

# **Economic Contribution to Household Dependence through *Ocimum basilicum* L. Cultivation: An Important Plant for Health and Livelihood Security in Kashmir Valley (J & K), India**

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## **Authors' contributions**

*This work was carried out in collaboration among all authors. Authors GMB, HM, MAI designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Authors MR and NAP managed the analyses of the study. Authors MR, NAP and SF managed the literature searches. All authors read and approved the final manuscript.*

## **Article Information**

DOI: 10.9734/CJAST/2020/v39i4431146

### Editor(s):

(1) Dr. Yahya Elshimali, Charles Drew University of Medicine and Science, USA.

### Reviewers:

(1) Isabel Nascimento dos Santos, FIOCRUZ, Brazil.

(2) Yelin Adalina, Forest Research and Development Centre, Indonesia.

Complete Peer review History: <http://www.sdiarticle4.com/review-history/64289>

**Original Research Article**

**Received 25 October 2020**  
**Accepted 31 December 2020**  
**Published 31 December 2020**

## **ABSTRACT**

The present study was conducted during the year 2018-19 in the Srinagar and Ganderbal district of Kashmir valley (J & K). The study was aimed to access the collection, consumption and economic contribution of *Ocimum basilicum* to household income and employment. The study was conducted using a well-structured questionnaire covering various aspects of the study. The total average yield/annum/family of *Ocimum basilicum* was recorded 3 kg. The average consumption/annum and sale/annum was 0.5 kg and 2.5 kg respectively. The household characteristics influencing the *Ocimum basilicum* livelihood in the locality averaged for the sample population indicated the preponderance of middle aged persons (55.9), low literate people (2.1) having large sized families (1.76), marginal sized landholdings (1.28), owning 6-10 livestock (1.76) were engaged mainly in agriculture (2.95) with family labour of mostly 3 members (2.45) and earning gross annual income of ₹60704.26 The total average gross income generated within the sample households was ₹450.00

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with the total average net income generation of ₹379.48 and the total average employment of 11.21 man-days by a single household. The structure of household average gross annual income, consisting of all off-farm and on-farm sources among the surveyed population, was ₹60704.26 which was differentiated as horticulture (37.70%) followed by agriculture (26.13%), livestock (21.93%), service (11.31%), business (1.65), basil based cottage industry (0.74%), wage labour (0.41%) and others (0.13%). The livelihood security from *Ocimum basilicum* L. depends on multitude of various socio-economic factors and cultivation practices and knowledge. The extensive cultivation of this plant may have more positive impact on the livelihood of the local communities.

**Keywords:** Basil; collection; consumption; household; wage labour; processing.

## 1. INTRODUCTION

Basil is a member of tropical genus *Ocimum*. It is native to tropical parts of Asia, Africa, Central and South America, but has now become globalized due to human cultivation. Basil is cultivated extensively in France, Egypt, Iran, Hungary, Indonesia, Morocco, Greece and Israel, mostly in Mediterranean countries and in various regions with temperate and hot climates [1]. Common basil (*Ocimum basilicum* L.) is the most popular herbaceous plant and is commonly used as a culinary herb for its characteristic aroma, which influences the taste and flavour of food, and subsequently the digestion process [2]. The genus *Ocimum* contains between 50 and 150 species of herbs and shrubs. The small white, yellowish or pinkish flowers are arranged in whorls in the upper leaf axil and fruit consists of four nutlets. All parts of the plant are hairy and aromatic. Basil alone has over fifty medicinal activities, from analgesic to vermifuge, and is reportedly used to treat over 100 conditions, including acne, fevers, headaches and fungal infections [3]. The herb is a good source of antioxidants, e.g., polyphenols, as well as components of essential oils that determine its health-promoting properties, such as antioxidant, antimicrobial, germicidal, antispasmodic, chemopreventive, radioprotective and antineoplastic [4,5]. It has been used in traditional Chinese medicine for kidney problems, gum ulcers and as a hemostyptic in childbirth and for problems as diverse as earache, rheumatoid arthritis, anorexia, skin conditions, menstrual irregularities, and malaria in India. Traditionally, basil has been used as a medicinal plant in the treatment of headaches, coughs, diarrhea, constipation, warts, worms and kidney malfunction [6]. The plant *Ocimum basilicum* is also called as Sweet basil, Royal herb, King of herbs, Tukh malanga, etc., locally in Kashmir it is called Babr or Babri kul (kashmiri). This is cultivated by different people of different communities for their local use and also for commercial purpose. Very less information is

available on the status of socio-economic and economic contribution of growers of the crop. Hence need was felt to carry out the study with the aim to study the socio-economic status, economic contribution and relation among the factors.

## 2. MATERIALS AND METHODS

The present study was conducted in the two central districts of Kashmir valley viz., Srinagar and Ganderbal. Purposive sampling technique was employed to select the villages and households in order to reach target sample. The area was visited twice before going for final data collection and prior consent was taken from the village heads. The first stage was the selection 5 villages (Faquir Gujari, Chek Dara, Harwan and Saedpora) from district Srinagar and 5 villages (Lar, Watlar, Saloora, Prang and Kangan) from district Ganderbal and was followed by selection of households. A sample of 60 households was drawn from the sample villages with 5 percent sampling intensity using simple random sampling technique. Data was collected using both primary field survey and secondary sources as well.

The primary data was collected by the personal interviews of the respondents through a well-structured pre-tested interview schedule at household level. Interview schedule for household survey was prepared on the basis of literature referred, reconnaissance survey of the study area and discussion with local people apart from consultation with the experts. Quasi-participant observation method was used to record the data on the basis of personal observation and interaction with the respondents. This technique helped to have firsthand on-the-scenes contact with the respondents, examine the behavior in natural situation and study the situation based features of conduct. The facts were gathered by assuming several roles as participant, interviewer, stranger or listener in various social, cultural, religious or political activities.

**2.1 Household Livelihood Contribution of *Ocimum basilicum* L.**

The questions asked through interview schedule included data on socioeconomic characteristics of growers, collection consumption/annum, sale/annum, quantity marketed, income generation, various sources of households' income and economic contribution through cultivation of this species. The socioeconomic variables of the farmers/ growers included age, education, family composition, land holding, livestock possession, housing status, subsequent occupation, wealth status annual income. These variables were measured using "Socio-economic status scale" of Venkataramaiah [7]. The observations recorded were used to triangulate and validate the data gathered through household survey, interpret the results and draw inferences. The data was analysed statistically for parameters like frequency (f %), mean and standard deviation.

Mean ( $\bar{X}$ ): The mean was computed by the formula:

$$\bar{X} = \frac{\sum f.x}{N} \tag{i}$$

Where,  $\bar{X}$  = mean of the scores,  $\sum$  =

summation,  $f$  = frequency of the class,  $x$  = class value or midpoint of the class interval and  $N$  = number of observations.

Standard deviation- is denoted by  $\sigma$  and computed by formula:

$$= \sqrt{\frac{\sum(x - \bar{x})^2}{n}} \tag{ii}$$

**3. RESULTS AND DISCUSSION**

**3.1 Yield and Income**

The perusal of data presented in (Table 1) indicates that total collection of basil/per family/per annum was 3.0 kg. Out of the total yield 0.5 kg was consumed at house hold level. The total average gross income generated by *Ocimum basilicum* among the sample households was ₹450.00 with total average net income generation of ₹379.48 and the total average employment of 11.21 man-days. Contribution of basil to household income and employment shows that basil cottage industry is the 6<sup>th</sup> major component of household economy after horticulture, agriculture, livestock rearing, service and business in the study area (Table 2).

**Table 1. Production, consumption and marketing of *Ocimum basilicum* in the sample household (N=60)**

| Particulars                    | Total    | Average |
|--------------------------------|----------|---------|
| Production/annum (kg)          | 180.00   | 3.00    |
| Consumption/annum (kg)         | 30.00    | 0.5     |
| Sale/annum (kg)                | 150.00   | 2.5     |
| Gross income (₹)               | 27000.00 | 450.00  |
| Transportation/other costs (₹) | 4231.2   | 70.52   |
| Net income (₹)                 | 22768.8  | 379.48  |
| Employment (man-days)          | 672.6    | 11.21   |

**Table 2. Contribution of *Ocimum basilicum* to household income and employment (N=60)**

| Livelihood source            | Income (₹/HH/annum) | Employment (Man-days/HH/annum) |
|------------------------------|---------------------|--------------------------------|
| Basil based cottage industry | 450.00(0.74)        | 11.21(4.09)                    |
| Horticulture                 | 22883.55(37.70)     | 82.50(30.08)                   |
| Agriculture                  | 15863.22(26.13)     | 75.51(27.53)                   |
| Livestock rearing            | 13310.21(21.93)     | 70.21(25.6)                    |
| Wage labour                  | 250.25(0.41)        | 2.50(0.91)                     |
| Business                     | 1000.00(1.65)       | 12.00(4.37)                    |
| Service                      | 6866.33(11.31)      | 20.21(7.36)                    |
| Other activities             | 80.70(0.13)         | 0.16(0.06)                     |
| Total                        | 60704.26(100.00)    | 274.3(100.00)                  |

Figures in parentheses show percentages

**Table 3. Age, education and family size in the sample households**

| <b>Age</b>              |                  | <b>Education</b>      |                  | <b>Family size</b>      |                  |
|-------------------------|------------------|-----------------------|------------------|-------------------------|------------------|
| <b>Category</b>         | <b>Household</b> | <b>Category</b>       | <b>Household</b> | <b>Category</b>         | <b>Household</b> |
| Young (up to 30 years)  | 4 (6.66)         | Illiterate            | 16 (26.66)       | Small (up to 5 members) | 14 (23.33)       |
| Middle (31 to 50 years) | 30 (50.00)       | Below primary         | 12 (20.00)       | Large (> 5 members)     | 46 (76.66)       |
| Old (> 50 years)        | 26 (43.33)       | Primary               | 6 (10.00)        | -                       | -                |
| -                       | -                | Middle                | 11 (18.33)       | -                       | -                |
| -                       | -                | High school           | 8 (13.33)        | -                       | -                |
| -                       | -                | Intermediate          | 5 (8.33)         | -                       | -                |
| -                       | -                | Graduate & above      | 2 (3.33)         | -                       | -                |
| X ± S.E. = 55.9 + 2.1   |                  | X ± S.E. = 2.1 + 0.23 |                  | X ± S.E. = 1.76 + 0.05  |                  |

*Figures in the parentheses show percentages*

**Table 4. Size of land holding and herd size in the sample households**

| <b>Size of land holding</b> |                  | <b>Herd size</b>       |                  |
|-----------------------------|------------------|------------------------|------------------|
| <b>Category</b>             | <b>Household</b> | <b>Category</b>        | <b>Household</b> |
| Landless                    | 0 (00.00)        | No livestock           | 05 (8.33)        |
| Marginal (< 1.00 ha)        | 45 (75.00)       | Up to 5 livestock      | 14 (23.33)       |
| Small (1.01-2.00 ha)        | 13 (21.66)       | 6 to 10 livestock      | 31 (51.66)       |
| Medium (2.01-4.00 ha)       | 02 (3.33)        | > 10 livestock         | 10 (16.66)       |
| Large (> 4.00 ha)           | 0 (00.00)        | -                      | -                |
| X ± S.E. = 1.28 + 0.06      |                  | X ± S.E. = 1.76 + 0.10 |                  |

*Figures in the parentheses show percentage*

**Table 5. Main occupation, family labour and gross annual income in the sample households (N=60)**

| Main occupation        |            | Family labour          |            | Gross annual income                   |            |
|------------------------|------------|------------------------|------------|---------------------------------------|------------|
| Category               | Household  | Category               | Household  | Category                              | Household  |
| Wage labour            | 10 (16.66) | 1                      | 13 (21.66) | Very low income (Up to ₹30000/annum)  | 13 (21.66) |
| Caste occupation       | 6 (10.00)  | 2                      | 15 (25.00) | Low income (₹30001 to 60000/annum)    | 37 (61.66) |
| Cultivation            | 29 (48.33) | 3                      | 24 (40.00) | Medium income (₹60001 to 90000/annum) | 8 (13.33)  |
| Business               | 9 (15.00)  | >3                     | 8 (13.33)  | High income (>₹90000/annum)           | 2 (3.33)   |
| Service                | 04 (6.66)  |                        |            | -                                     | -          |
| Any other              | 2 (3.33)   |                        |            | -                                     | -          |
| X ± S.E. = 2.95 ± 0.15 |            | X ± S.E. = 2.45 ± 0.12 |            | X ± S.E. = 62704.26 ± 4605.872        |            |

*Figures in the parentheses show percentages*

### 3.2 Age, Education and Family Size

Most of the respondents engaged in cultivation of *Ocimum basilicum* were middle aged (50.00%) followed by old aged (43.33%) and young (6.66%) groups respectively. The mean age was 55.9 year (Table 3). It could be observed from the data that maximum respondents (26.66%) were illiterate followed by below primary (20.00%), middle (18.33%), high school (13.33), primary (10.00%) intermediate (8.33%), and graduate and above (3.33%). The mean score of education was 2.1 which indicated that low literacy dominates in the surveyed population. Majority of the respondents (76.66%) were having large sized families and rest (23.33%) belonged to small category. The mean score of 1.76 indicated the prevalence of large sized families in the study area (Table 4).

### 3.3 Size of Land Holding and Herd Size

Maximum respondents (75.00%) were marginal followed by small (21.66%) and medium (3.33%). The number of landless and large farmers was nil (0.00%). The average score of landholding was 1.28 which indicated the prevalence of marginal landholders among the sample households. The mean score of the herd size of the respondents was 1.76 which indicated that households possessing 6-10 livestock are prevalent in the study area (Table 4).

### 3.4 Occupation, Labour and Gross Annual Income

The data presented in (Table 5) revealed that cultivation remained the main occupation for 48.33 percent of the respondents followed by wage labour (16.00%), business (15.00%), caste occupation (10.00%), service (6.66%) and any other (3.33%). The mean score of main occupation was 2.95 indicating agriculture as the back bone of the economy in the area. The average score regarding the family labour was 2.45 indicating that the labour force among the sample households was substantial. Considerable percentage (61.66%) of the respondents belonged to low income category, followed by very low income (21.66%), medium income (13.33%) and high income (3.33%). The average income of ₹60704.26 established the preponderance of families having low annual income ranging between ₹30001 to ₹60000/annum in the surveyed population (Table 5). There is a multitude of recent studies ([8-18]) all over the world corroborating that the

medicinal plants are an important constituent playing a significant role in income and employment security among rural communities.

## 4. CONCLUSION

The livelihood security from *Ocimum basilicum* L. depends on multitude of household socioeconomic and biophysical factors like education, size of family, size of land holding, herd size, main occupation, family labour and gross annual income, of the all off-farm and on-farm income sources horticulture contributed maximum income followed by agriculture, livestock, service, business, wage labour and others. Likewise, among the employment sources horticulture generated maximum employment opportunities followed by agriculture, livestock, service, business, wage labour and others. Hence, medicinal plant is the 6<sup>th</sup> major component of household economy and employment after agriculture and livestock.

## CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the authors.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

## REFERENCES

1. Ozcan M, Chalchat JC. Essential oil composition of *Ocimum basilicum* L. and *Ocimum minimum* L. Czech Journal of Food Sciences. 2002;20:223-228.
2. Nurzyńska-Wierdak R, Borowski B, Dzida K. Yield and chemical composition of basil herb depending on cultivar and foliar feeding with nitrogen. *Acta Scientiarum Pol. Hortorum Cultus*. 2011;10:207-219.
3. Duke JA. Handbook of medicinal herbs. 2002;60-62.
4. Kaledin VI, Pakharukova MY, Pivovarova EN, Kropachev KY, Baginskaya NV, Vasileva ED, Ilnitskaya SI, Nikitenko EV, Kobzev VF, Merkulova TI. Correlation between hepatocarcinogenic effect of estragole and its influence on glucocorticoid induction of liver-specific enzymes and activities of FOXA and HNF4 transcription factors in mouse and rat liver.

- Biochemistry. 2009;74:377–384
5. Moghaddam AMD, Shayegh J, Mikaili P, Sharaf JD. Antimicrobial activity of essentials oil extract of *Ocimum basilicum* L. leaves on a variety of pathogenic bacteria. J. Med. Plants Res. 2011; 5:3453–3456.
  6. Khalid KA. Influence of water stress on growth, essential oil, and chemical composition of herbs (*Ocimum* sp.). International Agrophysics. 2006;20:289-296.
  7. Venkataramaiah P. Development of socio-economic status scale, Ph.D. Thesis, Department of Agricultural Extension, University of Agriculture Sciences, Bangalore; 1990.
  8. Bukar BB, Dayom DW, Uguru MO. The growing economic importance of medicinal plants and the need for developing countries to harness from it: A mini review. IOSR Journal of Pharmacy. 2016;6(5):42-52.
  9. Bari MR, Ali MA, Miah GM, Abdullah MR, Jashimuddin M. Medicinal plants and their contribution in the socio-economic condition of the household in Haluaghat upazila, Myensingh. International Journal of Business, Management and Social Research. 2017;4(1):215-228.
  10. Joshi A, Kalauni D. Status of Medicinal and Aromatic Plant (MAPs) and Socio-Economic influence in Nepalese Livelihood-A Review Research. Acta Scientific Agriculture. 2018;2(9):123-130.
  11. Nida R. Ethnomedicinal practices and standardization of propagation technique of *Bergenia ciliata* L. in Kashmir. M. Sc thesis submitted to Faculty of Forestry, Sher-e-Kashmir University of Agricultural Sciences & Technology of Kashmir, Shalimar; 2018.
  12. Bhat GM, Bhat RA, Islam MA, Rather TA, Shahkhan FA, Majeed H, Rafiq N. Importance of *Acorus calamus* in rural livelihood security of district Ganderbal in Kashmir Valley, India. International Journal of current microbiology and applied sciences. 2020;9(10):986-994
  13. Baishya RA, Begum A. Promotion of rural livelihood through medicinal and aromatic plants based cottage industries for upliftment of rural economy of Assam rat. Open Access Scientific Reports. 2013; 2(1):1-4.
  14. Dar GH, Bhagat RC, Khan MA. Biodiversity of the Kashmir Himalaya. Valley Book House, Srinagar, India; 2002.
  15. Gurmet P, Dolma T, Angdus T, Stobgais T, Tharpa T. Status of medicinal and aromatic plants in the state of Jammu and Kashmir, India. International Journal of Current Microbiology and Applied Sciences. 2018;7(12):2597-2615.
  16. Hamilton AC. Medicinal plants, conservation and livelihoods. Biodiversity and Conservation. 2004;13:1477-1517.
  17. Joshi BC, Joshi RK. The role of medicinal plants in livelihood and improvement in Uttarakhand. International Journal of Herbal Medicine. 2014;1(6):55-58.
  18. Singh MP, Panda H. Medicinal Herbs with Their Formulations. Daya Publishing House, Delhi. 2005;607-610.

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Peer-review history:

The peer review history for this paper can be accessed here:  
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