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ORGANIC FARMING: COST-BENEFIT ANALYSIS OF BUCKWHEAT CROP IN VILLAGE LACHUNG OF DISTRICT NORTH SIKKIM

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ABSTRACT

The present study is an attempt to highlight the cost-benefit analysis of buckwheat crop under organic farming in village Lachung of district North Sikkim. The study is primarily based on primary data but for physical and socio-economic aspects of the village, secondary data are also utilized. The primary data regarding various agricultural operations or activities like land preparation, sowing, irrigation, manure application, weeding, harvesting, thrashing and winnowing, transportation, and marketing of the produce under buckwheat cultivation under organic farming is collected from the farmers of this village through a field survey conducted in 2018 under which structured interview method was adopted. A comparative study regarding the cost-benefit analysis for buckwheat cultivation per acre of land is exercised both in case of self/family members, and the hired labour cost involved in buckwheat cultivation in this village. The study highlights that buckwheat cultivation ismore beneficial in case of cultivation done by self/family members than hired labours. The benefits can be more if necessary infrastructures and organic inputs are provided to the farmers.

KEYWORDS: *Buckwheat, Village Lachung, Organic Farming, Thrashing and Winnowing, Market Surplus, Cost-Benefit Analysis*

INTRODUCTION

Sikkim is a mountainous state in India. Sikkim adopted organic farming in 2003 in order to protect the state from the adverse effects of chemical fertilizers and pesticides used in agriculture and its negative impact on human health. Organic farming was also adopted keeping in view for maintaining a better environment and to enrich soil fertility of the state. Today, Sikkim is leading in adaptation of organic farming not only at the national level but at international level also. The state is not only dominant in organic farming but it is also promoting animal husbandry to prepare manure by using their dung. Crop livestock integration can make organic farming more beneficial. Today, there is an eco-friendly environment in the state and the food intake is purely organic in nature. Most of the states in India are following the model of organic farming adopted by Sikkim.

In district North Sikkim especially in village Lachung the dominant crop is buckwheat under organic farming. Buckwheat is a major cereal crop taken in the form of *Sattu* (grinded seed mix with liquid) by the inhabitants of village Lachung. The climatic conditions are favourable for its growth in this village. The growing period of buckwheat is from February to June/July. Buckwheat is mainly grown in the moist cool climate and can be grown in slightly gravels soil. It does not require extensive land preparation and can grow on poor tilted soil.

Sikkim is facing some constraints in the field of agriculture especially in organic farming like the insufficient use of bio-fertilizers, less size of land holding, and lack of local market for organic produce, less workforce involved in farming, undulating physiography of the area, and lack of infrastructural facilities for promoting organic farming. A farmer is an economical man and he wants to get maximum return from his agricultural products. The cost of agricultural production in case of organic farming is less as compared to conventional farming and the farmers can get better returns from their agricultural products by adopting organic farming. Therefore, in this direction, the present study deals with Organic Farming: Cost-Benefit Analysis of Buckwheat Crop in Village Lachung of District North Sikkim

THE STUDY AREA

Sikkim has four districts namely North Sikkim, West Sikkim, South Sikkim, and East Sikkim and each district is further divided into sub-divisions. The sub-divisions of district North Sikkim are Chungthang, and Mangan. Village Lachung comes under Chungthang sub-division and the village comprises an area of 28.05 sq. km (2,805.82 hectares) with a population of 2,459 persons having a sex ratio of 389 females per 1000 males as per 2011 census. The number of household in village Lachung are 401 and the persons under main workers are 68.41 per cent to the total population of the village. The persons under cultivators are 9.31 per cent to the total main workers of the village and the agricultural labourers in the village account to 0.35 per cent to the total main workers of the village as per 2011 census. Lachung is a beautiful valley at an elevation of 2,900 metres along with river Lachung. The word Lachung means “small pass”. The nearest town is Mangan from this village. The climate of village Lachung is categorized as tundra-type and temperate in nature. The average temperature is 28°C in summer season, while in winter season it is recorded below 0°C. During winter season this area is covered under snow. The major *kharif* crops grown in this village are maize, paddy, finger millet, and buckwheat, while the major *rabi* crops are wheat and barley.

OBJECTIVES

The objectives of the study are following:

- To highlight the various agricultural operations or activities per unit of area under buckwheat crop under organic farming in village Lachung of district North Sikkim.
- To find out the cost-benefit analysis per unit area of buckwheat crop under organic farming in village Lachungof district North Sikkim.

RESEARCH DESIGN AND METHODOLOGY

The study is mainly based on primary data but for the geographical background of the area regarding the physical, and socio-economic aspects, secondary data are also utilized. For physical aspects, the data is mainly collected from the Encyclopedia of Sikkim. For socio-economic aspects, the data is collected from Statistical Abstract of Sikkim, District Census Handbook, and other official documents.

The present study deals with Organic Farming: Cost-Benefit Analysis of Buckwheat Crop in Village Lachung of District North Sikkim for which the primary data is collected from the farmers of this village through a field survey conducted in 2018 under which a structured interview method was adopted to know the information regarding various agricultural operations or activities like land preparation, sowing, irrigation, manure application, weeding, harvesting,

thrashing and winnowing, transportation and marketing of the produce under buckwheat cultivation. The questions regarding input-output cost of buckwheat cultivation and the geographical conditions required for its growth were also asked.

Finally, the data collected for various agricultural operations or activities performed for buckwheat cultivation is processed per acre of land. In case of hired labour, the man-hours spent per acre of land in each agricultural operation or activity like land preparation, sowing, irrigation, manure application, weeding, harvesting, thrashing and winnowing, transportation and marketing of the produce for buckwheat cultivation is calculated. A comparative study regarding the cost-benefit analysis for buckwheat cultivation per acre of land is exercised in case of self/family involved in buckwheat cultivation and the hired labour cost involved in buckwheat cultivation in this study area. The data regarding population characteristics are presented in per cent for the study area.

RESULTS AND DISCUSSION

Various Agricultural Operations under Buckwheat Crop

Land Preparation/ Ploughing

The land preparation is done by a traditional instrument known as *Ramba* which cost Rs. 500 in the market. Generally, two ploughings are done before sowing of buck wheat in village Lachung. Field preparation is done manually and the man-hours required per ploughing is 72 hours per acre (9 men x 8 hrs each).Thus, for two ploughings the man-hours required are 144 hours per acre (18 men x 8 hrs each). The land preparation done by self/family cost Rs. 00 per acre of land while in case of hired labour it is Rs.7,200per acre (18 men x Rs. 400 to each man for 8 hrs).

Sowing

The sowing of buckwheat seed is done in the month of February in village Lachung. After field preparation, the seed is scattered and mixed with the soil. No other improved technique is followed in this region. The seed required for sowing is 48 kg per acre of land and the total cost of seed is Rs. 4,800(48kg x Rs. 100 per kg) in the market. The nearest market from village Lachung is Mangan (District Headquarter of North Sikkim) where the farmers used to purchase certified seeds of buckwheat. Although the villagers use their own seeds grown in their fields which are organic in nature.Sowingis done manually and the man-hours required are 32 hours per acre (4 men x 8 hrs each)and this process is completed in one day. It took time to mix the scattered seed in the soil. The sowing cost in case of self/family involved in this process is Rs. 00 while in case of hired labour it is Rs. 1,600 (4 men x Rs.400 to each man for 8 hrs).

Irrigation

Buckwheat crop is mainly dependent upon the climatic conditions present in this area. Rainfall and snowfall is useful for this crop which occurs in this area during the growing period. No other means of irrigation is found in this area. The cool and moist climate of the area also helps in the growth of buckwheat crop. The irrigation cost is Rs. 00 both in case of self/family cultivation or hired labours as it is totally dependent upon nature.

Manure Application

Generally, the farmers have a compost pit in their farm which comprises of cow dung, urine of cow, and rotten/dry leaves which are stored for 6 to 7 months to decay. This decayedmanure is spread over the field. Sufficient number of cattles are

reared in village Lachung so that the farmers can make manure. Generally, manure application is done before the sowing of buckwheat. Manure application is done manually by scattered method and man-hours required in this process are 16 hours per acre (2 men x 8 hrs each) and this process is completed in one day. The manure application done by self/family cost Rs. 00 per acre while in case of hired labour it is Rs. 800 per acre (2 men x Rs. 400 to each man for 8 hrs).

Weeding

Weeds are the unwanted plants which can grow in any crop. The weeds which grow in buckwheat crop are manually picked out by hands and cow urine is used to control the weeds in this crop, as well as the paste of poisonous leaves present in this area are also used. Weeding is done manually and the man-hours required per weeding are 32 hours per acre (4 men x 8 hrs each). Weeding is done once during the growing period of buckwheat crop. The weeding done by self/family cost Rs. 00 per acre while in case of hired labour it is Rs. 1,600 per acre (4 men x Rs. 400 to each man for 8 hrs).

Harvesting

The upper part (product) of buckwheat plant is picked out by hands and stored in a safe place. The remaining lower part (stem) of buckwheat plant stands in the field and further it is burned in the field and the ash is spread over the field which enriches the soil in village Lachung. The villagers told that by burning the remaining part of this crop in the field kills the harmful insects present in the soil. They further added that crop rotation is done to maintain the fertility of the soil. Harvesting and other agricultural activities are also done in moonlight in this village. Harvesting is done manually for 4 days and the man-hours required are 192hours per acre (6 men x 8 hrs each for 4 days). The harvesting done by self/family cost Rs. 00 per acre while in case of hired labour it is Rs. 9,600 per acre (24 men x Rs. 400 to each man for 8 hrs).

Thrashing and Winnowing

Thrashing and winnowing of the product are done manually by traditional instruments used in this village. This process is completed in one day only by applying more workforce and it is only possible when the seed is dry and mature. Thrashing and winnowing are done in a sunny day so that the seed is protected from moisture. Further, the final product (seed) is kept in sun before it's storage in a wooden container. Thrashing and winnowing is done manually and the man-hours required are 64 hours per acre (8 men x 8 hrs each). Thrashing and winnowing done by self/family cost Rs. 00 per acre while in case of hired labour it is Rs. 3,200 per acre (8 men x Rs. 400to each man for 8 hrs).

Production

The production of buckwheat as a *kharif* cereal crop is recorded 1,800kg (18 quintals) per acre of land in village Lachung of district North Sikkim.

Transportation

The market surplus of buckwheat product is transported to Mangan for sale and the transportation cost to carry 18 quintals of seeds is Rs. 1,400 which is bearded by the landlord.

Marketing

The selling price of the product of Buckwheat crop in the market is Rs.100 per kg. Therefore, the selling price of 18 quintals of buckwheat produced in village Lachung is Rs. 1,80,000 and it is sold in the market (Mangan) which is 52 km away from this village.

Cost-Benefit Analysis of Buckwheat Crop

Cost-benefit analysis in general is the structure which involves a set of required activities, which use available resources to obtain a stream of benefits. The cost-benefit analysis for buckwheat crop per acre is exercised in case of self/family involved in buckwheat cultivation and the hired labour cost involved in buckwheat cultivation in the area, especially for land preparation, sowing, irrigation, manure application, weeding, harvesting, thrashing and winnowing, transportation and marketing of the produce respectively. The various agricultural activities performed for buckwheat cultivation in village Lachung are given below:

Table 1: Cost-Benefit Analysis of Buckwheat Crop in Case of Self/Family Cultivation and in Case of Hired Labour in Village Lachung, 2018

Item	Rs per acre (in case of self/family cultivation)	Rs per acre (in case of hired labour)
Land Preparation (2 Times)	00	7,200
Sowing Cost	00	1,600
Irrigation Cost	00	00
Manure Cost/Application	00	800
Weeding	00	1,600
Irrigation Cost	00	00
Harvesting Cost	00	9,600
Thrashing and Winnowing Cost	00	3,200
Transportation Cost	1,400	00
Total Cost of Cultivation	1,400	21,600
Total Production(kg/acre)	1800	1,800
Market Selling Price (Rs.100 per kg seed)	1,80,000	1,80,000
Net Returns (Market selling price - Total cost of cultivation)	1,78,600	1,58,400

Source: Field Survey, 2018 Conducted by Dr. Mohinder Singh Kadayan

Table 1 represents that in case of self/family cultivation of buckwheat as a cereal crop in village Lachung the cost of production of this crop is Rs. 1,400. In case of land preparation, sowing, irrigation, manure application, weeding, harvesting, thrashing and winnowing of buckwheat crop the cost of production is Rs.00in each agricultural activity in this village. Rs.1,400 is the expense to ship the product to the market (Mangan). The final product of buckwheat crop is 1,800 kg per acre of land and per kg of seed is sold at rate of Rs. 100, thus making a total of Rs. 1,80,000. Therefore, the net return in case of self/family involved in growing of buckwheat crop in this village is Rs. 1,78,600 while, in case of labour hired by the landlord(self) for cultivation of buckwheat crop the cost of production is Rs. 21,600. In case of land preparation, sowing, irrigation, manure application, weeding, harvesting, thrashing and winnowing of buckwheat crop the cost of production is Rs. 7,200, 1,600, 00, 800, 1,600, 9,600 and 3,200 respectively in village Lachung. Rs.1,400 is the expense to ship the product to the market (Mangan) which is bearedby the landlord (self/family). The final product of buckwheat crop is 1,800 kg per acre and the rate per kg of seed is Rs. 100 thus, it is sold at rate of Rs. 1,80,000 in the market. Therefore the net return in case of hired labour involved in growing of buckwheat crop in this village is Rs. 1,58,400. Therefore, the net return in growing of buckwheat crop in the village will be maximum when the crop is cultivated by landlord (self/family).

CONCLUSION

The study examines that, the total cost of cultivation of buckwheat under organic farming is Rs. 1,400 per acre of land in village Lachung of district North Sikkim in case of cultivation done by landlord (self) or his family, while it is Rs. 21,600 per acre of land in case of hired labours. The total production of buckwheat is recorded 1,800 kg per acre of land and the market selling price is Rs. 1,80,000 per acre of land. Thus, the net return of the landlord or his family involved in cultivation is Rs. 1,78,600 per acre of land while, in case of hired labours it is Rs. 1,58,400 per acre of land. Foodgrain deficiency can be solved if organic farming is adopted by the farmers. It will improve their social status and it will boost the rural economy too. Organic farming should be adopted in orderto maintain a better environment and to enrich soil fertility.

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