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Characterization of practices for livelihood assessment in region: A case study of district Jammu

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Abstract
The study was conducted to identify the present status of existing practices and its impacts on farmer's livelihood by comparing organic, inorganic and integrated farming in Jammu region. Three stage sampling procedure was followed and a total of 120 farmers (40 organic, farming, 40 inorganic and 40 integrated farming) were selected from the study area of Jammu district on the basis of having interventions from the different SKUATS institutes. Descriptive statistics were derived and calculated for analyzing the socio-economic data. Propensity score matching (PSM) was applied with kernel matching and radius matching methods to assess the impact of organic, inorganic and integrated farming on farmer's employment creation and income generation. The result of baseline survey showed that out of 12 sample farmers: less than 0.02 ha of cultivated land are landless (15%), marginal (18%) small (44%) medium (14%) and large (09%) were present. The highest employment duration for male was 152.5 man days/year for farming system C-L-P-H under integrated farms and 125.5 and 104.5 man days /years for organic and inorganic farms respectively. The higher returns from pulse-mustard-wheat the cropping system with B:C ratio 2.03 and rice-maize-vegetable was 1.97. Average calorie intake of food secure households was 2910kcal, 2793 kcal and 2854 kcal for organic, inorganic and integrated farming. To assess the livelihood pattern through asset pentagon approach, net worthy improvement was derived based on different capitals of farm households practicing integrated farming in comparison to organic and inorganic farming. Finally a constraints facing index was calculated based on different problems faced by the farmers in order to suggest policy recommendation.

Keywords: livelihood, employment, income, integrated farming, organic production, inorganic farming

Introduction
Agriculture is the predominant economic sector of Union Territory of Jammu and Kashmir as it supports about 65 per cent of its population. Jammu division of this UT is located 32.73°N and 74.87°E with elevation of 327 meters from MSL. The main crops of region are paddy, wheat, maize and barley. Paddy, maize and wheat contribute to major portion of the food grains in the UT and account for 70 percent of the total cropped area (DES, 2018) [3]. With varied agro-climatic conditions ranging from flat land to hill topography modifying crop growth factors and hence expresses a wide variety of agricultural and horticultural produces ranging from common cereals like rice-wheat to high quality basmati, rajmas etc. some of which are unique to the region. However, productivity of major cereal crops is much less than that of other parts of the country. Dairying and livestock sector is predominant in the region and there is a need for further development of dairy sector in the UT for catering to the demand of dairy products and for augmenting the subsidiary income of the farming community. Like national situation, per capita arable land availability is very low in and of the 17 million households, about 80% are small and landless farmers involved in farming activities through tenant farming or practicing dairying. Due to its subsistence nature, agriculture is characterized by diversified farming to meet the household requirements and to minimize the risk and uncertainty (Taj Uddin and Takeya, 2007 or Uddin, M. T. and Takeya, H., 2006) [8, 9]. Small farmers try to develop as many enterprises as their farming situations allow within the prevailing socioeconomic and agro-climatic condition, and in accordance with household goals, preference and resources. Land topography, soil type and availability of different inputs influence the farmers in choosing different enterprises along with the environmental factors. Hence, considering environmental and socio-economic factors, initiatives like dissemination of suitable modern technologies and improved package of practices would help to increase productivity, production and help in improving economic

status of farmers (Doss, 2006) [2]. Organic farming is considered as a solution to environmental ills associated with modern agriculture. While organic cultivation integrates sustainable farming methods–like the exclusion of synthetic pesticides and fertilizers, it also requires considerably more knowledge and resource management for bringing the yield at par with conventional chemical agriculture. Organic farming is mainly based upon traditional methods/techniques derived on sound ecological principles which favors maximum use of organic material (crops residues, livestock excreta, legumes/green manuring, on and off farm organic wastes, growth regulators, bio-fertilizer, bio-pesticides etc.) and discourages the synthetically produced agro-inputs for maintaining soil productivity and fertility and pest management under conditions of sustainable natural resources use and healthy environment (Islam, S., *et. al.* 2011) [4]. The pesticides/weedicides adverse effects on environment, their residues in food chain and their endangering action on biodiversity causing imbalance of ecosystem have been well understood and thus, use of pesticides is being discouraged slowly. Apart from pesticides even chemical fertilizers have jeopardized the environment through carbon mineralization, nitrate poisoning, phosphate runoff to water bodies, reduction of beneficial soil micro-flora and micro-fauna by adversely altering the chemical and physical properties of soil. These yield associated negative effects of chemical fertilizers are also economically expensive, increasing cost of cultivation to farmer Mamun *et al*. (2011) [6]. For example if conventional chemical farming incurs Rs. 11,250 towards cost of cultivation per hectare of rice, an organic farm spends around Rs. 9000 which can be further reduced if farmer uses his own resources as manure inputs. (Sharmi, S., *et. al* 2012) [7]. In terms of the energy budget too modern system of farming is expensive as it consumes 31000 MJ of energy while ecological organic farming accounts for only 23400 MJ. These statistics emphasize the need of organic farming in the country. However, there is declining trend of total production of rural compost and farm yard manure building the supply-demand gap which causes price of these organic inputs to go high making farmers adhere to cheap chemical fertilizers. Shrinking of green manure area is another aspect of present farming practices which do not show better prospects for sustaining soil health and implementing organic farming on large scale in the country Khan *et al.* (2019) [5]. Since the production of these organic inputs are reduced and practicing green manuring is very less, the benefits of ecological farming can be explored in regions where sufficient organic material is available and use of chemical fertilizer is either restricted or its supply is scarce Anowar *et al*. (2015) [1]. Keeping these facts in view, the present study is conducted to know the status of organic farming in the Himalayan regions of Jammu.

Materials and Methods

Study area and Sample size: The present study was conducted on organic, inorganic and integrated farming system of Jammu district. Three blocks practicing different cropping systems and varied with different topography were selected. In each block randomly three villages were selected for survey. Altogether total 120 farmers were interviewed for the study. Firstly, 40 farmers practicing farming under organic conditions and secondly, 40 farmers practicing farming under inorganic conditions and 40 farmers practicing farming under integrated farming system conditions were selected. The primary data on farming operations as well as other farm enterprises such as, livestock, poultry rearing, goat rearing, fruit crops, kitchen garden and agro forestry along with non-farm activities were collected. Secondary information sources in the form of handouts, reports, publications, notifications, etc. having relevance with this study were also collected by consulting the relevant departments. Apart from this additional basic information on age distribution, literacy level and farm categories of villages for interpreting socio-economic-literacy status of selected villages was also collected. A combination of descriptive statistics, mathematical and statistical techniques was used to analyze the data collected.

Impact evaluation

To evaluate the impact of organic/inorganic farming on farmers' employment creation and income generation, technique of propensity score matching (PSM) was applied with Kernel and Radius matching methods.

Poverty measurement

For understanding the level of poverty, food security was used as criteria and mathematical representation followed was:

$Z_i = Y_i/R$.

Here, Z_i = Food security index for i^{th} household which takes the value of 1 for food secure and that of 0 for food insecure household. For example, $Z_i = 1$ if Yi is greater than or equal to R; and $Z_i = 0$ if Yi less than R;
Y_i is daily per capita calorie intake of i^{th} household; and
R is daily per capita calorie required for i^{th} household and i = 1, 2, 3………., 30.

Based on the household food security index (Z), food insecurity gap/surplus index (P) and the head count ratio (H) were calculated. Food insecurity gap measures the extent to which households are food insecure and surplus index measures the extent by which food secure households exceeded food security line. This index is given as:

$$P = \frac{1}{M}\sum_{i=1}^{m} Gi$$

Where,
P = Food insecurity gap or surplus index;
M = Number of households that are food secure (for surplus index) or food insecure (for food insecurity gap); and3+-
G_i = Per capita calorie intake deficiency (or surplus) faced by i^{th} household.

$$G_i = \left(\frac{Yi-R}{R}\right)$$

The head count ratio (H) measures the percentage of the population of households that are food secure or insecure. This is represented mathematically as:

$$H = \frac{M}{N}$$

Where,
H = head count ratio;
M = Number of households that are food secure (for surplus index) or food insecure (for food insecurity gap); and
N = Number of households in the sample.

Kernel matching method
Kernel matching is simply a Kernel density function. In this method, all of the observations in the comparison group inside the common support region are used. Kernel matching method can be written as follows:

$$E(\Delta Y) = \frac{1}{N}\sum_{i \in T}\left[Y_{i,1} - \frac{\sum_{j=1}^{N_i^C} Y_{j,0}^{i} K\left(\frac{P(X_{j,0}^{i}) - P(X_{i,1})}{b_w}\right)}{\sum_{j=1}^{N_i^C} K\left(\frac{P(X_{j,0}^{i}) - P(X_{i,1})}{b_w}\right)}\right]$$

where T is the set of observations that are in the project (treatment group), and N is the number of treated cases; $Y_{i,1}$ and $X_{i,1}$ are the dependent and independent variables for the i^{th} treated case; $Y_{j,0}^{i}$ and $X_{j,0}^{i}$ are the dependent and independent variables for the j^{th} comparison/control case that is within the neighborhood of treatment case i, i.e., for which $|P(X_{j,0}^{i}) - P(X_{i,1})|$ <bw/2; N_i^C is the number of comparison cases within the neighbourhood of i; K(•) is a kernel function; and bw is a bandwidth parameter. In practice, the choices of K (•) and bw are somewhat arbitrary.

Radius matching method
Radius matching method can be written as follows:

$$R^M = \frac{1}{N^T}\sum_{i \in T} Y_i^T - \frac{1}{N^T}\sum_{j=C} w_j Y_j^C$$

Where, the weights w_j are defined as $w_j = \sum_i w_{ij}$;
Y^T = Output of treated individual; and
Y^C indicates output of control individual.

Poverty measure
The mathematical representations are as follows:

$Z_i = Y_i/R$

Where, Z_i = Food security index for i-th household which takes the value of 1 for food secure and that of 0 for food insecure households and, that is
Z_i = 1 for Yi is greater than or equal to R; and Z_i = 0 for Yi less than R.
Y_i = Daily per capita calorie intake of i-th households;
R = Daily per capita calorie required for i-th households; and i = 1, 2, 3………., 30.

Based on the household food security index (Z), food insecurity gap/ surplus index (P) and the head count ratio (H) were calculated. Food insecurity gap measures the extent to which households are food insecure and surplus index measures the extent by which food secure households exceeded food security line. This index is given as:

$$P = \frac{1}{M}\sum_{i=1}^{m} Gi$$

Where,
P = Food insecurity gap or surplus index;
M = Number of households that are food secure (for surplus index) or insecurity gap); and
food insecure (for food insecurity gap); and

G_i = Per capita calorie intake deficiency (or surplus) faced by i-th household.

$$G_i = \left(\frac{Yi - R}{R}\right)$$

The head count ratio (H) measures the percentage of the population of households that are food secure or insecure. This is defined as:

$$H = \frac{M}{N}$$

Where, H = head count ratio;
M = Number of households that are food secure (for surplus index) or food insecure (for food insecurity gap); and
N = Number of households in the sample.

Constraint facing index
An overall constraints score in organic and conventional chemical farming was computed for each farmer by adding their constraint scores in all 12 constraint items. The possible range of constraints facing score for each constraint could be 0 to 3 and possible range of overall constraints facing score for 12 constraints could range from 0 to 36. A constraint facing index (CIF) for each 12 selected constraints was computed by using the following formula:

$CFI = (C_h \times 3) + (C_m \times 2) + (C_l \times 1) + (C_n X 0)$

Where,
C_h= Number of responses indicating high constraint;
C_m= Number of responses indicating medium constraint;
C_l = Number of responses indicating low constraint; and
C_n= Number of responses indicating no constraint.
Constraint facing index (CFI) for any of the selected constraint could range from 0 to 240 for organic farming, where, 0 indicated no constraint facing and 240 indicated highest constraint facing.

Results and Discussion
Farmers' categories, farm size and average family size, Age distribution and literacy level of selected farmers and Land ownership pattern of different farm categories.
According to Ministry of Agriculture & Farmers Welfare, farmers are categorized based on operational holdings into five classes: marginal (below 1.00 hectare), small (1.00-2.00 hectare), semi- medium (2.00-4.00 hectare), medium (4.00-10.00 hectare) and large (10.00 hectare and above). Since there were no farmers with operational holdings of 10 ha or more than 10 ha in our selected villages, the operational holdings categorization was modified to include landless agricultural labourers as we found significant number of landless farmers actively involved in agriculture and contributing to farming. Hence, the five categories of operational holdings are landless, marginal, small, medium and large farmers (Table 1). Out of 120 sample farmers, the highest percentage of farmers was in small farm category followed by marginal, landless, medium and large. Average farm size for landless, marginal, small, medium and large were 0.02 ha, 0.73 ha, 1.41 ha, 2.63 ha and 4.70 ha, respectively. Number of persons in a family (family size) is an important parameter in order to understand socio economic aspects, capability of farm holding to support family food security and nutritional security, additional labour availability and etc. The average family sizes of landless, marginal, small,

medium and large farmers were 6.1, 4.7, 5.3, 6.2 and 4 persons per family, respectively.

All the five categories of farmers showed little variation in terms of the household members of the farmer. Farmer's age, literacy and farm size were the factors which were having impact on decision making processes in farming. Generally, technical efficiency and tendency to try new technologies are more in younger farmers than the older farmers (Battese & Coelli, 1995). In terms of age groups, marginal farmers were younger as the average age of marginal farmers in surveyed villages was 39 years. Reason behind such young population with marginal land holdings (0.02 to 1 ha) might be due to decreasing operational holdings from one generation to next; the same trend was observed in national level also leaving average land holdings of entire population to 0.14 ha and more than 64% of the population in the working age group (15-59 years). The range of age groups of our survey was from 38 to 43 years indicating that age was not a factor controlling farming decisions and there is more possibility of introduction of innovative practices to these farmers. This leaves us to focus on literacy level and capital/infrastructure availability of farmers for practicing organic cultivation or integrated farming. Education level of the sample farmers have been divided into five groups: illiterate, PSC (primary school certificate), JSC (junior school certificate), SSC (secondary school certificate) HSC (higher secondary school certificate) and above. Among the five levels, highest percentage of the farmers was in PSC level where as lowest in HSC and above HSC level (Table 02). As observed, as farm holding size decreased, the education level also decreased. Large and medium farmers were highly educated as indicated by their literacy level and small and landless laborers were more illiterate. The low level of literacy was attributed to lack of economic resources in some cases while in others lack of education itself was reason behind their present poor economic status (Battese and Coelli, 1995).

In Jammu district of, three types of land holding systems were observed: (i) Rented land holding system (ii) leased land holding system (iii) mortgage land holding system. In the first system, tenants provide one third of their produces to the owner of the land. In the second system, tenants cultivate land paying certain prefixed amount of money to the owner of the land. In the third system, tenants cultivate land providing certain amount of money (returnable) to the owner of the land. The formula for computing total cultivable land with the concerned farmer is: own cultivated land + rented in land–rented out land + leased in land–leased out land + mortgaged in land–mortgaged out land +homestead land (kitchen garden). Own cultivated land for marginal, small, medium and large were 0.53 ha, 1.30 ha, 2.31 ha and 4.65 ha, respectively whereas using above formula total cultivated land for marginal, small, medium and large were 0.73ha, 1.70ha, 3.26ha, and 6.51ha respectively (Table 1).

Major farming systems of the region

Variety of farming and cropping systems were being practiced by sampled farmers and among them six farming systems were found to be in majority in Jammu district (Table 2). Among the six major farming systems, the highest number of farmers practiced Crop + Livestock + Poultry (C-L-P) system. C-L-P was followed by Crop + Livestock + Agroforestry (C-L-A), Crop + Livestock + Kitchen gardening (C-L-K), Crop + Livestocks (C-L), Crops + Horticulture (C-H) and Vegetable + Crop + Horticulture (V-C-H) systems. On the other hand, percentage of agricultural land was the highest under Crop + Livestock + Poultry (C-L-P) system and lowest under Vegetable + Crop + Horticulture system.

Overall employment creation and income generation of farm households

Table 03 reveals that overall employment opportunities were increased significantly at 1 percent level by the duration of 60 to 61 man-days in the integrated farming compared to organic & inorganic farming. Based on Kernel and Radius matching methods, the average farm household income of the organic farming was increased by Rs. 35614 to Rs. 36817 per year compared to integrated farming which is statistically significant at 1% level. On the other hand, non-farm income was decreased slightly but it is not statistically significant in both the methods. Consequently, total household income was increased significantly at 1% level for organic farming compared to inorganic farming which is Rs. 34519 and Rs. 36915 based on Kernel and Radius propensity score matching methods, respectively.

Farm inputs used by sample farmers practicing organic cultivation

Among the crops, the highest input cost was in the potato followed by rice, maize, wheat, pulse and vegetable (Table 04). The large number of employment generated in the banana (250) cultivation followed by potato (215), less labor requirements in pulse (80) and wheat (90) cultivation. Higher irrigation costs are in rice (8100), banana (5000) and potato (4500) cultivation.

Per farm input used by the sample farmers practicing inorganic cultivation

For inorganic cultivation (conventional farming practice of the region), the main inputs adding to farmers cost of cultivation were Seed (kg), Urea (kg), TSP (kg), MP (kg), Pesticide (ltr.), Irrigation (Rs.) and labour charges. Among the crops, the highest input cost was in case of potato followed by rice, maize, wheat, pulse and vegetable (Table 05). Higher labour requirements are in vegetables (230), potato (210) and Basmati rice (135) cultivation.

Sources of inputs used by sample farmers

Sources of inputs used by sample farmers described in the Table 06. On an average, 28 percent farmers used the previous season seeds for next season sowing, 45 percent farmers purchased fresh seeds from market, 8 percent farmer's procured quality seeds from cooperatives like IFFCO, 15 percent farmers used seeds borrowed from other farmers and around 4 percent farmer's procured seeds from other sources. In contrast to seed procurement, all the fertilizer and pesticide used were purchased from the market. In case of organic manures and farm yard manure usage, on average 85 percent farmers used farm yard manures from their own livestock/dairying component and around 15 percent farmers purchased compost/ vermin compost from market. For farm operations the machinery were used on hiring for their small holdings on per hour basis and only 6-7% farmers owned farm implements like tractors, cultivators etc. and thus farm mechanization was almost outsourced. In terms of labour, farm family labour was utilized mainly and hired labour was used for some special farm operations like rice transplanting, weeding, etc.

Household livestock and poultry assets and economics of sample farmers

Average household livestock and poultry assets (no.) under different categories of farm holdings of sample farmers have been shown in the Table 07. In Jammu region, it has been observed that almost all farmers kept livestock on their farm and their family milk requirements were met by these livestock. It was type of subsistence dairying rather than commercial dairying. Only very few farmers were involved in commercial dairying with more than 5 to 6 animals. It has been observed that some landless farmers are exclusively involved in dairying with more than 10 animals and they purchase feed in the form of berseem, wheat straw from other farmers of the surrounding areas. Farmers involved in dairying mainly kept cows, bullocks, goat and sheep as their main animal components. More than 25% of the farmers practiced poultry and very few famers kept pigs also. The average number of animals, mean expenditure on them in the form of feed or medicines and profits originating from animal component is showed in table 07.

Cost and returns of major cropping systems of Jammu district

Among the existing cropping systems of Jammu district (table 08), five major cropping systems are taken for calculating cost benefit ratio *viz* Rice-Wheat, Maize-Potato-Wheat, Rice-Pulses+Wheat, Rice-Maize-Vegatable and Pulse-Mustard-Wheat. Total cost, gross returns, net returns and BC ratio have been shown in the Table 08. Out of five cropping patterns, net returns was the highest in Rice-maize-vegetable cultivation (Rs.135336 ha-1) followed by Maize-Potato-Wheat (Rs.116412 ha-1), Pulse-Mustard-Wheat (Rs.101100ha-1), Rice-Pulses-Wheat (Rs. 104145 ha-1) and Rice-Wheat system (Rs.90150ha-1) respectively. However, in terms of cost: benefit ratio, Pulse-Mustard-Wheat was profitable which yielding double for every rupee invested. Rice-Maize-Vegetable was next profitable cropping system in terms of returns for money invested with B:C ratio of 1.97 and Pulses-Mustard-Wheat system had B:C ratio of 2.03.

Farm income of the sample farmers

For calculating farm income of selected farmers, money received from sale of farm produce or its equivalent received during in exchange for labor or services, income generated from sale of animal products like milk, compost, wool etc have been considered. Farm income (Rs.) of the sample farmers have been shown in the Table 09. The items of income were categorized as crop, livestock, poultry, kitchen gardening, agro forestry, off farm and nonfarm. In case of land less and marginal farmers, non-farm income were higher compared to income from other sources.

Food security index of the households practicing integrated farming

To know economic sufficiency and poverty situation of selected integrated farming practicing farmers, indices like food security index and calorie intake are used. The overall food security index in case of integrated farming practicing households was 1.33. However, food security indices of food secure households and food insecure households were 1.29 and 1.21, respectively. From the index it can be seen that even though the farmers are practicing integrated farming, there is still gap in terms of food security and more interventions in terms of resource utilization, recycling and income generation are helpful to increase food security index of these farmers. The reason for food insecure situation is unscientific management of farm resources and thus scientific approach for resource management can uplift the status. Nevertheless, organic, inorganic and integrated farm households were food secure given the fact that 85, 80 and 90 percent integrated farms were able to meet the required calorie intake of 2910.76, 2792.83 and 2853.83 kcal per capita per day while 15, 20 and 10 percent of households consumed only 1953.1, 1749.1 and 1833.1 kcal per capita respectively, which is below recommended calorie intake and thus fell under food insecure households (Table 10). The food insecurity gap/surplus index shows that the food secure households exceeded the food poverty line by 7, 6 and 9 percent while food insecure households fell short of required calorie intake by 0.09, 0.10 and 0.08 percent, respectively.

Constraint facing index (CFI)

The computed CFI for 12 common constraints taken into consideration ranged from 208 to 240. Majority of the farmers mentioned that low price of outputs, non-availability and/or high price of HYV seeds and scarcity of concentrate feed and fodder are the serious problems in the study areas and CFI for these three problems faced by farmers were 240, 231 and 227, respectively. High cost of fertilizers and pesticides and lack of irrigation facilities are also more remarkable problems. Low literacy level and lack of knowledge about trainings related to agricultural skill improvement and modern technologies were forcing farmers to stick to traditional method of cultivation in order to make subsistence living and thus were getting lower yield. Irrigation facilities and electricity charges of using bore wells etc. were also some of the constraints faced by farmers in upland areas where water table was very low. Labourers in study area migrated from agriculture to non-farm employment creating scarcity of labour (Table 11).

Conclusions and Policy Recommendations

In Union Territory of Jammu where land is scarce, effort should be taken to increase production through integration of various production components in agriculture for efficient utilization of resources. It would result in production of diversified products from minimum area and help in increasing the income of the farmers.

The study reveals that crop–livestock–poultry–homestead farming system was the most popular in integrated farming systems. The study also concludes that integrated farming has the potential of increasing farmers' income and employment creation over the mixed and traditional farming practices in the study areas. The study also reveals that the extent of food security situation was much better among the integrated farm households. Worth mentioning improvements were found based on different capitals (namely, human capital, social capital, natural capital, physical capital and financial capital) of farm households practicing in integrated farming. Considering the findings of the study, some important policy recommendations have arisen which are: special incentives from Department of Agricultural Extension (DAE) on irrigation and fertilizer for small and marginal farmers are necessary to enhance the productivity and profitability. Veterinary services for dairy cattle and poultry birds should be ensured by Department of Livestock Services (DLS) at village level. Training program on production technologies, harvesting, processing, storage, value addition and transportation should be offered by different institutes for increasing skill of the farmers so that they can obtain and apply knowledge for field crops, livestock production and poultry culture as well. In conclusion it can be said that the integrated farming system is not only technically feasible but also economically viable in. Extensive efforts should be made to transfer this technology among the farmers.

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References

1. Anowar MM, Parveen A, Ferdous MZ, Kafi AH, Kabir ME. Base line survey for farmer livelihood improvement at farming system research and development, Lahirirhat, Rangpur. International Journal of Business, Management and Social Research 2015;02(01):92-104.
2. Doss CR. Analyzing technology adoption using micro studies: limitations, challenges, and opportunities for improvement. Agricultural Economics 2006;34(3):207–219.
3. Government of India. Directorate of Economics and Statistics, Ministry of Agriculture & Farmers Welfare Department of Agriculture, Cooperation & Farmers Welfare, New Delhi, India 2018.
4. Islam S, Uddin MT, Akteruzzaman M, Rahaman M, Haque MA. Profitability of alternate farming systems in Dighapota*haor* area of Netrokona district. Progressive Agriculture 2011;22(1&2):223-239
5. Khan, Md Abdul Helim, Nasima Aktar, Nargis Sultana, Shammi Akhter, Md Faruque Hossain. "Baseline survey for farm productivity improvement through agricultural technologies in Charland of Mymensingh." International Journal of Business, Management and Social Research 2019;07(01):395-411
6. Mamun SA, Nusrat F, Debi MR. 'Integrated farming system: prospects in Bangladesh', Journal of Environmental Science & Natural Resources 2011;4(2):127-136.
7. Sharmi S, Islam MS, Hasan MK. Socioeconomic analysis of alternative farming systems in improving livelihood security of small farmers' in selected areas of Bangladesh. The Agriculturists 2012;10(1):51-63
8. Taj Uddin M, Takeya H. Integrated farming in some selected areas of Bangladesh: Resource Interdependence and Enterprise Combination Perspective. The Journal of Rural Development 2007;34(2):107-126.
9. Uddin MT, Takeya H. Comparative study on integrated farming in Bangladesh and other countries. Bangladesh Journal of Agricultural Economics 2006;29(1&2):81-92