# Constraints of Soybean Production by Farmers in Wardha District, Maharashtra, India

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*Authors' contributions*

*This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.*

*Original Research Article*

## ABSTRACT

The Present study, conducted during the agriculture year 2022-2023 with a sample size of 80 farmers of who cultivates soyabean in the Wardha District of Maharashtra. Multi-stage sampling technique was used for selection of districts, blocks, villages, and respondents in the study area. Primary data was collected from 80 soybean growers in ten randomly selected villages: Ajansara, Bopapur, Chincholi, Daroda, Pipari, Sawangi, Umari, Pohana, Nandgaon, and Wela. The Respondents were divided into three size groups on the basis of the size of their land holdings. A total of 80 respondents were selected, and the data was collected with the help of schedule. The study reveals that the farmers had marginal farms (45%), followed by small (35%) and medium (20%) farms. It has been seen that most respondents live in nuclear families (75%), and 25% live in joint families. The study also revealed that the marginal farmer has an annual income up to Rs.20,000, followed by the small farmer, who has an annual income between Rs.20,000 to Rs.50,000. The medium farmer annual income above Rs.50,000 per year. The major constraints on

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the production of soybean, as presented by garrett ranking in the present study are non-availability of seed material, labour, implements hired for operation in time. There also difficulties in pest and disease control non-availability of fertilizer in time.

## 1. INTRODUCTION

Soybean (*Glycine max* L. Merrill) is one of the important oilseed crop which is grown mainly in the kharif season. It belongs to the family Leguminoseae, sub-family Papilloideae, and genus Glycine. Soybean has been known by various names in India. It is called the miracle crop or Golden Bean of the 20th century and is popularly known as the "Queen of Pulses", wonder crop, farmer's friend, and agriculture's cindrella. It is the cheapest source of high-quality protein. It is a high-protein food (42% protein as against 7% in rice, 12% in wheat, 10% in maize, and 20–25% in other pulses) and also gives 21% good-quality oil, which is used for manufacturing vegetable oil (vanaspati ghee) and several other industrial products. In addition, it contains a good amount of minerals, salt, and vitamins (thiamine and riboflavin), and its sprouting grains contain a considerable amount of vitamin A and C. Soybean is widely used in the antibiotic industry for making penicillin and other drugs [1-3].

India is the fifth-largest producer of soybeans in the world (Vision 2030 – ICAR-Indian Institute of Soybean Research). In terms of total oilseed production, it occupies fourth place among the major oilseed-producing countries of the world followed by, USA, China, and Brazil.

"In India, the region under the soybean 6 crop in recent years has apparently expanded. During 2019–20, the harvest on 11.1 M ha of the region was 81.8 kg/ha yield and a productivity of 9 M tonne. Madhya Pradesh, Maharashtra, Rajasthan, Karnataka, and Andhra Pradesh are the major states in soybean development. In Maharashtra, soybeans are fundamentally cultivated as rain-fed harvest from June to November. Nandurwar, Nasik, Satara, Sangli, Kolhapur, Warda, Amravati, Chandrapur, and so on are significant soybean-developing regions of Maharashtra state. When compared with the world efficiency (2670 kg/ha) of soybean, the Indian soybean profitability (955 kg/ha) is missing behind" [4-7].

In spite of having made fast steps for both area inclusion and complete production, soybean actually endure on the productivity front. There are numerous requirements that restrict the soybean efficiency, which incorporate ecological, climatic, production, and innovation angles. One method of improving agricultural productivity and profitability specifically and rural occupation overall is the acquaintance of improved rural advances with farmers [8-10]. For solutions to the constraints, labour should be made available to farmers; farmers should also be linked to saving technologies as sources of financial support so as to enable them to afford hired labour; improved seeds that possess high yielding and early maturing characteristics should be provided to farmers; and extension services should educate and encourage farmers on the use of soybean as a household food item [11-14].

Keeping this scenario of bridging the gap in productivity in mind, For arrangements of the constraints, labour-saving innovations ought to be made accessible to farmers; farmers ought to likewise be connected to monetary help in order to empower them to bear the cost of recruited work; improved seeds that have high yielding and early-developing qualities ought to be given to farmers; and augmentation administration ought to teach and support farmers on the usage of soybean as a family food item. Keeping this situation of overcoming any barrier to efficiency in mind, the present investigation was undertaken to know the bottlenecks and Constraints of soybean production in Maharashtra, one of the important soybean-growing parts of country.

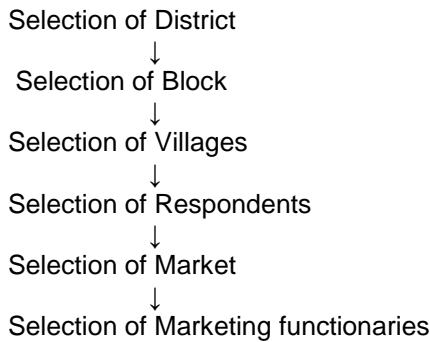### 1.1 Objective

1) To study the socio-economic status of the soybean growers in the study area.
2) To study the constraints in production of soybean and suggestions of soybean respondents.

## 2. METHODOLOGY

### 2.1 Sampling Design

The Multi-stage sampling procedure was adopted for the selection of samples:

Selection of District
↓
Selection of Block
↓
Selection of Villages
↓
Selection of Respondents
↓
Selection of Market
↓
Selection of Marketing functionaries

### 2.1.1 Selection of the districts

Wardha district was selected because there are more soybean growers in Wardha District than in any other District in Maharashtra, it was purposely chosen for the research of soybean.

### 2.1.2 Selection of blocks

There are 8 blocks in Wardha District. Out of them Hinganghat block was selected because of more soybean growers purposively for this study.

### 2.1.3 Selection of villages

The relevant Gramme Panchyat provided a complete list of all the villages, and 5% of them were randomly chosen. Wardha was selected because there are more soybean growers in Wardha District than in any other District in Maharashtra, it was purposely chosen for the research of soybean for the study. A list of the communities that cultivate soybeans was created after a call was made to the taluka development officer based on the pre-prepared data regarding the chosen Districts, Talukas, Villages, and respondents. Ajansara, Bopapur, Chincholi, Daroda, Pipari, Sawangi, Umari, Pohana, Nandgaon, and Wela were selected.

### 2.1.4 Selection of respondents/farmers

Gram Pradhan provided a list of farmers farming soybeans in particular villages. Following that, these farmers were divided into groups according to farm size (Land holding). 10% of those were chosen at random for the study based on the cultivation of soybeans. Farmers were divided into groups based on the size of their holdings, i.e.

From this list 80 respondents were selected randomly through proportionate allocation to the population.



**Fig. 1. Map of Wardha district**
*(Source: www.mapsofindia.com)*

**Table 1. List ten villages were selected randomly from the selected taluka**

| State | District | Block | Villages | Respondent |
|-------|----------|-------|----------|------------|
| Maharashtra | Wardha | Hinganghat | Ajansara | 9 |
| | | | Bopapur | 7 |
| | | | Chincholi | 8 |
| | | | Daroda | 6 |
| | | | Pipri | 9 |
| | | | Sawangi | 11 |
| | | | Umari | 6 |
| | | | Pohana | 8 |
| | | | Nandgaon | 6 |
| | | | Wela | 10 |
| Total | | | | 80 |

**Table 2. Classification of farmers based on size of holding**

| Sr. No. | Category | Size - class |
|---------|----------|--------------|
| 1 | Marginal | Below 1.00 hectare |
| 2 | Small | 1.00-2.00 hectare |
| 3 | Semi medium | 2.00-4.00 hectare |
| 4 | Small Medium | 4.00-10.00 hectare |
| 5 | Large | 10.00 hectare & above |

*Source: (https://www.pib.gov.in)*

## 2.2 Garratee Ranking Technique

This techniques was used to evaluate the problems faced by the 80 respondents. The orders of merit given by the respondents were converted in to rank by suing the formula. To find out the most significant factor which influences the respondent, Garrett's ranking technique was used. As per this method, respondents have been asked to assign the rank for all factors and the outcomes of such ranking have been converted into score value with the help of the formula.

## 2.3 Analysis of Data/ Analytical Tools Used

### 2.3.1 Standard derivation

*2.3.1.1 Socio-economic profile of soybean growers in the study area*

Analytical Tools: The following statistical tools and techniques will be used in analysis of data and interpretation of result.

Arithmetic Mean= $AM = \frac{\sum Xi}{N}$

Where,

AM = Arithmetic Mean
$\sum$xi = Sum of Variable
N = Total number of Variables

Weighted Mean= WM= $\frac{\sum WiXi}{\sum Wi}$

Where,

WM= Weighted Mean
Wi= Weight of Xi
Xi= Variable

*2.3.1.2 Constraints faced by the farmers in production Garrett's ranking technique*

Constraints perceived and the measures for improvement suggested by the producers in production of soybean were prioritized by using Garret's ranking technique by using the follow formula:

$$Percentage = \frac{100\,(Rij - 0.5)}{Nj}$$

Where,

Rjj is the rank given to 'i'[th] item by the 'j'[th] individual,
Nj is the number of items ranked by the 'j'[th] individual

The percentage position of each rank was converted into score using Garret's table. For each constraint, score of individual respondents for whom scores were added. Thus, mean score for each constraint was ranked by arranging them in descending order.

## 3. RESULTS AND DISSCUSION

### 3.1 Socio Economic Profile of the Farmers

Table 3 show one of the key socio-demographic factors in the farm size. Farm size has a crucial association in market – related studies since it influences purchasing decisions since the farm size seems to have different results when buying because of differences in how people perceive and socialize. A total of 80 people responded, and of those, 38 (47.5%) had marginal farm, 26 (32.5%) had small sized farms, and the remaining 16 (20%) had medium farms.

Age is one of the important sociodemographic characteristics in this study, as shown in Table 4. Because age impacts the physical and psychological makeup of the consumer, which in turn affects the consumer's purchasing behaviour, age is given a lot of weight in market-related research. This table shows that 27 respondents (33.75%) are in the 20–30 age bracket, 35 respondents (43.75%) are in the 31–55 age bracket, and 18 respondents (22.5%) are over the age of 56. Consequently, the average respondent is between the ages of 31 and 55.

Table 5 shows that education is another sociodemographic component taken into account in this study of consumer behaviour. Nine respondents were found to be illiterate out of the 80 respondents in the table. The majority of responders had an intermediate degree, it was discovered. They number 21 (26.25%) 20 (25%) was found that they were qualified till high school, 17 (21.25 %) were found to be qualified for graduation and above and 9 (11.25%) were found to be qualified for primary school. Remaining 13 (16.25%) were illiterate. Thus, it can seen majority among all is intermediate category which is 21 (26.25%)

As shown in Table 6. Family plays a crucial role in market research since it influences purchasing decisions. Joint family and nuclear family members frequently reach different purchasing decisions as a result of the differences in their perceptions and socialisation. Out of the total 80 responders, 58 family which is 75% were nuclear family, while the remaining 22 belonged to joint families, making up 27% of the sample as a whole.

### Table 3. Category of the farmer based on land area

| Sr. No. | Category | Value | Percentage |
|---------|----------|-------|------------|
| 1. | Marginal | 38 | 47.5 |
| 2. | Small | 26 | 32.5 |
| 3. | Medium | 16 | 20 |

### Table 4. Age of respondents

| Sr. No. | Particulars | Marginal (%) | Small (%) | Medium % | Total (%) |
|---------|-------------|--------------|-----------|----------|-----------|
| 1. | Young (20-30 years) | 12 (15%) | 6 (7.5%) | 9 (11.25%) | 27 (33.75%) |
| 2. | Middle (31-55 years) | 15 (18.75%) | 11 (13.75%) | 9 (11.25%) | 35 (43.75%) |
| 3. | Old (above 56 years) | 8 (10%) | 6 (7.5%) | 4 (5%) | 18 (22.5%) |
| 4. | Total | 35 (43.75%) | 23 (28.75%) | 22 (27.5%) | 80 (100%) |

### Table 5. Education of farmers

| Sr. No. | Particulars | Marginal | Small | Medium |
|---------|-------------|----------|-------|--------|
| 1. | Primary | 7 (8.75%) | 1 (1.25%) | 1 (1.25%) |
| 2. | High School | 11 (13.75%) | 6 (7.5%) | 3 (3.75%) |
| 3. | Intermediate | 9 (11.25%) | 8 (10%) | 4 (5%) |
| 4. | Graduation | 4 (5%) | 7 (8.75%) | 6 (7.5%) |
| 5. | Illiterate | 6 (7.5%) | 5 (6.25%) | 2 (2.5%) |

### Table 6. Family size of farmers

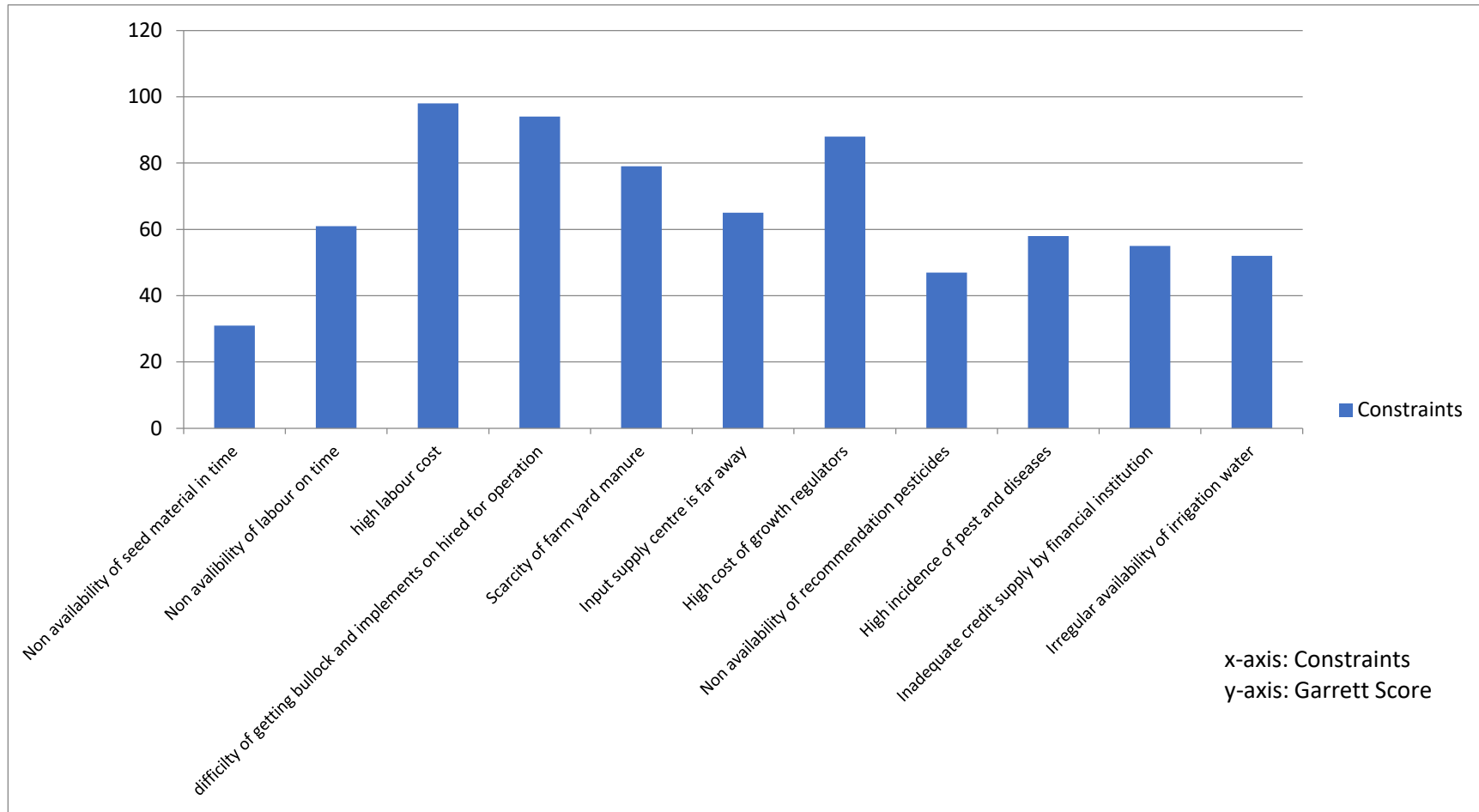| Sr. No. | Particulars | Family type | Percentage |
|---------|-------------|-------------|------------|
| 1. | Up to 5 members | Nuclear | 73% |
| 2. | More than 5 members | Joint | 27% |

x-axis: Constraints
y-axis: Garrett Score

**Fig. 2. Constraints among different parameters**

**Table 7. Annual income (based upon income level)**

| Sr. No. | Category | Annual income |
|---|---|---|
| 1 | Marginal | Up to 25,000 |
| 2 | Small | 25,000-50,000 |
| 3 | Medium | Above 50,000 |

Table 7: Income Per Year Monthly income is another highly important socioeconomic factor that has a direct impact on consumers' purchasing decisions because it is closely related to the economic component. A yearly income data collection was conducted. Inferred from Table 7: Responders in the marginal group make up to 25,000 annually. Small-category farmers (those who earn between 25,000 and 50,000 annually) and medium-category farmers (those who make over 50,000 annually) are next based upon income level.

## 3.2 Constraints in Production of Soybean by Sample Farmers

Graph reveals that constraints faced by the different size of farms group in production of Soybean. Most of the farms group expressed that major constraint was identified that high labour cost was assigned first rank followed by difficulty of getting bullock and implements on hired for operation (II),High cost of growth regulators (III), Scarcity of Farms yard manure (IV), Input supply centre is far away (V), non-availability of labour on time (VI), High incidence pest & diseases (VII), Inadequate credit supply by financial institution (VIII), Irregular availability of irrigation water (IX), Non availability of recommended pesticides (X), non-availability of seed material in time (XI) respectively.

## 4. CONCLUSION

It was determined from the socio-economic profile of the farm group that the majority of respondents belong to marginal farmers (42.5%) as compared to small (32.5%) and medium farmers (20%). The majority of respondents were aged between 31 and 55. On the basis of education, the majority of respondents had an intermediate degree compared to primary school, high school, and graduation. Most farmers have a nuclear family (73%) or a joint family (27%). The constraints of soybean production were the non-availability of seed material on time, the non-availability of labour on time, the high labour cost, the difficulty of getting bullocks and implements hired for operation, Scarcity of

farmyard manure, The input supply center being far away, High cost of growth regulators, non-availability of recommended pesticides, High incidence of pests and diseases, Inadequate credit supply by financial institutions and Irregular availability of irrigation water. Magnifying the research and development activities with respect to insect, pest and disease resistant varieties to enhance the shelf life of soybean. Strengthening the Institutional credit facility to the small and medium farms through Banks and Co-operatives. Government should extend Crop Insurance facility for the soybean scrop. So that, the respondents can avail the facilities and minimize their risks in production.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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