



STUDY OF ECONOMICALLY VIABLE FARMING SYSTEM MODEL FOR MARGINAL FARMERS IN CENTRAL PLAIN ZONE OF UTTAR PRADESH, INDIA

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ABSTRACT

The present study was conducted in Maitha and Akbarpur block of district Kanpur Dehat, Uttar Pradesh, India to find out a sustainable and economically viable farming system model being integrated with the components like crop, livestock, poultry and goatry on 1 acre land. Among the various model being followed, integration of 2 bullocks +1 cow +1 buffalo +5 goats +10 poultry birds along with crop cultivation was found most profitable with a net income of Rs 35687/ year as compared to crop cultivation alone Rs 9276/ year. This occupied the highest B: C ratio 1:2.33 and 295 days of employment generation. Significant amount of animal feed was available from the system itself. The farmyard manure from the animal component used for manuring saved 30-35 % chemical fertilizer in mixed farming system. From the study, it is concluded that integrated farming system with 2 bullocks + 1 cow + 1 buffalo + 10 goats along with other subsidiary enterprise like poultry was proved more beneficial for augmenting the income and livelihood of the marginal farmers.

KEY WORDS: integration of modules, cost returns, employment generation, land holdings, mixed farming, net income.

INTRODUCTION

The District Kanpur Dehat is situated at the Central Plain Zone of Uttar Pradesh, India in 26°28" N Latitude and 80°21" E Longitude. The climate of above district is mild with moderate dry summer and cold winters. Average annual rainfall of the district is recorded 566 mm, most of it is received during the monsoon months (July to September). There is a great variation in quantity of rainfall in different parts of the district. The size of the operational holding is less than or about one hectare. The major crops grown during *Kharif* season are Paddy, Maize, Sorghum, Groundnut and Pearl millet while Wheat, Barley, Gram, Mustard are principal crops grown in *Rabi* season. Among the Model, Crop + Dairy enterprise was found most popular having 80% share over Crop + Horticulture with 20% coverage in the district. Several researchers recommended a viable farming system approach (Singh, 2012; Venkateswarlu *et al.*, 2012) to meet the multiple objectives of poverty reduction, food and nutritional security, competitiveness and sustainability. The concept of man - land - livestock ecosystem is gaining momentum to maximize food production and to elevate economic status of the farmers by multifarious farm activities particularly by incorporating livestock enterprises. Marginal farmers lie crop cultivation only and engaged for few months in a year but they survived whole year with livestock and other subsidiary occupations. Poultry in backyard are being kept by the farmers to meet their domestic needs. These components are operated either alone or in combination depending upon the size of the farm holdings and other available resources. Keeping this view, on importance of integrated farming system for substantial increase in profitability of marginal households, a study was made to

identify the best mixed farming model based on available resources, which were being practiced at farm level. Livestock fulfill the need of food, fiber, skin, transportation, fertilizer, fuel and also constitutes "living bank" which provides flexible financial reserve in emergency and serve as 'insurance' against crop failure. Farmers having average five members in a family, keep cows, buffaloes, sheep and goats along with small numbers of poultry in backyard to meet their domestic needs. Being a profitable venture, livestock became an integral part of farming system as such. Despite crop and livestock, other agricultural components like horticulture, plantation, vegetables, sericulture and agro-forestry are also prevalent in the homesteads. These components are operated either alone or in combination depending upon the size of the farm holdings and other available resources. In farming system, animals are raised generally on agricultural waste. In variably the animal power is used for agricultural operations and their waste is used as manure and fuel. It might be possible to increase the level of yield in sustainable manner with less input due to waste of one enterprise used as the input of other, leaving no waste to pollute the environment and degrade the natural resource base. To put this concept into mind, it is necessary to study linkage and complement of different enterprises that will help to develop integrated farming system module where the waste of one enterprise can efficiently be used as an input for another enterprise within the system itself.

MATERIALS & METHODS

The present study was conducted in Maitha and Akbarpur block of district Kanpur Dehat. Three villages were randomly selected from each block to find out a sustainable and economically viable mixed farming

system model among the existing models prevalent at the villages on 1 acre land holding during April 2013 to March 2014. Six different viable models viz. (T₁) sole crop, (T₂) crop + 1 pair of bullocks + 1 cow, (T₃) crop + 1 pair of bullocks + 1 buffalo, (T₄) crop + 1 pair of bullocks + 1 cow + 1 buffalo, (T₅) crop + 1 pair of bullocks + 1 cow + 1 buffalo + 5 goats and (T₆) crop + 1 pair of bullocks + 1 cow + 1 buffalo + 5 goats + 10 poultry birds were being practiced on the land holding of 1 acre suitable for this region. Informations were collected by personal and collective interviews. The details regarding size of land holdings, no. of livestock, family labour, expenditure on crop, livestock and other enterprise along with annual income from agriculture and livestock gathered from the

randomly selected five respondents in each village. To calculate the net margin from livestock & crop cultivation, various cost concepts were followed. Livestock farming - paid out expenses like feed cost, hired labor, Medicines, computed value of family labor and miscellaneous recurring expenses. The livestock and poultry birds included in the present study were of local and desi type of breed. The expenses incurred in crop farming like hired human labour, bullock labour, tractor hour, cost of seed, manure, fertilizer and family labour were computed. To calculate the net margin, various cost concepts were used for the livestock and crop production are as follows. The modularly treatments prevalent under marginal farmers having 1 acre land holding are given as under (Table-1).

TABLE 1. The different treatments

S. No.	Treatments
T ₁	Crop (1Acre)
T ₂	Crop + 1 pair of Bullock + 1 Cow
T ₃	Crop + 1 pair of Bullock + 1 Buffalo
T ₄	Crop + 1 pair of Bullock + 1 Cow + 1 Buffalo
T ₅	Crop+1 pair of Bullock + 1 Cow + 1 Buffalo + 5 Goats
T ₆	Crop + 1 pair of Bullock + 1 Cow + 1 Buffalo + 5 Goats + 10 Poultry birds

Livestock farming – Total cost of feed, Labour, Medicines, Family Labour and miscellaneous recurring expenses.

Crop farming – Total cost of inputs like Labour, Seed, Manure, Fertilizer, Bullock hour, Tractor hour and value of family labour.

The numbers of livestock including poultry have not been put to different modules as per the existing practices of farmers; rather these birds were kept on the basis of requirement to make the mixed farming module viable to achieve the maximum returns. Livestock comprised of cows, buffaloes, bullock, pigs and goats besides poultry and ducks. The livestock and poultry birds included in the present study were local and desi type.

RESULTS & DISCUSSION

The results of this study have indicated that integration of various enterprises on 1 acre land holding were viable (Tables 1 and 2). Integration of livestock rearing with crop production gave significantly ($P < 0.01$) higher economic return as compared to crop production alone. Further, better utilization of land, water and other inputs in integrated model can be possible as compared to arable farming alone (Table 2 and Figure 1). Mixed farming of 1 pair of bullock + 1 cow + 1 buffalo + 5 goats + 10 poultry birds gave a net return of Rs 35687 as compared to Rs.

9276 from arable farming only. Similarly, employment potential of mixed farming system was higher than arable farming. In a mixed farming system of 1acre land, the employment generation was found 295 man days with uniform distribution throughout the year as compared to 165 man days in sole cropping system. Significant amount of feed for animals was also available from the system itself. The farmyard manure from the animal component was used for manuring of crops and 25-30% savings in fertilizer use was observed in mixed farming system. Present findings are in agreement with the findings of Singh (1994) reported that 1 ha canal irrigated land gave net return ranging from Rs. 14000 to Rs. 32700 in different years in mixed farming with 3 crossbred cows. Whereas, it was observed that in mixed farming with three buffalo, the net return with a range from negative to Rs. 19700. Ramrao *et al.* (2006) developed a mixed farming (crop-livestock) module of 1.5 acre small scale holders with the employment generation of 571 man days and net income of Rs. 58456 per year over crop farming alone with employment generation of 385 man days and net returns of Rs. 18300 per year. From the present study, an attempt was made to identify the existing viable model representing the various combinations of the mixed farming system.

TABLE 2: Income and expenditure (Rs.) due to Livestock Farming (Mean $\pm$ SE)

Particulars	Cow	Buffalo	Bullock	Goats	Poultry
No. of animals	1	1	1	5	10
Expenditure	2180 $\pm$ 0.07	3441 $\pm$ 0.09	2520 $\pm$ 0.02	1905 $\pm$ 0.05	670 $\pm$ 0.03
Gross income	5450 $\pm$ 1.20	10099 $\pm$ 1.18	5560 $\pm$ 1.22	10050 $\pm$ 1.19	3270 $\pm$ 1.21
Net income	3270 $\pm$ 0.15	6658 $\pm$ 0.12	3040 $\pm$ 0.17	8145 $\pm$ 0.19	2600 $\pm$ 0.16
Cost return ratio	2.50	2.93	2.20	5.27	4.88
Employment days	37.4	40.2	41.0	38.2	11.2

TABLE 3: Income and expenditure (Rs.) of different mixed farming modules for marginal holder (Mean $\pm$ SE)

Treatment	Expenditure	Gross income	Net income	B:C ratio	Employment days
Crop (1 Acre)	12440 $\pm$ 2.31	21716 $\pm$ 0.03	9276 $\pm$ 1.36	1.74	165
Crop+1pair of Bullock + 01 cow	18656 $\pm$ 1.97	35601 $\pm$ 0.07	16945 $\pm$ 1.41	1.90	250
Crop+ 1 pair of Bullock +1 Buffalo	18721 $\pm$ 2.12	38539 $\pm$ 0.05	19818 $\pm$ 1.35	2.05	254
Crop 1 pair of Bullock + 1 Cow 1 Buffalo	22490 $\pm$ 2.15	47319 $\pm$ 0.01	23983 $\pm$ 1.39	2.10	278
Crop + 1 pair of Bullock + 1 Cow + 1 Buffalo + 10 Goats	24339 $\pm$ 2.06	56816 $\pm$ 0.00	32477 $\pm$ 1.40	2.33	289
Crop + 1 pair of Bullock + 1 Cow + 1 Buffalo + 5 Goats + 10 Poultry	26342 $\pm$ 2.22	62029 $\pm$ 0.02	35687 $\pm$ 1.41	2.35	295

CONCLUSION

From the study undertaken, it was found that integrated farming system model with 1 pair of bullock + 1 cow + 1 buffalo + 5 goats along with keeping poultry birds was found most beneficial that augmented the income and socioeconomic status of marginal farmers. Integration of livestock and crop production enterprises gave higher economic return compared to crop production alone. Hence, it was concluded that integrated farming systems assume greater importance for marginal farmers in comparison to crop alone under aforesaid region. Livestock serves as a means for recycling nutrients and as a source of energy and value-added production. Complementary role of livestock within the farming system is unique and needs to be fully exploited. Although, the highest expenditure was incurred under the module crop + 1 pair bullock + 1 cow + 1 buffalo + 5 goats and 10 poultry, whereas, under the same module, the highest net income (Rs 35687), B: C Ratio (1:2.35) and employment generation (295 man days) was noted. Thus, the present study proved that integration of different complementary enterprises enhances the socio-economic status of the marginal farmers living under the Central Plain Zone of Uttar Pradesh.

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