

Commercialization of summer radish

cultivation for higher income generation

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Under the ICAR's Farmers FIRST Programme (2016–2024) in Dharer Panchayat, Baijnath Block, Kangra district, Himachal Pradesh, summer radish cultivation was promoted to enhance farmers' income through diversification. Improved hybrids and scientific practices such as line sowing and seed treatment replaced traditional broadcast methods, resulting in higher yields (170.7 q/ha vs. 115.9 q/ha) and improved B:C ratios (4.9 vs. 2.8). Farmers adopted commercial-scale cultivation, supported by improved road access and market linkages. The intervention increased total farm income by about 79%, with nearly 45% of farmers doubling their income, demonstrating the profitability and scalability of summer radish in hill farming systems.

Keywords: Diversification, Farm income enhancement, Hill agriculture, Off-season vegetables, Technology adoption

HIMACHAL Pradesh, a north-western hill state of India lies between 30°22'40" and 33°12'40" N latitude and 75°47'55" and 79°04'20" E longitude with altitudes varying from 350–6,975 m amsl. According to NARP concept of classification, Himachal Pradesh has been divided into four zones viz. sub-mountain and low hill sub-tropical, mid hill sub-humid zone, high hill temperate wet zone and high hill temperate dry zone. Among the four agro-climatic zones, mid-hill sub-humid zone has been characterized as the grainery of the State for production and productivity of field crops and milch animals. This zone comprises of about one sixth of total area and contribute for about one fourth of total food grain production. District Kangra is one of the most important districts of the State with respect to agriculture, wherein major areas fall in the mid hill zone. Wheat, paddy, maize, pulses and vegetables apart from horticulture are the main crops of the district and source of livelihood to rural masses.

To ensure food and nutritional security to fast growing Indian population, making agriculture a remunerative occupation and enhance farmer's income, the Government of India initiated a mission for doubling the farmers' income and to achieve it, the agriculture sector needs to grow at 15% per annum. Therefore, there is a need for reorienting the conventional cropping system with a more productive alternative integrated farming systems, combining on and off-farm enterprises

with latest technological support. Keeping this objective in mind, the farmers' FIRST [Farm, Innovation, Resources, Science and Technology] Programme of the Indian Council of Agricultural Research (ICAR) was implemented by the Directorate of Extension Education of the university in a cluster of villages of Dharer Panchayat, Baijnath Block, District Kangra, Himachal Pradesh, from 2016–17 to 2023–24.

The selected project operational area represents different micro-farming situations prevalent in mid-hill sub humid zone and over and above the existence of agro-ecosystems and their production systems identified for technology assessment and dissemination. About 80% of the area of district is rainfed and maize-wheat is the most dominating cropping system. Concerted efforts in the past has resulted in diversification of this system and many areas have adopted vegetable cultivation for better returns. Different set of farm families were identified. The project interventions hence, were conceptualized in view of the facts that it will cover all farm families in the cluster for different modules based on their existing production systems potential and interest.

Based on results of benchmark survey using participatory rural appraisal (PRA) technique and extensive discussions with farmers regarding their skills and managerial capabilities, 16 interventions of various farming modules of doubling farmers' income model were implemented in 500 farm holdings in a systematic



Women farmers transporting radish from their fields

manner. In selected households, the average family size was 3.80 and most of the (75.21%) population had agriculture as the main occupation, while nearly 25% families had employment as an additional income source. The average size of holdings was 0.35 ha. The selected farmers were continuously provided technological and partial input support in terms of training, skill up-gradation, supply of seeds, fertilisers and other production linked inputs. The outputs in terms of production/productivity, revenue generation and profitability of the model were regularly recorded to quantify the contribution of interventions over the traditional farmers' practices.

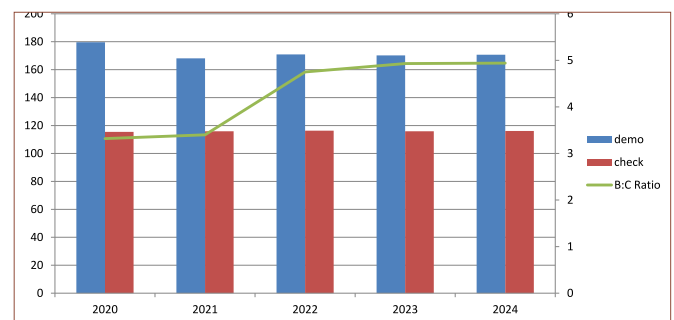
Visualizing the agroecological conditions prevailing in the study area, the operational area has the potential to grow various high value cash vegetable crops. The cultivation of off-season vegetable production had high potential for supplementing farm income. During summer season, the possibilities of cultivation of French bean, peas and radish existed and amongst these crops, the radish crop appeared to be less input demanding and high profit making when it is available during summer rainy season (June-August). Initially, the farmers of the area were broadcasting radish seeds and the varieties in cultivation bolt (flower) early without forming appropriate marketable sized roots during summer season (April-May). As a result, the farmers were not getting premium prices of their produce.

The farmers of the area were educated about line sowing of the crop and improved radish varieties and hybrids suitable for growing especially during summer season (April-May sowing time) and these produced good quality marketable sized roots and did not bolt (flower) during summer season. As such, the quality produce fetched premium prices in the market during off-season. Since, 2020–21, the summer crop of radish is continuously producing higher root yield and a substantial improvement over B:C ratio has been recorded. The farmers of the area are highly impressed

with the successful and higher income generating activity in the area. Earlier, the farmers used to transport the produce to the markets manually or the use of animal power for transport especially the horses. With the concerted efforts of the farmers and Gram Panchayat representatives, the local road has been constructed which is now facilitating the transport of fresh produce from the production sites in the villages to the markets. The farmers of the area are now cultivating summer crop of radish on commercial scale and the entire two village clusters namely, Kandkosari-I, Kandkosari-II are completely saturated with this crop. The farmers are earning lucrative returns through the sale of their produce and are sustaining their livelihoods.

Table 1. Yearly wise demonstrations, yield increase and B:C ratio of summer radish cultivation in the area

Year	Seed (Kg)	Area (ha)	No. of Farmers	Yield of Demo (q/ha)	Yield of Check (q/ha)	% Increase	B:C ratio of Demo	B:C ratio of Check
2020-21	5	1.0	120	179.60	115.45	55.49	3.32	2.08
2021-22	10	2.0	30	168.09	115.88	45.75	3.40	2.22
2022-23	18	3.5	84	170.90	116.3	46.90	4.75	2.96
2023-24	18	3.6	88	170.20	115.9	46.85	4.93	2.80
2024-25	20	4.0	79	170.70	116.1	47.02	4.94	2.81
Average	14.2	2.8	80	171.89	115.92	48.4	4.3	2.6



Year wise yield increase and B:C ratio over local check of radish cultivation

Impact on farmers' income

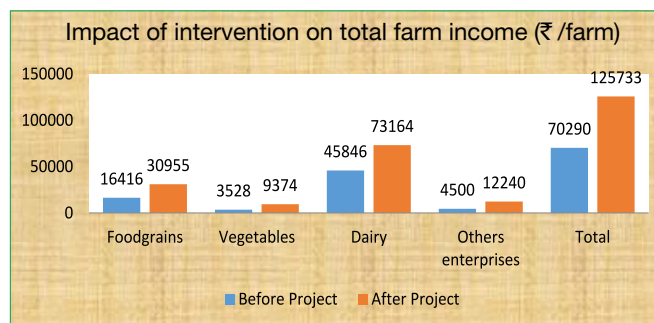
The impact assessment studies of various interventions executed from 2016–17 to 2023–24 revealed that due to high productivity, the income from foodgrain crops increased by about 88.57% from ₹16,416 before the intervention of the project to ₹30,955 the income significantly by ₹14,539. In case of vegetables, due to the increase in productivity of the existing vegetables and introduction of new crops by replacing pulses and oilseeds, the income of the vegetables increased by 165% (from ₹3,528 to ₹9,374/farm/annum) compared to the before project. The major increase in the farm income was noticed in dairy component as increased significantly by ₹27,318 i.e. from ₹45,846 to ₹73,164 thereby showing an increase of 59.59% The income from ancillary enterprises (mainly mushroom and backyard poultry) was more than double showing an increase

of about 172%. Overall, the total farm income that was estimated ₹70,290/farm before project increased to ₹125,733/farm after the project interventions. This clearly shows a significant addition to the income worth of ₹55,443 farm. Therefore, the total income in the project area got increased by about 78.88% as a result of various technological interventions.

As far as distribution of total income among the different farm components is concerned, the data revealed that before the project, major portion of total farm income was derived from dairy component (65.22%) followed by foodgrains (23.35%) and ancillary farm enterprises. However after the project interventions, productivity foodgrains and ancillary increased by 25, 7 and 9%, respectively. Income of the 40% of the farmers got doubled or more than doubled while the income of 10% of the farmers increased by more than 75%. The income of 9.33% farmers increased in the range of 50-75% while income of about 11% of the farmers increased to the extent of 25-50%. The income of 12% of the farmers recorded a meagre increase and there was no change in the farm income of 18% of the beneficiary farmers. In this way, the income increased was recorded on about 82% of the farm households that clearly embarks the appreciable impact of the project activities in the study area.

Table 2. Impact of intervention on total farm income (₹/farm)

Crops	Before Project	After Project	% increase
Food grains	16,416 (23.35)	30,955 (24.62)	88.57
Vegetables	3,528 (5.02)	9,374 (7.46)	165.7
Dairy	45,846 (65.22)	73,164 (58.19)	59.59
Others enterprises	4,500 (6.41)	12,240 (9.73)	172
Total	70,290 (100.00)	125,733 (100.00)	78.88



Extent of increase in farm income

The extent of increase in the farm income at the beneficiary farms has also been analysed. It was inferred that the proportion of the farmers at which the farm income increased by more than 100% was quit high i.e. 44.67% of the total farmers. The proportion of the farmers who were able to increase their income by 75-100 and 50-75% was found to be about 14 and 15%, respectively. The table clearly indicated that majority of the beneficiary farmers (about 73%) has increased their income by more than 50%. However, there has been no change in the income on 6.67% of the beneficiary farmers.

Table 3. Distribution of beneficiary households according to income enhancement

Extent of increase in income	No. of farmers	Farmers (%)
>100 (more than doubled)	67	44.67
75-100	21	14.00
50-75	22	14.67
25-50	16	10.67
Less than 25	14	9.33
No change	10	6.67
Total	150	100.01



Demonstrations of summer radish in FFP area



Demonstrations of summer radish in FFP area

SUMMARY

The Farmers FIRST Programme implemented from 2016–2024 in Kangra district, Himachal Pradesh, introduced summer radish cultivation as a profitable diversification option for smallholders. Through demonstrations, training, and supply of improved varieties, farmers shifted from traditional broadcast sowing to scientific practices, achieving about 48% higher yields and doubling profitability. The adoption

of improved varieties and better market access enabled commercial-scale production across village clusters. Overall, farm income in the project area rose by nearly 79%, with 45% of farmers doubling their earnings. The initiative proved that off-season vegetable cultivation can significantly enhance livelihoods and sustainability in hill farming systems.

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Articles invited for Special Issues of *Indian Farming* and *Indian Horticulture*

On the occasion of the 98th ICAR Foundation Day

ICAR invites articles for two Special Issues of its flagship magazines, *Indian Farming* and *Indian Horticulture*, to be published on the occasion of the 98 ICAR Foundation Day. Researchers, scientists, and subject matter experts are encouraged to contribute high-quality articles aligned with the themes given below.

1. Special Issue of *Indian Farming* on “Environmental Sustainability”

This issue will focus on innovations, technologies, and products that contribute to Environmental Sustainability and support the attainment of the Sustainable Development Goals (SDGs). Articles should present a clear and complete storyline demonstrating how the described method advances specific SDGs and promotes sustainable agricultural practices.

Authors are requested to follow the submission guidelines available on the *Indian Farming* ePubs portal: <https://epubs.icar.org.in/index.php/IndFarm/about/submissions>

2. Special Issue of *Indian Horticulture* on “Nutrition and Health”

This issue will highlight advancements that enhance nutrition, improve health outcomes, and promote sustainable food systems, contributing to relevant SDGs. Articles should present a coherent narrative demonstrating how the work supports better nutrition and health through horticultural innovations.

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While submitting the article, please clearly mention that the submission is for the **Special Issue**.

Last date for submission: 28th February 2026