



Economic Feasibility of Cultivation of Gobhi Sarson (*Brassica napus*) alongwith Bee Keeping

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ABSTRACT

In Punjab about 35 lakh ha area is put under wheat cultivation during Rabi season. This crop gives about Rs 61908/- net income/ha. In order to increase the farmer's income as well as profitability, cultivation of gobhi sarson was advocated to 40 honey bee keepers replacing wheat crop. The study was carried out at 40 honey bee keepers farm replacing about 16 ha area. It was found that the average yield of gobhi sarson/ha was 20 q/ha and sold at the rate of Rs. 3700/q which gave a gross income of Rs 74000/ha. Similarly, honey produced from 10 bee hives by individual farmer was worth Rs 51952/- whereas from one hectare wheat, gross income of Rs. 82500/- was obtained. Hence, it was evident that integration of gobhi sarson with bee keeping proved to be more economical than the cultivation of sole wheat crop. Therefore, farmers must replace some area from wheat crop and put under gobhi sarson alongwith keeping of atleast 10 bee hives. This combination will definitely help the farmer in increasing the farm income.

Key Words : Gobhi sarson, Wheat, Beekeeping, Economic feasibility

INTRODUCTION

Beekeeping with *Apis mellifera* is now popular in several regions in India, including Jammu and Kashmir, Punjab, Haryana, Uttar Pradesh, Uttarakhand, Bihar, Jharkhand and West Bengal. In Punjab, at present there are 3,50,000 lakh honey bee colonies working at the farmers' fields. There are 30,000 bee keepers in Punjab and honey production is 14,000mt which is about 30 per cent of the country's total honey production (Singh and Sharma, 2017). This has not only improved the nutrition of the people but also helped the nation to earn foreign exchange through the export of honey. Punjab is the only state having the largest number of bee colonies followed by Haryana (10,500), Himachal Pradesh (50,000 colonies) and Jammu and Kashmir (15,000 colonies). Although Punjab is a leading state in India in honey production, but farmers are now facing problem in sustaining 3,50,000 honey bee colonies for want of sufficient availability of flora and fauna throughout the year.

During the year 2013-14 a survey was conducted in the district in order to assess the performance

of bee keeping units established by the farmers at their farms. Similarly vocational trainings on bee keeping were imparted to the unemployed youth, farmers and farm women so that they can also start their own bee keeping units. Likewise, efforts were made to ascertain the various problems being faced by the bee keepers in the district so that the required remedial measures could be advocated (Singh and Sharma, 2017). However, in spite of the best efforts done by the scientists as well as farmers, the honey production/unit (37.06 kg/colony/year) was not found to be increased.

The quantity of honey produced per colony depends on a number of factors. The most important factors that affect honey production are availability of bee pasture, the queen's condition, hive population, nutrition, swarming, space in the hive for expansion of the brood nest and storage of honey, the colony's freedom from disease, the beekeeper's experience and weather. Additionally the availability of adequate nectar producing plants and trees, colonies with vigorous queens and large number of foraging bees, proper hive management

techniques and favourable weather conditions will ensure greater honey production. The most important crops grown by farmers in Punjab on a large area are wheat, rice and cotton occupying an area of more than 8 per cent in Punjab. Therefore, there is a need to go for gobhi sarson cultivation during the rabi season by replacing a small area from wheat. Gobhi sarson (*Brassica napus*) is a rabi season oilseed sown during 10th October to 30th October under Punjab condition by using seed @ 3.7kg /ha, 225kg of urea and 187.5kg of single super phosphate /ha, after the harvest of paddy crop (Anonymous, 2017). Hence, this practice, if followed will definitely encourage the bee keepers to get higher yields of honey and will avoid migration to other areas on one hand and simultaneously increase the gross return over the wheat crop. In order to encourage this practice, study was undertaken to evaluate the economic viability of cultivation of gobhi sarson by the bee keepers over the wheat crop at the farmer's field.

Mostly the honey production in Punjab comes from the bee flora of gobhi sarson, berseem, eucalyptus, sunflower, pear, peach, plum, litchi, cucurbits etc. Among the available bee flora, Gobhi sarson, berseem and eucalyptus are the major crops to be grown on the remaining 15% area. Hence, this study was undertaken to ascertain the feasibility of Gobhi sarson in place of wheat so that honey bee keeping could flourish to its maximum extent.

MATERIALS AND METHODS

A study was conducted in the district Kapurthala by selecting 40 bee keepers. In order to motivate them to increase the yield and income from bee keeping enterprise, the role of gobhi sarson was highlighted through delivering lectures on and off the KVK campus. Moreover, the seed of gobhi sarson var. GSC 7 was provided alongwith all other critical inputs like single super phosphate and Actara insecticides for the management of aphids. Hence, 40 demonstrations were laid out by covering an area of 16 hectare. The area put under gobhi sarson was being used earlier for the cultivation of wheat which

was replaced by incorporating gobhi sarson crop. At the harvest of both the crops in the months of March and April of gobhi sarson and wheat respectively, the yield and selling rate were recorded. Likewise, the cost of production of both the crops i.e. gobhi sarson and wheat alongwith establishment and recurring cost of 10 bee hives was calculated. A comparison was made for economical viability of both the crops alongwith honey bee keeping.

RESULTS AND DISCUSSION

Cost of cultivation of gobhi sarson

The data (Table 1) show that it requires Rs. 19750/- for cultivating 1 ha area which will yield 20 q of gobhi sarson worth Rs 74,000/ha. The net income comes out to be Rs. 54250/ha. In order to get optimum yield of this crop, proper plant population is must and for that farmers have to go for thinning operation at about 20 days after sowing otherwise, plant growth will be affected adversely. Likewise, there are chances of attack of insect pests, specially aphids and tobacco caterpillar at pod formation stage and Alternaria blight at knee height stage. Proper control measures are needed to be taken at farmer's field.

Cost of cultivation of wheat

The data (Table 1) shows that it requires Rs. 20592/- for cultivating 1 ha area which will yield 50 q of wheat worth Rs 82500/ha. The net income comes out to be Rs. 61908/ha. In order to get optimum yield of this crop, selection of variety, seed rate and seed treatment are the most important factors to be followed by the farmers. The advantage of growing wheat over other crops is its assured market support price and therefore farmers hesitate to go for other alternative which may prove risky for them. It is worth to mention that in the fields where continuous rice-wheat cropping system is followed, there is problem of Phalaris minor, not being controlled by the recommended weedicides. Hence, under such situation, crop rotation is the only viable method to keep the weed population under control and cultivation of gobhi sarson in such fields would be

Cultivation of Gobhi Saraon along with Bee keeping

Table 1. Cost of cultivation of gobhi sarson and wheat at farmer's field during 2016-17.

Sr. No.	Particular	Expenditure (Rs.)	
		Gobhi sarson	Wheat
1.	Ploughing with disc harrow (2 times)	900	900
2.	Ploughing with tillers (2 times)	900	900
3.	Planking (1 time)	450	450
4.	Bund making	900	-
5.	Sowing with seed drill	-	900
6.	Seed cost (3.7 kg @ Rs 120/Kg)	450	
7.	Seed cost (100 kg @ Rs 30/Kg)	-	3000
8.	Transplanting cost	3000	-
9.	Seed treatment (consortium , Raxil and chlorpyriphos)	-	442.5
10.	Fertilizers (225 Kg Urea and 187.5 Kg SSP)	2625	-
11.	Fertilizers (225 Kg Urea and 137.5 Kg DAP)		4500
12.	Irrigation (Labour of 2 men for 5 irrigations)	1500	1500
13.	Earthing up with tractor	900	-
14.	Spray of weedicides	-	2250
15.	Cost of plant protection measures (2 sprays of fungicide and 1 of insecticide)	2625	2750
16.	Harvesting cost	2500	3000
17.	Threshing cost	3000	-
18.	Yield	20q/ha	50 quintal/ha
19.	Selling rate (Rs. 3700 /q)	74000	-
20.	Selling rate (Rs. 1650/quintal)	-	82500
21.	Net income	54250	61908

more desirable. Further, wheat crop takes about 155 days whereas gobhi sarson takes about 145 days but if sown in the first week of October, it vacates the field in the month of March and after that cultivation of summer moong is the suitable cropping sequence (paddy-gobhi sarson-summer moong).

Cost of cultivation of honey bee keeping

The data (Table 2) revealed that from 10 honey bee hives, a net income of Rs. 51952/- is obtained. This enterprise requires skilled labours for its success. Seasonal management and management of bees from the attack of insect pests particularly wax moth and mites are the other most important factors in production of honey. Honey is a nutritious product and hence there is no problem of its marketing. Bee

wax, pollen, royal jelly and bee venom are the other bee products besides honey obtained from the honey bees which are in great demand in the international market. In addition, income is also enhanced from selling of honey bee colonies. This enterprise can be successfully integrated with other enterprises. Singh and Sekhon (2014) reported that annual yield of honey from one hive was found to be highest (27.6 kg) on large farms and lowest (24.2 kg) for small farms. Similarly, annual net returns per hive obtained from sealed honey and allied products were highest for large bee keepers (Rs 1712/-) followed by medium (Rs. 1063/-) and small bee keepers (Rs. 523/-). The overall B:C ratio was 1 : 1.50 indicating that bee keeping is profitable enterprise.

Table 2. Economics of 10 honey bee hives/ha at farmer's field during 2016-17

Sr. No.	Name of item	Cost (Rs.)
1.	Fixed cost	
	Purchase of 10 hives with honey bees (Rs 4000 per hive)	40000/-
	10 super chambers (Rs 500 per super)	5000 /-
	10 queen excluder	3000/-
	100 frames to be put in super chamber (Rs. 40/frame)	4000 /-
	Honey bee kit (gloves, hive tool and veil)	190 /-
	Rent of Honey extractor	200 /-
	Total fixed cost	55000/-
2.	Variable cost	
	Interest @11%	5548/annum
	Depreciation @ 10%	5500/annum
	Management of honey bees, extraction, packing etc (5 labour days)	1500/-
	Bottle cost @ Rs 25 per bottle	7500/-
	Total variable cost	20048/-
3.	Gross cost	75048/-
4.	Honey produced (30 Kg/hive) 300 Kg sold @ Rs 240/kg	72000/-
5.	Return over variable cost/10 bee hives	51952 /-

Table 3. Economic viability of gobhi sarson with bee keeping over wheat crop.

Sr. No.	Crop	variety	No. of demonstrations	area (ha)	Av yield (q/ha)	Selling rate/q	Total income (Rs.)	Expenditure (Rs.)	Return over variable cost
1.	Gobhi Sarson	GSC 7	40	16	20.0	3700	74000	19750	54250
2.	Wheat	HD 2967	40	16	50	1650	82500	20592	61908
3.	Honey bee keeping	NA	-	160 Hives	30 kg honey/hive	240/kg	72000	20048	51952
4.	Bee keeping along with gobhi sarson	-	-	-	-	-	146000	39,798	106202

Comparison between wheat versus gobhi sarson and bee keeping

It has been observed that cultivation of gobhi sarson proved to be more economical if followed with rearing of honey bee hives over the wheat crop (Table 3). The data show that an amount of

Rs. 106202/- was realized by selling gobhi sarson and honey obtained from 1 ha area compared to Rs. 61908/- from wheat crop. This practice will not only increase the honey production but also enhance the farmer's income. Moreover, not all area being cultivated under wheat crop area is to be replaced

Cultivation of Gobhi Saraon along with Bee keeping

with gobhi sarson but even if a small area (1 ha/ farmer family) from wheat crop is shifted towards cultivation of gobhi sarson, this will definitely help in increasing the farmer's income.

CONCLUSION

The study showed that it was more economical to cultivate gobhi sarson alongwith 10 bee hives on 1 ha area compared to cultivation of wheat crop. As one can earn Rs 106202/ha by interesting honey bee keeping with cultivation of gobhi sarson over cultivation of sole wheat crop which yielded a total income of Rs 61905/ha only. Besides, the seeds of gobhi sarson variety GSC 7 can be used for its oil extraction as its oil has less than 2 per cent erusic acid and is very good for heart patient. Further, GSC 7 matures in 145d and vacates the field in the month of March. Therefore, sowing of summer moong crop can be performed. It is worth to mention here that as the crop of gobhi sarson provides sufficient flora during the rabi season, hence this practice will

help bee keepers to avoid migration to other areas in search of bee flora.

The honey production also increased due to availability of sufficient flora during the rabi season in the district. Therefore, efforts need to be made to educate the farmers regarding adoption of this cropping sequence i.e. cultivating of paddy-gobhi sarson-summer moong in the district followed by rearing of honey bees.

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