



Sustainable Bee-keeping through

Farmers FIRST Project interventions in Nainital district of Uttarakhand

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In Uttarakhand, more than 75% of the population is dependent on agriculture and its allied activities. Bee-keeping in Uttarakhand along with agriculture is being practiced for generating supplementary income. Jeoli village in Bhimtal block of Nainital district in Uttarakhand state has been adopted under Farmer FIRST Project for empowering the villagers economically by providing improved technologies and viable livelihood opportunities suitable to their conditions. In Jeoli village, nearly 25 farmers are doing bee-keeping as an enterprise along with agriculture. They earlier used to face problems of high cost of standardized bee-keeping equipment, unfavourable weather and climatic conditions, unfixed price of raw honey, unorganized and unregulated markets, lack of proper storage containers and facilities. With the help of Farmer FIRST interventions, the village got honey processing plant unit and other equipments which helped the honey-bee farmers in doubling their income.

Keywords: Bee-keeping, Doubling income, Economic, Farmers FIRST programme

BEE-KEEPING is one of the most widespread agricultural allied activities carried throughout the world. It is basically an agro-based seasonal activity, interdependent with agriculture. Both agriculture and apiculture have mutual benefits from each other as honey bees pollination services increase the yields and quality of many cultivated crops. In Uttarakhand, more than 75% of the population depends on agriculture and its allied activities for their livelihood. Bee-keeping or apiculture is one of such activities which is running successfully in Jeoli village. Jeoli village is one of the villages which are adopted under Farmers FIRST Project. It is located in mid-hills region of Bhimtal block in Nainital district of Uttarakhand state. It has 230 households and total agricultural land is 20 hectares (1000 Nali). According to survey, nearly 80% of the households have marginal holdings, 15% households have small size land holdings and 5% households have medium size land holdings. Their main occupation is agriculture and allied activities. They usually grow wheat, paddy, maize and horticultural crops such as onion, garlic, ginger, coriander, tomato, okra, spinach, mango, strawberry etc for household consumption as well as selling purposes. All the households in the village have agricultural land but few of them also do bee-keeping as a supplementary income.

Bee keeping is an important enterprise which

involves low input and high output sector. Jeoli village has enormous potential for bee keeping due to availability of endowment diversity of flora. There are nearly 25 farmers doing bee-keeping in the village since many years by traditional methods inherited from their forefathers and have no information about modern day practices. Earlier, they did not have proper guidance and scientific knowledge related to management of honey bees. Honey and bee-wax were the main products which were obtained by the farmers in Jeoli village. While practicing bee-keeping, they were facing various problems such as high cost of standardized bee-keeping equipment, unfavourable weather and climatic conditions, problems during migrations, bee diseases, predators and natural enemy problems, high cost of supplementary feeds, unfixed price of raw honey, unorganized and unregulated markets, lack of proper storage containers and facilities. These farmers usually had marginal lands and belonged to middle-income groups. They could not afford such expensive processing plants and other equipments which were important for modern scientific methods for extracting and preserving honey.

Farmer FIRST Project intervention

After seeing the problems and analyzing the gaps, Farmer FIRST Project's doubling farmers income

intervention was done to overcome the problem of high cost of standardized bee-keeping equipment and unfixed price of raw honey. The Farmers FIRST Project aimed at increasing the income of farmers and making them economically empowered by providing them with improved technologies and viable livelihood opportunities suitable to their conditions (Table 1). Thus, following the objectives, an installation of honey processing unit was done in the Jeoli village. The unit comprised of honey tank and filtration unit, honey extractor and honey processing plant unit, packaging containers/jars/glass bottles and packaging unit. Another intervention under this project was Wax Plate making machine which would be used for making mom sheet electrically.

The bee-keeping farmers of Jeoli village were also facing problems of storage of honey and infection of various pest diseases. Thus, distribution of honey containers was done under Farmers FIRST Project for preventing raw honey from the infection and storage problems. The honey containers made up of stainless steel were distributed among 12 bee-keeping farmers.

Previously, farmers were doing bee-keeping via traditional methods due to which the productivity per hive was low. Thus, several trainings were provided on capacity building and scientific management of bee-keeping to the farmers by experts of Govind Ballabh Pant University of Agriculture and Technology, Pantnagar.



Honey processing unit in Jeoli village

A self-help group consisting of bee-keeping farmers of Jeoli village was also made for security, maintenance of processing unit and responsible for processing of honey specifically. Meetings were done to mobilize members towards collective processing of honey and sheet making process.

Table 1. Lists of bee-keeping farmers of Jeoli village under Farmers FIRST Project intervention

Farmer's name	Age	Education	Bee-farming experience (years)	Before intervention (2016)				After intervention (2021)			
				Honey boxes (in no.)	Production per boxes (kg)	Sales/ kg (raw honey)	Production/ year in quintal (raw honey)	Honey boxes (in no.)	Production per boxes (kg)	Sales/ kg (raw honey)	Production/ year in quintal (raw honey)
Dinesh chand pandey	34	10th	12	20	15	60	3	130	24	130	31
Madan pandey	36	10th	12	25	12	80	3	90	25	150	22.5
Narayan dutt tiwari	31	8th	10	30	15	60	4.5	150	25	130	37
Puran chand pandey	57	10th	30	20	15	60	3	205	25	150	70
Girish chand pandey	44	10th	21	15	8	80	1.2	50	20	130	10
Harish chand pandey	47	8th	70	20	6	80	1.2	130	25	150	50
Kailash chand pandey	47	10th	20	25	10	60	2.5	125	20	140	25
Bhuwan chand tiwari	32	12th	12	20	13	80	3	100	25	150	25
Rakesh joshi	35	12th	12	40	12	60	5.2	100	24	140	30
Mohan chand pandey	48	10th	10	20	10	60	2	50	20	150	10
Ganesh chand pandey	60	8th	12	55	12	60	6.6	100	24	150	40
Kheema Nand pandey	75	3rd	50	80	15	80	12	100	24	150	25
Manoj pandey	38	10th	12	20	10	80	2	80	23	130	18
Harish Chandra bhatt	39	10th	15	25	10	60	2.5	120	25	140	30
Umesh Chandra bhatt	57	10th	30	50	12	60	6	100	23	150	25
Geeta bhatt	35	10th	10	25	8	60	1.2	100	24	150	25
Naveen pandey	42	10th	20	20	10	60	2	100	25	150	25
Jagdeesh pandey	39	10th	22	25	8	60	1.2	90	25	150	24
Puran bhatt	48	10th	25	35	10	80	4	100	24	150	50
Shekhar bhatt	58	12th	30	50	12	80	6	100	25	150	60



Bee-boxes in the field of Jeoli village

Distinctions between before and after intervention

Before intervention, farmers usually sold raw honey into the market which was less valuable. Farmers were making mom-sheets by using traditional method which was economical but hazardous to their health and environment. After Farmer FIRST Project intervention of doubling farmer's income, farmers are selling processed honey and making mom sheets by machine. This has helped bee-keeping farmers to produce processed honey which has improved the quality and shelf-life of the produce leading to better return and improving supplementary income.

After successful trainings on capacity building and scientific management, farmers adopted new technologies and practices to do better in bee-keeping. Farmers were aware about the cure of pests and diseases, adopted bee boxes for keeping honey-bees, management of bees during off season etc.

Income enhancement

Before interventions, farmers usually sold raw honey at the rate of ₹90–130/kg that was not upto the expenditure but after successful implementation of

the intervention, bee-keepers got enormous profit by selling processed honey. In 2021, there were 2,120 bee-boxes in the Jeoli village and production of raw honey was approx. 632.5 quintals. Bee-keepers processed honey approx. 500 quintals using honey processing unit and sold into the market at the rate of ₹350–400/kg. This intervention showed a step towards doubling the farmer's income.

SUMMARY

There is enormous potential for bee-keeping in the country. However, due to lack of improved standardized equipments and scientific knowledge, bee-keeping is not being practiced by the bee-keepers serving as one of the major reasons behind low production of honey. In Uttarakhand, farmers use traditional practices for bee-keeping which gives them less economic benefits. In order to obtain high output from bee-keeping, it is necessary for the bee-keepers to use modern technologies and scientific knowledge, participate in the training and other capacity building programmes. As per the objective, Farmers FIRST Project transferred the improved technologies among the bee-keeping farmers in Jeoli village, trained them to use scientific methods of bee-keeping and made them capable to use honey processing unit and other related equipments which eventually led to alleviate their income and standard of living. Seeing the benefits of bee-keepers, other farmers in the village also have taken up bee-keeping as an enterprise to generate additional income. This intervention has helped the bee-keepers to lead sustainable bee-keeping in Jeoli village of Uttarakhand state.

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Pusa Decomposer A microbial consortium for in situ paddy straw management

Pusa Decomposer is a microbial consortium of fungi developed by IARI for accelerated degradation of paddy straw into manure in 20–25 days. This technology is an effective eco-friendly solution for agri-residue management and an alternative to burning, thereby decreasing air pollution and improving soil health. A standard operating protocol (SOP) has also been developed for *in situ* management of agri-residue. The protocol involves application of the Pusa Decomposer spray, followed by rotavator for proper mixing of the spray with the straw and light irrigation to ensure moisture in the field. During 2020, Pusa Decomposer was demonstrated in an area of about 13,420 ha in different states of the country including Delhi. In 2021, the Pusa Decomposer shall be applied to > 15 lakh acres in the four states of Punjab, Haryana, Uttar Pradesh and Delhi.



Pusa Decomposer



Spraying



Mixing and incorporation



Irrigation



Germination of wheat

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