other hand, few resources were allocated inefficiently. Hence, this hypothesis may be considered accepted in some cases and in some cases it was rejected.

Conclusion

Beside the crops production in a year, in study area 3 most important farming systems were also prevailing at farm level. The data of relative change in income and employment generation from farming system IInd (Crops + Vegetables), IIIrd (Crops + Dairy) and IVth (Crops + Poultry) over to crop husbandry in study area found to increase in positive way. Accordingly, overall the income generation in these farming system were increased by (188.87%) over base farming system i.e. crop husbandry alone Ist. On the other hand, in respect to overall relative change in employment generation of these farming system were increased by (128.10%) over base farming system i.e. crop husbandry alone Ist. It can be concluded that the Integrated Farming System provided additional (188.87%) farm income and additional (128.10%) family labour to the farmers over crop husbandry alone.

In case of vegetable production data showed that the utilization of resources except fertilizer application and irrigation charges was being done properly. It is also concluded that vegetable growers used human labour, seed and plant protection measure inputs more efficiently as these inputs independent variables shown positive contribution on gross return of vegetable cultivation. On the other hand, they used higher dose of fertilizer and irrigation. In case of dairy data showed that the utilization of resources except concentrate charges was being done properly. It is also concluded that dairy farmers used human labour, green fodder and dry fodder inputs more efficiently as these inputs independent variables shown positive contribution on gross return from dairy production. On the other hand, they used higher level of concentrate. In case of poultry production data showed that the utilization of resources layer feed and grower feed were being done properly. It is also concluded that poultry farmers used layer and grower feed inputs more efficiently as these inputs independent variables shown positive contribution on gross return from poultry production. On the other hand, they used higher level of human labour and chick feed.

Table 1 : Income and employment generation during the year under Integrated Farming Systems. (%)

S.No.	Farming system	Income (Rs.)	Employment (days)
1.	1st - Crop husbandry	25084 (100.00)	121 (100.00)
2.	2nd – Crops + Vegetables	42546 (169.61)	143 (118.18)
3.	3rd – Crops + Dairy	61322 (244.47)	175 (144.63)
4.	4th – Crops + Poultry	38258 (152.52)	146 (120.66)
5.	Average of farming system II, III and IV	47375 (188.87)	155 (128.10)

Note : Figure in parenthesis denotes percentage over farming system Ist

Table 2 : Production function coefficient of vegetable production on the sample farm.

S.No.	Independent variable	b value	std. error	t' value
1.	Human labour utilization (days)	0.486**	151.303	3.400
2.	Seed (Rs.)	0.561**	4.412	3.689
3.	Fertilizer consumption (Rs.)	-0.152*	1.249	-1.625
4.	Plant protection measure (Rs.)	0.236**	2.117	3.315
5.	Irrigation charges (Rs.)	-0.132 N.S.	4.839	-1.011
	Coefficient of Multiple determination (R^2)	98.50 %		

Dependent variable gross income
** Level of significant 1%
* Level of significant 5%
N.S. = Non significant

Table 3 : Production function coefficient of dairy production on the sample farm.

S.No.	Independent variable	b value	std. error	t' value
1.	Human labour utilization (days)	0.871**	0.543	11.047
2.	Green fodder (Rs.)	0.131*	2.727	4.960
3.	Dry fodder (Rs.)	0.054 N.S.	1.634	0.754
4.	Concentrate (Rs.)	-0.018 N.S.	0.378	-0.273
	Coefficient of Multiple determination (R^2)	98.30 %		

Dependent variable gross income ** Level of significant 1%
* Level of significant 5% N.S. = Non significant

Table 4 : Production function coefficient of poultry production on the sample farm.

S.No.	Independent variable	b value	std. error	t' value
1.	Human labour utilization (days)	-0.014 N.S.	0.962	-0.416
2.	Chick feed	-0.248*	3.046	-2.300
3.	Grower feed	0.085 N.S.	0.285	1.327
4.	Layer feed	1.174**	0.234	10.805
	Coefficient of Multiple determination (R^2)	99.80%		

Dependent variable gross income ** Level of significant 1%
* Level of significant 5% N.S. = Non significant

References

Malathesh, G.B. (2004). An Analysis of selected farming system in eastern dry zone of Karnataka. *M.Sc. (Agri.) Thesis (Unpub.), University of Agricultural Sciences, Bangalore.*

Murugan, G. and Kathiresan, R.M. (2005). Income and economic efficiency under low land integrated farming systems. Research-on-Crops. 6(2):234-236.

Dwivedi, R.P.; Tewari, R.K.; Kareemulla, K.; Chaturvedi, O.P. and Rai, P. (2007). Agrihorticultural system for household livelihood - A case study. Indian Research Journal of Extension Education. 7(1):22-26.

Bhende, M.J. and Kalirajan, K.P. (2007). Technical efficiency of major food and cash crops in Karnataka (India). Indian J. Agric. Econ. 62(2):176-190.

Channabasavanna, A.S.; Biradar, D.P.; Prabhudev, K.N. and Hegde, Mahabhaleswar (2009). Development of profitable integrated farming system model for small and medium farmers of Tungabhadra project area of Karnataka. Karnataka J. Agric. Sci., 22(1):25-27.

Jayanthi, C.; Vennila, C.; Nalini, K. and Chandrasekaran, B. (2009). Sustainable integrated management of crop with allied enterprises- Ensuring livelihood security of small and marginal farmers. Special Feature: Sustainable Agriculture.

Torane, S.R. (2009). An econometric analysis of Farming system in North Konkan region of Maharashtra. Department of Agricultural Economics, University of Agriculture Sciences, Dharwad.

Jha, B. (2009). Evaluating agricultural policy in a farming system framework: A case study from North West India. Working Paper Series No. E/299/2009 Institute of Economic Growth University of Delhi Enclave North Campus Delhi.

Dorge, J.T.; Yadav, D.B. and Shinde, H.R. (2013). Sustainability of Farming Systems for Improving Farmers' Livelihood Security. Agricultural Economics Research Review. 26: 243.

Rahaman, S.; Mahidur, K. and Haldar, S. (2013). A Study on Farming Systems and Sustainable Livelihood through Managing Wastewater in West Bengal. Agricultural Economics Research Review. 26: 233.