

doi: <https://doi.org/10.20546/ijcrar.2023.1107.001>

Economic Impact of Purple Revolution on Farmer's Income in Doda District of Jammu and Kashmir, India

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Abstract

The objective of this study is to examine the farming of lavender plants in the Doda district of Jammu and Kashmir (J&K) by using data collected through a field survey and the Statistical Abstract of J&K. In developing countries such as India, growing medicinal crops like lavender provides an opportunity for farmers to diversify away from traditional crops that may no longer be financially rewarding, even though they are still important for ensuring food security. The findings of this study suggest that farmers in the study area have embraced lavender farming to a great extent, and it has significantly increased their income. Therefore, it is crucial for the J&K administration to learn from the Doda experience and promote lavender farming in other regions of the state. Other state governments should also take a cue from Doda and explore the potential of a 'purple revolution' in their respective states.

Article Info

Received: 20 May 2023

Accepted: 28 June 2023

Available Online: 20 July 2023

Keywords

Purple revolution, Economy, Farmer, Agriculture, Lavender.

Introduction

Lavender is a small, aromatic shrub used in the fragrance, speciality food, and alternative medicine industries. Lavender (*Lavandula spica*) is the family Lamiaceae's aromatic and perennial shrub. It is valued for its highly fragrant flowers and comes in a variety of colours like purple, pink, white, mauve etc. It is a popular ornamental plant used in various gardening and landscaping and has an arsenal of medicinal and home applications. Lavender oil extracted from flowers is an important ingredient in many commercial products. Its high economic value and ease of cultivation practices are prompting farmers to grow it on large scale. In India, high-altitude areas of Himachal Pradesh, Uttarakhand, Uttar Pradesh and Jammu Kashmir are suitable for lavender cultivation. Around 500 farmers in the Doda

district of Jammu Kashmir have quadrupled their income by switching from the cultivation of maize to lavender. That is the reason for its popularisation as "Jammu's Purple Revolution". The purple revolution is reported to be the 17th revolution in India moving towards "Atmanirbhar Bharat". To increase the income of small and marginal farmers with the primary focus of research on drug discovery from natural products, the Council of Scientific and Industrial Research (CSIR) initiated Aroma Mission to popularise aromatic crops and provide. Giving up the age-old traditional farming of maize crops, 200 progressive farmers residing in the vast hilly slopes of Jammu and Kashmir's Doda have successfully embraced aromatic lavender cultivation that is comparatively more profitable, starting a "purple revolution" in the district. About 500 farmers of district Doda used to cultivate maize, they switched to lavender

in 2010 when the state's tourism department introduced the plant in the area for beautification like most farmers in Khillani village in Jammu and Kashmir's Doda district. In 2016, the central government launched the 'Aroma Mission' to boost the cultivation of plants like lavender that have aromatic medicinal properties.

Finding suitable cold climate and favourable growing conditions, 200 small and marginal farmers of the Bhadarwah region of Doda district soon took up the initiative in a big way and started cultivating lavender in their fields at several villages including Tapri, Lehrote, Kellar, Koundla, Himote, Saringal, Butla, Nalthi and Nakshari. Besides giving them technical support, free essential oil distillation facilities were provided to the farmers of Bhadarwah and through CSIR-IIIM interventions. As a result, they have been able to produce more than 800 litres of lavender oil worth Rs 80 lakh between 2018 and 2020.

Purple Economy

"Lavender oil is in high demand in India. We market refined oil directly to industrial sachets, floral arrangements, and a hydrosol, which is made from the flowers after distillation and used to produce soaps and air fresheners. Farmers like lavender because of its easy-to-grow qualities, they note That the income from lavender farming is much higher than that from maize farming. A hectare of land will produce 30 to 45 litres of lavender oil, which is highly sought after as an essential aromatic oil. Lavender oil sells for at least Rs 10,000 per litre, according to scientists from the Council of Scientific and Industrial Research (CSIR) and the Indian Institute of Integrative Medicine, Jammu (IIIM Jammu), the two bodies responsible for taking the Aroma Mission forward. A minimum of 40 litres of lavender oil is produced from lavender grown over one hectare of land. However, because Doda is flatter than desirable, 32-40 litre of lavender oil can be extracted per hectare from the local produce Lavender water, which separates from lavender oil, is used to make incense sticks. Hydrosol, which is formed after distillation from the flowers, is used to make soaps and room fresheners. Apart from increasing farm incomes, lavender cultivation also employed the district's women farmers.

Purple Revolution

Most of the farmers in Jammu and Kashmir's Doda district used to cultivate maize. Then, in 2016, the Centre launched Aroma Mission to boost the cultivation of

plants like lavender which have aromatic medicinal properties. Around 500 farmers from the Doda district switched from maize to the perennial flowering plant and reported a boost in their income. As the profits started flowing in, lavender began to replace maize plants on more land with lavender till the flowers covered almost ten times the area a decade ago.

The objective of the study

- 1) To study the effect of lavender cultivation on the income of the farmers.
- 2) To conduct a trend analysis of land under lavender cultivation.

Hypothesis

Ho: There is no statistically significant difference between the income generated by traditional crop cultivation and lavender crop cultivation.

H₁: There is a statistically significant difference between the income generated by traditional crop cultivation and lavender crop cultivation.

Ho: There is no significant incasement in lavender cultivation

H₁: There is significant shift from tradition cultivation to lavender cultivation in study area.

Research Methodology

The reliability and viability of the research findings depend upon the methodological framework adopted for the study. Therefore, an attempt has been made in the present study to make use of elaborate methodological procedure and various analytical techniques in achieving the set objective of the study. The detail of the selection process is as follows:

Selection of the Study Area of Study

The present study aims to analyse "The Economic Impact of Purple Revolution on Farmers' income in Doda District of Jammu and Kashmir" the area of study is district Doda in Jammu and Kashmir. The total population of District Doda is 4, 09,936 as per the census of 2011. The population is mostly in rural areas and only 7.97% of it resides in urban areas. The workforce accounts for 37.06% of the total population and is mainly composed of cultivators, agriculture labourers, livestock

rearing and others. Doda district comprises four Sub-Divisions, 16 Tehsils, 17 Blocks, 231 Panchayats, and 402 revenue villages. 92.03% population of the district. Agriculture is the main source of livelihood in this district as in the rest of the state. Due to variation in climate, there is variation in crop production too under cultivation and in turn improvement in the socio-economic status of farmers, Selection of 2 Agriculture blocks of district Doda (Bhalla and Bhaderwah) Selection of all 20 villages of the district (Kehlani, Bhara, Laertote, Dhudu, Tipri, Ghatt, Karain, Ghuraka, Seri, Gutassa, Haga, Chinta, Deggi, Gatimorh, Bhorowa, Rounda, Khallu, Sotha, Dugli and Neota).

Sample design

A multistage random sampling technique has been used to identify the area of study and survey household. The area under study is selected by using a multistage random sampling method.

In the first stage, out of 22 districts we have selected Doda district. In the second stage, out of 19 block we have selected two blocks Bhadarwah and Bhalla. In the third stage, out of 179 villages of both blocks 20 villages are selected through purposive sampling. And in the fourth stage, we have randomly opted households for collecting data.

Sample size

The present study is based on the primary data collected from the sampled household of the 20 village. A total of 100 households were chosen by a multistage random sampling method for the survey. In these 100 respondents, our respondents were one who cultivate lavender crop

Method of Data Collection

In this study, data was collected through an interview schedule. We have done door-to-door surveys and collected data with the personal contact method, the respondents were interviewed at their houses and the questions were put to them in a language which is easily understood by them. We requested them to share correct information for yielding meaningful and accurate results.

Source of data

The secondary data was obtained by using the district Statistical Handbook, prepared and released by the

District Statistics & Evaluation Office Doda for the year 2014-15 and supported by the J&K Development Report of Planning Commission, 2012.

Tools and techniques

In the present study, descriptive statistic techniques have been used in order to get conclusions based on some background characteristics like type of family, religion, caste, type of ration card, education and occupation. Wherever possible simple descriptive statistics technique has been used for analysing the data. Data analysis has been done using MS Excel. To compare compared the income of farmers before lavender farming and after lavender farming, we have used paired sample t-test. We have used a t-test to examine the significant difference in income of the farmer in the study.

Results and Discussion

The table shows data related to lavender cultivation in Doda district, including the area under cultivation, production of essential oil, and income generated for each year from 2013-14 to 2020-21. In 2013-14, the area under lavender cultivation was 247.10 kanal, but there is no data on production or income generated. In the following years, the area under cultivation increased each year, reaching 1789.03 kanal in 2020-21. The production of essential oil from lavender also increased over the years, from 27 kg in 2014-15 to 2200 kg in 2020-21. This shows a significant growth in the production of essential oil, indicating that lavender cultivation is becoming more productive in the region. The income generated from lavender cultivation also increased year by year. While it was 2.7 lakh rupees in 2014-15, it reached 88 lakh rupees in 2020-21. This suggests that lavender cultivation has become a profitable venture for farmers in Doda district. Overall, the data indicates that lavender cultivation has been expanding and becoming more productive in Doda district, resulting in increased income for farmers.

The given table presents a cost breakdown for a farming project, with various categories of expenses and their associated costs in Indian Rupees (Rs). The first category is "Land preparation," which includes the costs of ploughing, tilling, and any other related expenses. The cost listed for this category is Rs 900. The second category is "Plant Purchase," which involves the purchase of pinery (pineapple plants). The cost for purchasing the plants is listed as Rs 4200. The third category is "Fertilizer," which represents the cost of

purchasing fertilizers for the plants. The cost for this category is listed as Rs 0, which may indicate that the farmer is not using any fertilizer in this project. The fourth category is "Labour," which includes the cost of hiring labour for planting, harvesting, and other related activities. The cost for this category is Rs 6000. The fifth and final category is "Irrigation," which includes the cost of installing an irrigation system and the usage of water. The cost for this category is also listed as Rs 0, which may indicate that the farmer is using rainwater or other natural sources of water for the project. The total cost for the farming project is Rs 11,100, which is the sum of all the costs listed in the table.

The table represents a revenue and profit calculation for a farm that produces two different products - oil and water. The first column lists the product names - oil and water. The second column represents the yield of each product per Kanal. A Kanal is a traditional unit of land measurement in India and Pakistan, equal to 1/8th of an acre. For oil, the yield is 3 litres per Kanal, while for water, the yield is 50 litres per Kanal. The third column shows the market price of each product per unit. For oil, the market price is Rs 10,000 per litres, while for water, it is Rs 100 per litres. The fourth column represents the revenue generated from the sale of each product.

The revenue is calculated by multiplying the yield and market price of each product. For oil, the revenue is 3 litres per Kanal multiplied by Rs 10,000 per litre, which equals Rs 30,000 per Kanal. For water, the revenue is 50 litres per Kanal multiplied by Rs 100 per litre, which equals Rs 5,000 per Kanal. The fifth row represents the total revenue generated from both products. The total revenue is calculated by adding the revenue from oil and water, which equals Rs 35,000 per Kanal. The last row represents the net profit generated from the farming project. Net profit is calculated by subtracting the total cost of production from the total revenue. The total cost of production is not mentioned in the table, but assuming it is less than the total revenue, the net profit is Rs 23,900 per Kanal.

Statistical Analysis of Result

As can be seen from the above summary the total number of respondents is 100 out of which 90 respondents are Male and the remaining 10 are female. 51 respondents belong to the General Category 30 respondents belong to the Scheduled Castes while the rest belong to other categories 60 respondents live in joint families, with the remaining living in nuclear

families. 51 respondents belong to the APL family and 49 respondents are in BPL Family. The Average Total Land Holding is 18.07 Kanal, the average cultivating land holding is 13.85 Kanal. And the Average lavender Cultivation land Holding is 7.5 Kanal. It is noteworthy that on average the respondents have devoted more than half of their cultivated landholding to lavender cultivation, even though it's not even been a decade since they took up the activity. This is obviously due to the spectacular returns that the crop has delivered in recent years. It remains to be seen if the share of farmland devoted to lavender cultivation increases further in the coming years

In the above table we have shown the total landholding and total cultivated landholding and total lavender cultivation landholding. In the study are average total land holding is 18.07 canal out of which 13.85 is cultivated landholding that mean 4.22 canal landholding is barren land. Average lavender cultivation is 7.5 canal which means 50 percent cultivated land equipped by lavender cultivation. In the study area most of the household has 14 canal total landholding out of which 12 canal is presently cultivated land out of them 10 canal is equipped by lavender cultivation.

Income

Ho: There is no statistically significant difference between the income generated by traditional crop cultivation and lavender crop cultivation.

H1: There is a statistically significant difference between the income generated by traditional crop cultivation and lavender crop cultivation.

From this analysis, it is concluded that growing of lavender in Doda district of Jammu and Kashmir is a profitable. Lavender cultivation earn high profits. When farmers adopt good agronomic management practice including mechanisation of farm operations intercropping with other crops The study finds that the growers to increases the area under cultivation of lavender Industrialist to established efficient oil distillation units and policy Various government agencies such as department of floriculture and department of agriculture provide the support to farmers in stable price support and proper infrastructure facility which helps to the farmers to increase the area under cultivation of lavender. Since the wide consumption of lavender oil is increasing there is urgent need to augment lavender oil production throughout the large scale.

Table.1 The area under lavender cultivation, year-wise production and income generated 2013-14 to 2020-21

Year	Area under lavender Cultivation (In Kanal)	Production of Essential oil from lavender (In Kg)	Income Generated (In Lakh)
2013-14	247.10	--	---
2014-15	504.09	27	2.7
2015-16	602.93	30	3.0
2016-17	701.77	50	5.0
2017-18	800.61	75	7.5
2018-19	919.22	80	8.0
2019-20	1294.82	250	25
2020-21	1789.03	2200	88

Source: Department of floriculture (Doda district)

Average estimated annual cost and revenue of lavender cultivation (per Kanal) (in Rs)

Table.2 Cost of Production Lavender Crop

S.No.	Cost Category	Cost description	Cost in Rs
1	Land preparation	Ploughing, tilling and other cost	900
2	Plant Purchase	Purchase of pinery	4200
3	Fertilizer	Purchase of fertilizer	00
4	Labour	Cost of labour for planting harvesting and other cost	6000
5	Irrigation	Cost of irrigation system and water usage	00
Total			11100

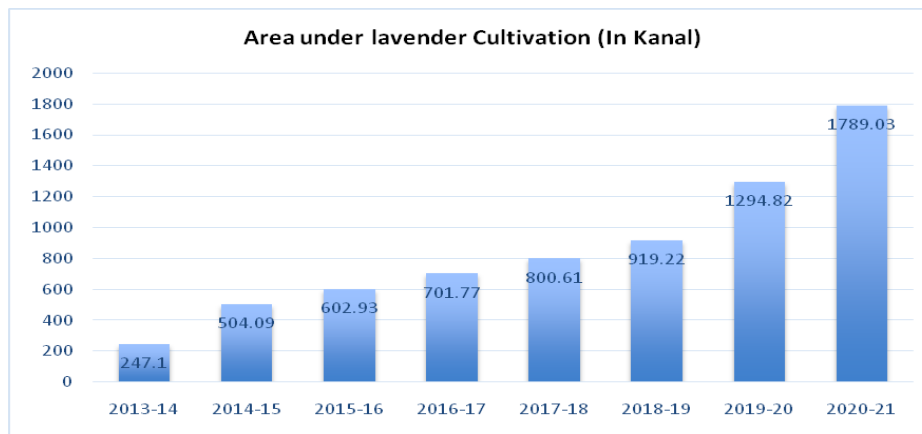
Source: Primary Survey 2022.

Table.3 Estimated Annual Revenue from lavender cultivation

S. No	Product	Yield per Kanal	Market Price in Rs.	Revenue
1	Oil	3 litres	10000/litre	30000
2	Water	50 litres	100/litre	5000
3	Total			35000

Source: Primary Survey 2022.

Fig.1 Area under lavender cultivation 2013-14 to 2020-21



Source: Department of floriculture (Doda district)

Table.4 Summary statistic of General Analysis

Characteristic	Number of Respondents
Total Household	100
	Gender
Male %	90
Female %	10
	Social Group
General	51
S.C.	30
Other	19
Total Household	100
	Types of family
Joint	60
Nuclear	40
APL Family	51
BPL Family	49
Average Total Land Holding in Kanal	18.07
Average Cultivated Land Holding in Kanal	13.85
Average Lavender Cultivated Land Holding in Kanal	7.5

The Above Table shows the Summary statistic of the general analysis.

Table.5 Summary statistic for present status of landholding in the study area (land in canal)

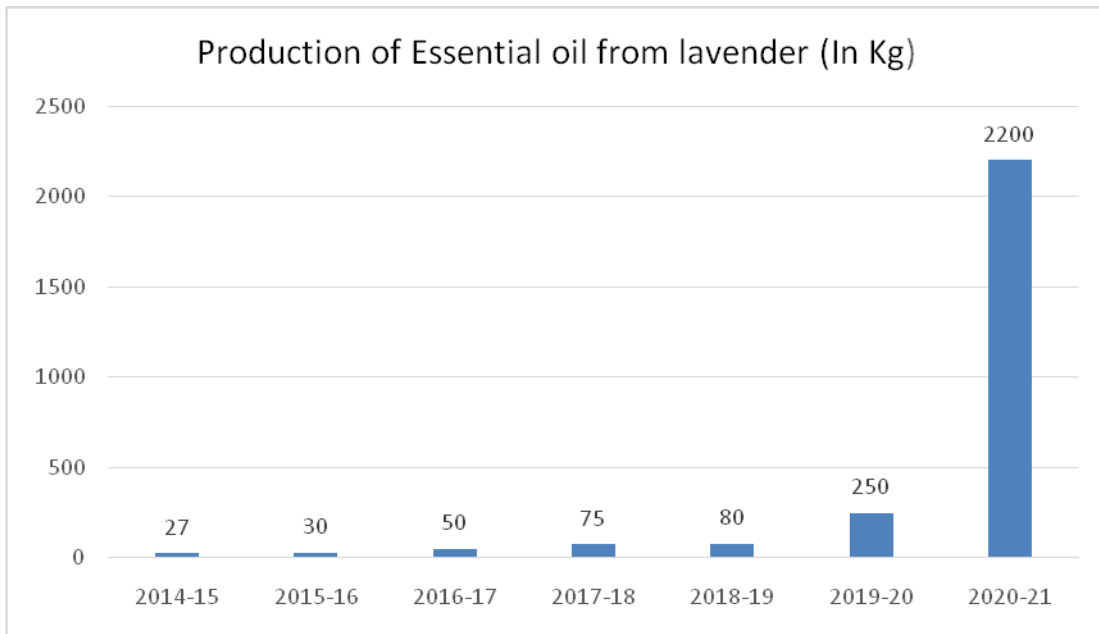
<i>Total landholding</i>		<i>Total Cultivated landholding</i>		<i>Total Lavender Cultivation</i>	
Mean	18.07	Mean	13.85	Mean	7.5
Median	18	Median	13.5	Median	7
Mode	14	Mode	12	Mode	10
Standard Deviation	5.470315	Standard Deviation	4.833333	Standard Deviation	3.699577
Sample Variance	29.92434	Sample Variance	23.36111	Sample Variance	13.68687
Count	100	Count	100	Count	100

Table.6 t-Test: Paired Two Sample for Means

	<i>Traditional Crops Income</i>	<i>Lavender Crops Income</i>
Mean	15000	90000
Variance	54747474.75	1970909091
Observations	100	100
Pearson Correlation	1	
Hypothesized Mean Difference	0	
df	99	
t Stat	-20.27258888	
P(T<=t) one-tail	2.55849E-37	
t Critical one-tail	1.660391156	
P(T<=t) two-tail	5.11698E-37	
t Critical two-tail	1.984216952	

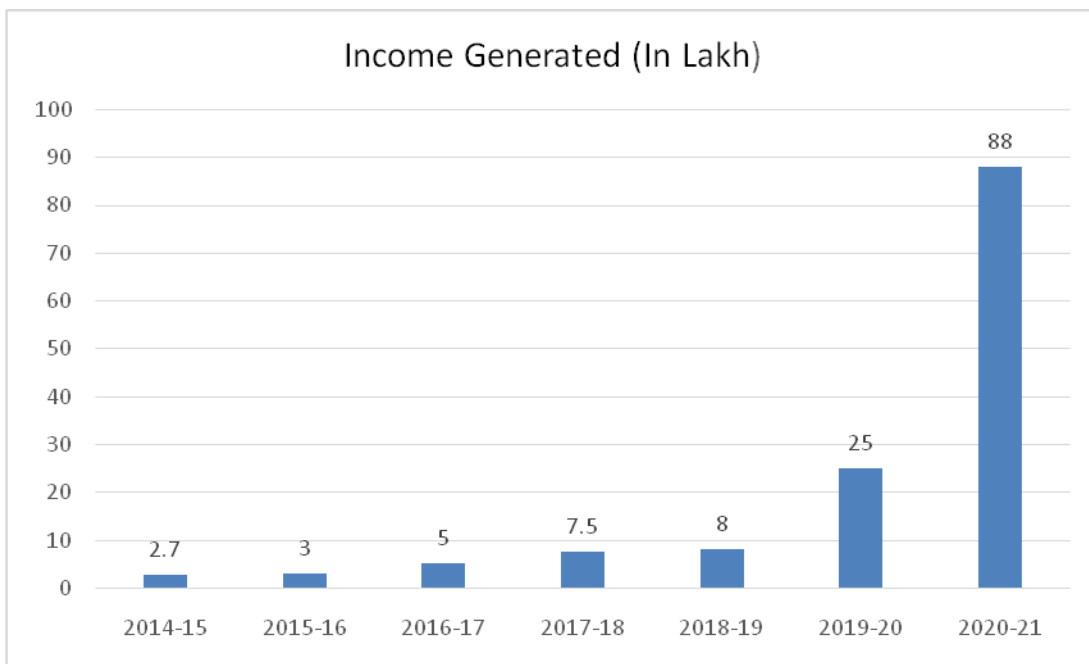
As $p < .05$, we reject the null hypothesis and conclude that the income generated by lavender cultivation is significantly higher than the income generated by traditional crops. Due to lavender cultivation the farmer's income increase almost six time.

Fig.2 Year-wise Production of Essential oil from lavender



Source: Department of floriculture (Doda district)

Fig.3 Year wise income Generated



Source: Department of floriculture (Doda district)

Fig.4



Source: Field Survey 2023

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How to cite this article:

Manjeet Kumar and Padam. S. Bisht. 2023. Economic Impact of Purple Revolution on Farmer's Income in Doda District of Jammu and Kashmir, India. *Int.J.Curr.Res.Aca.Rev.* 11(07), 1-8.
doi: <https://doi.org/10.20546/ijcrar.2023.1107.001>