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### Yield gap analysis of rabi sorghum production in Buldhana district

<sup>1</sup>PD Pingale, <sup>2</sup>Dr. SN Ingle, <sup>2</sup>Dr. SM Sarap, <sup>2</sup>Dr. SS Thakare and <sup>3</sup>Shri VM Gedam

<sup>1</sup>PG Student, Agricultural Economics and Statistics Section, Shri. Shivaji Agriculture College, Amravati, Maharashtra, India

<sup>2</sup>Assistant Professor of Agricultural Economics and Statistics Section, Shri. Shivaji Agriculture College, Amravati, Maharashtra, India

<sup>3</sup>Associate Professor of Agriculture Botany Section, Shri. Shivaji Agriculture College, Amravati, Maharashtra, India

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Corresponding Author: PD Pingale

#### Abstract

The present study entitled “Yield gap analysis of rabi sorghum production in Buldhana district” was conducted in the year 2023-24. Data for the selected study were collected with the aid of well-structured questionnaire. On the basis of the result obtained in the present study it can be concluded that the highest yield gap was observed in case of gap -III was 15.83 percent. The yield gap-II was 10.52 percent, while the total yield gap-I for Rabi Sorghum was 5.93 percent.

**Keywords:** Sorghum, yield gap, potential yield, potential farm yield

#### Introduction

Sorghum is the world's fifth-most important crop after rice, wheat, maize and barley. It is scientifically known as *Sorghum bicolor* L. belongs to Gramineae family and is popularly known as 'Jowar' in India. Among other millets, a large size is referred to as a 'Great millet'. It is also known as the "King of Millets". Sorghum is a major and important food grain in our country. Sorghum is the best alternative for extreme weather conditions and well suited to drought-prone regions. It is also called as Camel crop. Jowar (Sorghum) is traditionally grown for food and fodder purposes. Sorghum has the potential for grain production even under low rainfall and they sustain adverse agro-climatic conditions. In India it is a staple food in the states of Maharashtra and parts of Karnataka, Madhya Pradesh, Tamil Nadu, Gujarat and Andhra Pradesh. Sorghum is cultivated in India during Kharif and Rabi seasons. Sorghum is an excellent source of energy, contains 349 k. cal, 10.4 g of protein, 1.9 g of fat and 72.6 g of carbohydrate and also has good amount of minerals particularly iron (4.1 mg/100g) and zinc (1.6 mg/100 g).

Sorghum is widely used as animal feed, especially for poultry, cattle and pigs. It has high nutritional value, is easily digestible and can replace or supplement other grains in livestock diets. Sorghum's economic importance in the livestock industry lies in its role as a cost-effective feed option, contributing to the profitability and sustainability of livestock management. Among the dry fodder, sorghum kadba is exceptionally much favoured and preferred by all sorts of livestock viz., drought animals, milch animals and other pet animals. Green leaves and stalks are also utilized as fodder for live stocks. Poultry industry is the major region where sorghum grains is utilized as poultry nourish.

Sorghum is considered a valuable feedstock for biofuel production, particularly ethanol. The stalks and grain of sorghum can be converted into bioethanol, which serves as an alternative to fossil fuels and reduces greenhouse gas emissions. The growing demand for renewable energy sources and the push for sustainable biofuels contributes to the economic significance of sorghum in the bioenergy sector.

The area, production and yield of Kharif Sorghum 2023-24 in India was 36.47 lakh hectare, 40.34 lakh tonnes and 1106 kg/ ha, respectively. Area, production and yield of Rabi Sorghum in India was 3.04 million hectare, 2.63 million tonnes and 886 kg/ha, respectively. (Source: Ministry of Agriculture and Farmers Welfare, Govt. of India, 2024).

Among the states, the Maharashtra stood first in area, production and yield of sorghum in (2023-24) was 16 lakh hectare, 14.04 lakh tones and 878 kg/ha, respectively. The major sorghum growing states in 2023-24 was Karnataka, Rajasthan, Uttar Pradesh, Andhra Pradesh and Tamil Nadu with production 7.06, 5.27, 4.62, 2.93 and 2.83 lakh tonnes, respectively. (Source: Ministry of Agriculture and Farmers Welfare, Govt. of India, 2024).

In Buldhana the area, production and productivity of Kharif Sorghum in (2023-24) was 19.88 hundred hectare, 26.98 hundred tonnes, 1356.78 kg/ha, respectively. The area, production and productivity of Rabi Sorghum in Buldhana district (2023-24) was 232.55 hundred hectare, 250.42 tonnes, 1076.84 kg/ha, respectively. (Source: Third advance estimates of area, production and productivity, 2023-24).

#### Materials and Methods

##### Collection of Data

The primary data was collected by survey method for the

year 2023-24 with the help of specially designed questionnaire. The data was collected by conducting personal interviews with the sample growers. Potential 90 Sorghum grower was selected from Buldhana district. The data pertaining for the year 2023-24.

### Selection of Villages

Three villages from each tahsil were selected randomly. Taroda, Sahastramuli and Shirwa villages from Motala tahsil and Tarapur, Borkhed and Warwand from Buldhana tahsil was selected.

### Selection of Sorghum Growers

15 samples of Rabi Sorghum cultivators were randomly selected from each village. Thus, the total 90 rabi Sorghum cultivators from two tahsils were selected for the present study.

### Data analysis Methods

#### Yield Gap Analysis

To estimate the yield gap the methodology developed by "International Rice Research Institute" (IRRI), Philippines was used.

The following important concepts used in the present study.

#### Potential Yield (Yp)

It is the per hectare yield realized at the Research Station. This yield is considered to be the maximum absolute production potential of the crop, since the research stations conducting the trials are equipped with all the requisite resources including technical input and carried out along with scientific procedures.

#### Potential Farm Yield (Yd)

It is the per hectare yield realized on demonstration plots, where in the agronomic practices are undertaken by the farmers himself under the supervision of agricultural extension workers. These demonstration trials are more or less research station trials conducted by the farmer under the same resource conditions under his own characteristic agro-climatic conditions. So, the potential farm yield is considered to be an attainable yield by the average farmers, provided such yield is arrived at by a correct and extensive trials under envisaged weather conditions.

#### Actual Yield (Ya)

It is the per hectare yield realized by the farmers on their farms with their own resources, management practices and preferences.

#### Yield Gap I

It is the difference between potential yield and potential farm yield.

i.e.  $(Yp - Yd)$ .

$Yp$  = Potential yield (Yield realized at research station).

$Yd$  = Potential farm yield (Yield realized on demonstration plot).

#### Yield Gap II

It is the difference between potential farm yield and actual

yield.

i.e.  $(Yd - Ya)$

$Yd$  = Potential farm yield (Yield realized on demonstration plot)

$Ya$  = Actual yield (Yield realized on sample farm)

#### Yield Gap III

It is a difference between potential yield and actual yield.

i.e.  $(Yp - Ya)$

$Yp$  = Potential yield (Yield realized at research station)

$Ya$  = Actual yield (Yield realized on sample farm)

### Results and Discussion

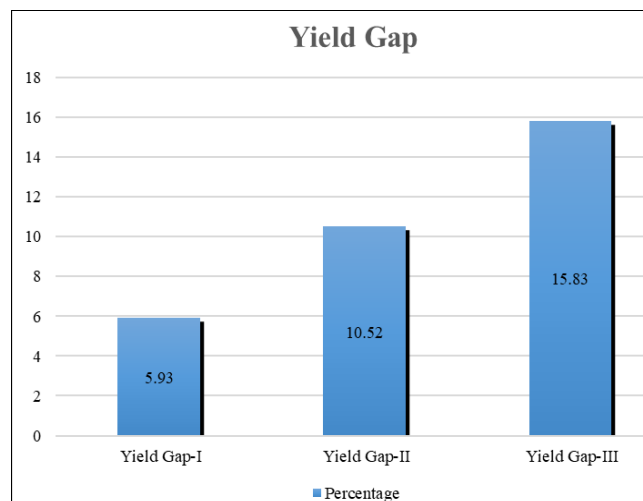
#### Yield gap in Rabi Sorghum production

The study was undertaken with the overall objective of estimating the magnitude of yield gap and factor contributing to yield gap in sorghum production. The results obtained are presented in the table 1 and Fig. 1.

It is observed from table 1 that, there existed a sizable gap in the Sorghum productivity between research station, demonstration plots and sample farmer's fields. In Sorghum potential yield at research station was 3100 kg/ha while potential farm yield at demonstration plots was 2916 kg/ha. The actual yield of sample farm was 2609 kg/ha. The yield gap-I for Sorghum was 184.00 kg (5.93%) and yield gap-II was 307.00 kg (10.52%). The total yield gap -III was observed at 491.00 kg (15.83%).

**Table 1:** Yield gap in Rabi Sorghum (kg/ha)

Sr. No.	Particulars	Yield
1.	Potential Yield	3100
2.	Potential Farm Yield	2916
3.	Actual Yield	2609
4.	Yield Gap-I	184
5.	Yield Gap-II	307
6.	Yield Gap-III	491
7.	Percent Yield Gap-I	5.93
8.	Percent Yield Gap-II	10.52
9.	Percent Yield Gap-III	15.83



**Fig 1:** Yield Gap

## Conclusion

On the basis of the result obtained in the present study it can be concluded that the highest yield gap was observed in case of gap -III was 15.83 percent. The yield gap-II was 10.52 percent, while the total yield gap-I for Rabi Sorghum was 5.93 percent. There is a possibility of reducing the yield gap the input use gaps. In addition to this farmers ability to use the level of input needs to be considered.

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