

Income and Employment Generation through Integrated Crop-Livestock Farming System in Bulandshahr District: A Geographical Analysis

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Abstract

Livestock-cropping integrated or mixed farming system has been prevailing in India since antiquity. It is very sustainable, long experienced, farming system in which crop by products like crop residue, feed grain are used for feeding animals and animal by-products like manures used for enriching the soils. It provides permanent as well as temporary employment especially to women during off farm season through involvement in various operations i.e. rearing, cleaning, milking, collection, processing and marketing of livestock husbandry process. Income generation is improved as an extra income from selling milk, dung cake, livestock kids. The present study deals with analysis and assessment of income and employment generated through integrated livestock cropping systems in Bulandshahr district. Study revealed that seven types of integrated farming are practiced in the study area. Rice, wheat and sugarcane and buffalo are important components of integration. Farmers' income is improved tremendously through integrated farming system but highest beneficiary is medium farmers followed by marginal and large. It is expected to mitigate the rural poverty, improve agricultural sustainability, farmers' economic viability and check the rural urban migration' if properly planned with scientific agricultural management.

Keywords: Integrated Farming; Income Generation; Economic Viability

Introduction

Indian agriculture is at cross road and passing through transition between traditional subsistence and modern and market oriented one. It followed the process of intensification, diversification and commercialization during different phases of agricultural history in India since independence. Intensification of cropping equipped modern agro technologies undoubtedly boosted up agricultural production and productivity especially of food grains. Indian agriculture has responsibility of providing national as well as household food and nutritional security to its spilling over millions. Wide-spread occurrence of ill-effects of green revolution technologies in all intensively cultivated areas like Punjab and Haryana is threatening the sustainability of the important agricultural production systems and national food security. The declining trend in size of land holding poses a serious challenge to the sustainability and profitability of farming. The average size of the landholding has declined to 1.16 ha during 2010-11 from 2.28 ha in 1970-71. If this trend continues, the average size of holding in India would be mere 0.68 ha in 2020 and would be further reduced to 0.32 ha in 2030 [1]. Diversification of agricultural farming and cropping system with value added crops and species of livestock in view of making agriculture sector rather more profitable might have posed an alarming ecological crisis i.e. soil fertility depletion, falling underground water table, disturbing soil ecology as well as increasing trend of emission of green house gases especially from livestock through more production of methane gas. The grown population, rapid urbanization and growth in purchasing power are playing

the catalytic role in the demand for livestock derived products which has also exerted enormous pressure on agriculture. Under this agricultural stress and resulted increasing number of farmers' suicides call upon a new option of agricultural practice which may have potential to mitigate the emerging farmers' crisis, to maintain soil ecology and environmental sustainability.

An integrated livestock - cropping farming system has been proved as an ideal system integrating physical, agronomic and socio economic milieus for development of eco-friendly, eco viably and environment sustainable farming in India and other countries of world. It is an indigenous agricultural practice aimed to develop eco-friendly farming system. There is reciprocal behavior in utilization of waste products generated from different constituent entities of the system. Crop residues as dry fodder, feed grains and green fodder are derived from cropping system. Dung, manures, compost mixed of urine, dung and plants, as by products from livestock are used in enriching soils for best production. The Concept of sustainable agriculture "Integrated Farming Systems" hold special position as in this system nothing is wasted, the by-product of one system becomes the input for other. Integrated farming is an integrated approach to farming as compared to existing monoculture approaches. It refers to agricultural systems that integrate livestock and crop production. The goal of such integrated farming systems also encompasses the objective of conservation of existing natural resources and efficiently using them for sustainable growth of productivity as well as profitability [2]. The livestock revolution is not only pushing the limits of existing production capacity but

also degrading the environment. An integrated farming system is an ideal way to satisfy the grown demand for food, decrease the environmental degradation, enhance the nutritional supply and increase the productivity of areas of marginal productivity. The profitability of Integrated Farming Systems is well known to the world and can be considered for its wide spread adoption by small land marginal farmers [3]. In India most of the farmers are marginal and small who practice intensive tillage in a very traditional way which degrade the environment. They also keep livestock to enhance their income generation and supplement the growing demand of food because their income generation from the owned piece of land cannot satisfy the grown demand of their families. The approach aims at increasing income and employment from small-holding by integrating various farm enterprises and recycling crop residues and by products within the farm itself [4]. It refers to an agricultural system in which livestock is integrated with crop cultivation to enhance the productivity and sustainability of both production system by complementing the components of each other's production process. This system is mostly adopted by the resource poor, marginal and small farmers for crop production with few animals in their herd to enhance cash income, increase quantity and quality of food production and meaningful utilization of unexploited resource. Changing food consumption patterns among the population, particularly among the urban middle classes, in favor of quality dairy, poultry and other meat products coupled with growing exports of such products on the one hand, and the uncertain potential of traditional agriculture by itself to ensure food security to the masses have made the livestock sector an increasingly important factor on the agricultural scene [5]. Besides above advantages, the livestock provides cash income on daily basis which add farmers income during agriculture off season when the farmers are free and without work or employment. Taking into consideration the emerging issues the researchers aim to understand the following objectives in the present paper.

1. To understand the level of integration of crop-livestock farming.
2. To find out employment generation from various operations of crop-livestock farming.

Database and Methodology

The study is entirely based on primary sources of data. Primary data has been collected through field survey by direct interview in the year 2017. In order to understand the different types of farming systems present in the district, four villages (Senda Faridpur in Khurja block, Ranau Raham Alipur in Shikarpur, Tillor Buzurg in Pahasu block and Ahar Bangar in Anupshahr block) of Bulandshahr district have been selected for the detailed study. Data has been collected from sampled villages selected through stratified random and purposive sampling technique. 30 households from each village and, total 120 households have been surveyed. Detailed information has been collected regarding operations of livestock, number and species of livestock, income, mode of agricultural practices, types of crops etc. from which income and employment is generated. For purpose of data analysis simple statistical methods have been used.

Study Area

Bulandshahr district lies in the Meerut region in Upper Ganga plain of Western Uttar Pradesh located between 28.4°N and 28.0°N latitudes and between 77.0°E and 78.0°E longitudes. It is one the important agriculturally developed district of U.P. It covers an area of 4,353 sq. km. inhabited by 30,09,840 persons out of this 60 percent are engaged in agricultural occupation. Total cropped area under various crops like wheat, rice, sugarcane, barley, millet, pulses, vegetables and horticulture is 299680 hectares. The district is also well developed in livestock husbandry mainly dairy farming, goat rearing and poultry. Meat industry is also developing due to increasing demand of meat in national and international markets. There are 224555 heads of cattle, 1109638 heads of buffalo, 177272 heads of goat and sheep in the district during 2012. Farmers are following mixed farming system with integration of crops and different species of livestock. The study area is divided into 7 sub-divisions, 16 development blocks and 1246 villages for administrative convenience (Figure 1).

Figure 1

Results and Discussion

Integrated-crop livestock farming (ICLF) is one of the most important income and employment generation economic activity for resource poor and marginalized sections of society; it is a major tool of poverty eradication and environmental sustainability. It is a system in which crop farming and livestock rearing are practiced integrated and in this system crops and livestock depend and support each other. It is a resource saving practice in which nothing is wasted, in this process by-products of one system are utilized as inputs in another system. In ICLF crop straw, oatmeal and fodder is provided by the crops for livestock production while draught power, solid excreta (manure) and urine are used for crop cultivation. People get benefitted from both the enterprise as they get direct food supply and income from livestock and crops although human labour both enterprise is supplied by farmers (Figure 2).

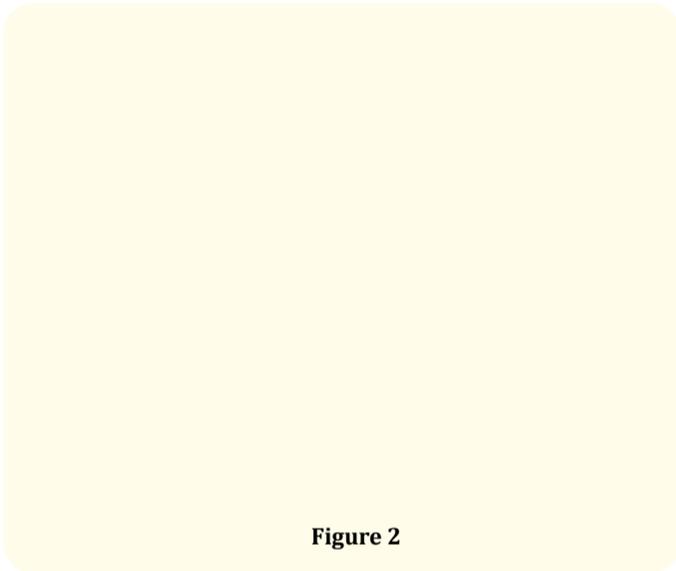


Figure 2

Land is one of important attribute of socio-economic development and it determines the level and intensity of crop production. The rapid growth of population and rising trend of small families have led to the fragmentation of landholdings that is why there has been a rapid increase in the number of marginal and small farmers in the last few decades in India. Most of the farmers are engaged in subsistence crop production practiced in traditional way. Table 1 show that out of total 120 farmers there are 34.17 percent marginal, 42.50 percent small, 15.83 percent medium and 5 percent are large farmers in the study area. These farmers are engaged in integrated crop-livestock farming (ICLF) to enhance level of income generation, sustainable agricultural development and increase the efficiency of existing sources of employment generation. The proportion of marginal and small farmers is much more in the ICLF than the medium and large farmers because their land resources are not fulfilling their existing need while medium and large farmers are practicing mono-crop farming on their large landholdings.

In India crops are mostly grown in association with livestock rearing where livestock is mostly depend on agriculture because it is mostly reared by the marginal, small and resource poor farmers but cultivation of crops depend on soil type, climate, topography and socio-economic status of farmers. Livestock is a major income generating enterprise during non-farm period which fulfills the financial needs of the farmers. Table 2 shows that there are 7 farming systems adopted by the farmers along with livestock.

Wheat-rice-sugarcane-livestock is the most prevalent system adopted by 22.50 percent farmers, 18.33 percent farmers adopted wheat-rice-livestock, 15.83 percent farmers adopted wheat-rice-sugarcane- pulse-oilseeds-maize-livestock, 13.33 percent farmers adopted wheat-rice-sugarcane-vegetables -livestock, 11.67 percent farmers adopted wheat-rice-millet-sugarcane-oilseeds-pulses-livestock, 10.83 percent farmers adopted wheat-sugarcane-horticulture-livestock and 7.50 percent farmers adopted wheat-rice-sugarcane-vegetable-pulses-livestock. All the integrated crop livestock systems are wheat and rice based systems while 5 systems out of 7 are also sugarcane based. The prevalence of wheat, rice and sugarcane based systems are found in the study area because livestock thrives on the straw of these crops. The top most part containing green leaves of sugarcane also used as green fodder for the livestock. The dried leaves of oilseeds are useful fodder for buffalo and cattle. The manure from livestock incredibly increases the productivity of crops. The district has horticulture in farming along the banks of Ganga River where common land for grazing lands are also found.

Name of Sampled Village	Marginal (less than 01 hectare)	Small (1-2 Hectares)	Medium (2-5 Hectares)	Large (More than 5 Hectares)	Total
Senda Faridpur	26.67	40.00	10.00	3.33	30
Ranau Raham Alipur	36.67	43.33	13.33	6.67	30
Tyore Buzurg	30.00	36.67	16.67	3.33	30
Ahar Bangar	43.33	50.00	23.33	6.67	30
Total	34.17	42.50	15.83	5.00	120

Table 1: Landholding Status (%) of Respondents in Bulandshahr District, 2017. Source: Field Survey, 2017.

S. No.	Farming System	No. of Respondents	Percent
1	Wheat-Rice-Livestock	22	18.33
2	Wheat-Rice-Sugarcane-Pulses-Oilseeds-Maize-Livestock	19	15.83
3	Wheat-Rice-Sugarcane-Livestock	27	22.50
4	Wheat-Rice-Sugarcane-Vegetable-livestock	16	13.33
5	Wheat-Rice-Millet-Sugarcane-Oilseeds-Pulses-Livestock	14	11.67
6	Wheat-Rice-Sugarcane-Vegetable-Pulses- Livestock	9	7.50
7	Wheat-Sugarcane-Horticulture-Livestock	13	10.83

Table 2: Distribution of Crop-Livestock Farming System in Bulandshahr District, 2017. Source: Field Survey, 2017.

The ICLF has always been a major income generating occupation since the earliest period in India. Income from crop farming is generated only during post-harvest period when the crop production is sold. While livestock is a perennial source of income generation in the form of sale of milk, dung cake, live animals for meat and so on. This generated income from livestock is spent on daily household needs while income from crop production is used to purchase the livestock and agricultural inputs. Table 3 shows that total estimated annual income generated from surveyed households (120) is Rs. 7234000.00, out of which 24.98 percent generated by marginal, 31.98 percent by small, 20.66 percent by medium and 22.38 percent by large farmers. Marginal and small farmers' most of income comes from livestock i.e. 41.60 percent and 45.39 percent respectively on the other hand medium and large farmers' major proportion of income is generated from crop farming of rice, sugarcane, pulses, oilseeds and marketing of straw. They sell their straw to the marginal and small farmers directly and to the urban market dealers. Marginal and small farmers have very small land holdings so they grow fodder on very small fraction of land while rearing is used for food grain production for their family. Medium and large farmers grow crops like wheat, rice, sugarcane, pulses and oilseeds because they have irrigation facilities, technological support, use high yielding variety seeds and insecticides and pesticides required for crop production. There is one peculiar feature that out of total income from horticulture small farmers earn 46.68 percent and 23.90 percent is earned by marginal farmers because horticulture is more profitable than crop farming on small land holdings and it requires more labour than then technology which these farmers have in plenty. The livestock also controls the migration of farmers during off farm season by proving them alternate source of income generation.

Components	Total Annual Income	Share in Total Income			
		Marginal	Small	Medium	Large
Livestock	3260000	41.60	45.39	9.09	3.92
Rice	656000	11.91	18.46	26.10	43.52
Wheat	790000	13.25	19.76	32.25	34.73
Sugarcane	589000	3.31	7.96	35.98	52.75
Pulses	378000	1.26	5.71	37.68	55.36
Oilseeds	280000	2.43	6.29	40.68	50.61
Maize	227000	5.66	12.68	44.31	37.35
Marketing of Straw	116000	0.00	3.45	40.28	56.28
Horticulture	938000	23.90	46.68	16.68	12.74
Total	7234000	24.98	31.98	20.66	22.38

Table 3: TIncome and Employment Generation from Livestock and Various Crops in Bulandshahr District, 2017.

Source: Field Survey, 2017.

Conclusion

An integrated crop-livestock farming system enhances the economic viability than the traditional farming system. All the crops (combined) generated total income Rs. 3974000 in the traditional agricultural practice on the other hand livestock added Rs. 3260000 to the farmers' income. Integrated farming systems gave 6 - 8 fold increase in net returns in improved farming systems with value of household consumption (produced within farm) increas-

ing by 51.4 per cent. Per day profit of marginal and small households can be increased by 69.2 per cent [6,7]. It boosts the income generation and creates employment opportunity while it also reduces the risk of crop failure. India has developed response mechanisms for primary (crop failures) and to some extent secondary (livestock deaths) consequences of climate variability [8]. This system has stimulated the income growth and means of employment for marginal and small farmers). It is the most important farming system for maintain the sustainable agricultural growth and environmental balance. It increases the productivity of land resource and reduces the wasteful utilization of non-crop components. The integrated farming system in the study area particularly and in the country general is pro poor, economically viable, environmentally sustainable and tool for checking rural-urban migration. The system has enormous capability to alleviate the rural poverty and to strengthen the farmers' economic power and ultimate solution to control agricultural crisis and farmers' suicides [9].

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