

Status of Millets Cultivation and Production in Telangana State, India

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ABSTRACT

Millets are grown in semi-arid regions of the world which require less water to grow, particularly these crops were grown in Asia and. African continents of the world. Telangana has a semi-arid weather condition which is a suitable environment for the cultivation of millets. Commonly cultivated millets in Telangana are jowar, ragi, and bajra Present study is carried out by taking statistical data from directorate of statistical office Telangana. The conclusion was drowning from the data by using a bar diagram. The conclusion states that korra millet was cultivated only in the Mahbubnagar district of Telangana. The productivity difference was also observed in Rabi and kharif crops of the jowar, ragi, and bajra crops. The difference in productivity is not consistent. It is more in some year and less in other year. Millets are nutria cereals comprising of sorghum, pearl millet, finger millet (major millets) foxtail, little, kodo, proso and barnyard millet (minor millets). These are one of the oldest foods known to humanity. These are one of the several species of coarse cereal grasses in the family Poaceae, cultivated for their small edible seeds. Most of millet crops are native to India and are popularly known as Nutria cereals as they provide most of the nutrients required for the normal functioning of the human body. Millets are classified into Major Millets and Minor Millets based on their grain size. Pseudo millets are so called because they are not part of the Poaceae botanical family, to which 'true' grains belong, however they are nutritionally similar and used in similar ways to 'true' grains. Millets are grown in semi-arid regions of the world which require less water to grow, particularly these crops were grown in Asia and. the African continents of the world. Telangana has a semi-arid weather conditions which is a suitable environment for the cultivation of millets. Commonly cultivated millets in Telangana are jowar, ragi, and bajra Present study is carried out by taking statistical data from the directorate of the statistical office in Telangana. The conclusion was drowning from the data by using a bar diagram. The conclusion states that korra millet was cultivated only in the Mahbubnagar district of Telangana. The productivity difference was also observed in Rabi and kharif crops of the jowar, ragi, and bajra crops. The difference in productivity is not consistent. It is more in some year and less in other year. Millets are nutria cereals comprising of sorghum, pearl millet, finger millet (major millets) foxtail, little, kodo, proso, and barnyard millet (minor millets). These are one of the oldest foods known to humanity. These are one of the several species of coarse cereal grasses in the family Poaceae, cultivated for their small edible seeds. Most of the millet crops are native of India and are popularly known as Nutria cereals as they provide most of the nutrients required for the normal functioning of the human body. Millets are classified into Major Millets and Minor Millets based on their grain size. Pseudo millets are so called because they are not part of the Poaceae botanical family, to which 'true' grains belong, however they are nutritionally similar and used in similar ways to 'true' grains. Millets are grown in semi-arid regions of the world which require less water to grow, particularly these crops were grown in Asia and. the African continents of the world. Telangana has semi-arid weather conditions which is a suitable environment for the cultivation of millets. Commonly cultivated millets in Telangana are jowar, ragi, and bajra. The Present study is carried out by taking statistical data from the directorate of the statistical office in Telangana. The conclusion was drowning from the data by using a bar diagram. The conclusion states that korra millet was cultivated only in the Mahbubnagar district of Telangana. The productivity difference was also observed in Rabi and kharif crops of the jowar, ragi, and bajra crops. The difference in productivity is not consistent. It is more in some years and less in other years. Millets are nutria cereals comprising sorghum, pearl millet, finger millet (major millets) foxtail, little, kodo, proso, and barnyard millet (minor millets). These are one of the oldest foods known to humanity. These are one of the several species of coarse cereal grasses in the family Poaceae, cultivated for their small edible seeds. Most of millet crops are native to India and are popularly known as Nutria cereals as they provide most of the nutrients required for normal functioning of the human body. Millets are classified into Major Millets and Minor Millets based on their grain size. Pseudo millets are so called because they are not part of the Poaceae botanical family, to which 'true' grains belong, however they are nutritionally similar and used in similar ways to 'true' grains.

Keywords: Seri-arid, cultivation of millets, statistical data, productivity

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INTRODUCTION

As demand of food increase with increasing population. Presently about 50% of the world population caloric Intake is derived from cereals [1]. Millets cultivation can be observed as a solution to meet the nutritional requirements of the population as millets. Can grow in shallow low fertile soils with pH 8.0 [2]. As various studies state that newly developed hybrid varieties were more resistant to various diseases and climate resilience and the yield obtained from them is more compared to the traditional varieties [3]. This made scientists to produce new variety of millets and increase this vulnerability to the climate change [4]. Cultivation of millets can give an overall solution to exactions agrarian exists and prove a milestone in achieving United Nations' commitment to overcome malnutrition in all its forms by 2030 [5]. Nutritional values of the millets; Especially millets produce gluten free protein high fiber content, low glycemic index and has rich bioactive components responsible for good health of human [6]. For example finger millet protein contains essential amino acids such as methionine, valine, and lysine which contribute 44.7% of total essential amino acid [7]. Millets also contain minerals ranging from 1.7 to 4.3 g/100gm, which is several times higher than the staple cereals like rice and wheat as calcium and iron deficiency high in India [8].

Cultivation

Millets represent a unique biodiversity component in the agriculture and food security systems of millions of poor farmers in regions such as Sub-Saharan Africa. Pearl millet is an important food across the Sahel, although, India is the largest producer of pearl millet [9]. In 2007, global millet production reached about 32 million tonnes with the top producing countries being: India (10,610,000), Nigeria (7,700,000), Niger (2,781,928), China (2,101,000), Burkina Faso (1,104,010), Mali (1,074,440), Sudan (792,000), Uganda (732,000), Chad (550,000) and Ethiopia (500,000) (FAO, 2009). Millets range in color as creamy, red, brown and black depending on the variety of crop. Millets have been cultivated since ancient civilizations by people across the globe. In East Asia, they date back to 10,000 years ago. Millets are an important crop in the semi-arid tropics of Asia and Africa (especially in India and Nigeria), with 97% of millet production originating in developing nations. Millets are a staple food for the population living in dry land regions of the world, particularly

Asia and Africa. However, their consumption and cultivation in India has gradually declined over the past three decades because of a multitude of reasons. For instance, in India, production of sorghum came down from 7.0 million tonnes during 2010-11 to 4.2 million tonnes during 2015-16, bajra production has reduced from 10.4 million tonnes to 8.1 million tonnes, production of ragi reduced from 2.2 million tonnes to 1.8 million tonnes while production of small millets came down to 0.39 million tonnes from 0.44 million tonnes during the same period [10].

Millets are major food sources for millions of people, especially those who live in hot, dry areas of the world. They are grown mostly in marginal areas under agricultural conditions in which major cereals fail to give substantial yields. Discrepancies exist concerning classification of family millet, with some references giving the family name Gramineae, and others classifying it in the family Poaceae. Millets are classified with maize, sorghum, and Coix (Job's tears) in the grass sub-family *Panicoideae* [11].

Millets are important food source in many underdeveloped countries because of their ability to grow under adverse weather conditions like limited rainfall. In contrast, millet is the major source of energy and protein for millions of people in Africa. It is a drought resistant crop and can be stored for a long time without insect damage [12]; hence, it can be important during famine. The area under millets is declining at an alarming rate in spite of the favorable cultivation conditions available. According to a recent research study the millet cultivation area of about 44% is occupied by other crops since 1966 to 2006 [13].

Absence of millet processing unit was the primary lacuna either for reduction in millet cultivation or complete stoppage of cultivation by control group of farmers who have abandoned growing of millets in their farms. Demand for millets by the consumers is low which deprives farmers to grow millets. Market price and total profit from millet cultivation are far low compared to other cereals grown. Millet grains available for consumption were not free from stones, dirt, and husk and are mixture of dehiscent grains. More grains still remained with husk coating even after processing by hand pounding. The available grains are difficult to clean. Hence the consumption of millets reduced in the rural area due to non availability of processed and quality millet grains [14].

Telangana is a 29th newly formed state of India located in central southern stretch of India peninsula of Deccan plateau. With semi-arid and hot and dry climate in the month of March and summer temperature 42 °C with monsoon rainfall of 755 mm .average which is suitable for cultivation of millets. In Rabi and Kharif season generally four types cultivated.

Study area

Present study is carried out in Telangana state which comprises 10 districts. Every district has different trend in cultivation of millets as Mahbubnagar district cultivation is remaining. District people cultivate different kinds of millets as represented in the map.



Sorghum

Sorghum or “Jowar” cereal is perceived to be an important coarse-grained food crop. It is cultivated widely across Maharashtra, Madhya Pradesh, Uttar Pradesh, Haryana, Telangana, Andhra Pradesh, Tamil Nadu and Karnataka and in parts of Rajasthan. Sorghum is a traditional staple food of the dry-land regions of the world.

Sorghum (Jowar)

English:	Sorghum
Hindi:	Jowar, Jowari
Gujarati:	Jowari, Juar
Bengali:	Jowar
Kannada:	Jola
Marathi:	Jowari, Jondhala
Oriya:	Juara
Punjabi:	Jowar
Tamil:	Cholam
Telugu:	Jonna

Sorghum is a warm season crop intolerant to low

temperatures, resistant to pests and diseases, highly nutritious and a climate-compliant crop. It ranks fifth in cereals produced world-wide and fourth in India. Generally, sorghum grains act as a principal source of protein, vitamins, energy and minerals for millions of people, especially in the semi-arid regions. On that count, they play a crucial role in the world's food economy. Sorghum has a nutritional profile that is better than rice, which is the staple food of majority of the human population for its rich protein, fiber, thiamine, riboflavin, folic acid, calcium, phosphorus, iron and β -carotene. Sorghum is rich in potassium, phosphorus and calcium with sufficient amounts of iron, zinc and sodium. Due to this, it is being targeted as a means to reduce malnutrition globally. It helps to control heart problems, obesity and arthritis. Adding sorghum regularly in the meals of pregnant women helps them attain the dietary mineral and vitamin requirements. Sorghum also helps to control heart problems, body weight and arthritis. This millet is consumed preferably as roti by most of the physically hard working people and is preferred to wheat roti. The other forms of food preparations from Jowar include kchidi, upma, etc., by Indian people. Major portion of sorghum protein is prolamins (kaffirin) which has a unique feature of lowering digestibility upon cooking, which might be a health benefit for certain dietary groups. Sorghum proteins upon cooking are significantly less digestible than other cereal proteins, which might be a health benefit for certain dietary groups (FASS 2019).

Pearl millet

Pearl millet or “bajra” is an extensively grown variety of millet. It is being grown in the African and Indian subcontinent from ancient times. Known as ‘bird feed’, in India it is usually grown in Rajasthan, Gujarat and Haryana as it can adapt well to nutrient-poor, sandy soils in low rainfall areas. It is a tall, erect plant and grows from 6-15 ft in height. The plant produces an inflorescence with a dense spike-like panicle, which is brownish in colour. This millet is known to possess phyto-chemicals that lower cholesterol. It also contains folate, iron, magnesium, copper, zinc, and vitamins E and B-complex. Pearl millet has a high-energy content compared to other millets. It is also rich in calcium and unsaturated fats, which are good for the body.

Pearl Millet

English: Pearl Millet

Hindi: Bajra
 Bengali: Bajra
 Marathi: Bajri
 Gujarati: Bajri
 Oriya: Bajra
 Punjabi: Bajra
 Kannada: Sajje
 Telugu: Sajja
 Tamil: Kambu

Marathi: Nagli, Nachni
 Oriya: Mandia
 Punjabi: Mandhuka, Mandhal
 Tamil: Keppai, Ragi, Kelvaragu
 Telugu: Ragi, Chodi

Pearl millet contains considerably high proportion of proteins (12-16%) as well as lipids (4-6%). It contains 11.5% of dietary fiber. It increases transit time of food in the gut. Hence, reduce risk of inflammatory bowel disease. The niacin content in pearl millet is higher than all other cereals. It also contains foliate, magnesium, iron, copper, zinc and vitamins E and B-complex. It has high energy content compared to other millets. It is also rich in calcium and unsaturated fats which are good for health. (FASSI 2019).

Finger millet

Finger millet or “ragi” is a short, profusely tillering plant with characteristic finger like terminal inflorescences, bearing small reddish seeds. Maturity of crop is between three to six months depending on the variety and growing conditions. The crop is adapted to fairly reliable rainfall conditions and has an extensive but shallow root system. It is an annual plant extensively grown as a cereal in the dry areas of India, especially in the southern States. Finger millet contains high amount of calcium, protein with well-balanced essential amino acids composition along with Vitamin A, Vitamin B and phosphorous. It also contains high amount of calcium. Ragi flour in Karnataka is mostly prepared into balls, popularly known as “ragi mudded”, made into flatbreads, leavened dosa and thinner unleavened rotis. Its high fiber content also checks constipation, high blood cholesterol and intestinal cancer. Protein content in finger millet is high, thereby making it an important factor in preventing malnutrition. It is an ideal food for diabetics as it has demonstrated the ability to control blood glucose levels and hyperglycemia. (15)

Finger millet

English: Finger Millet
 Hindi: Ragi, Mandika, Marwah
 Bengali: Marwa
 Gujarati: Nagli, Bavto
 Kannada: Ragi,

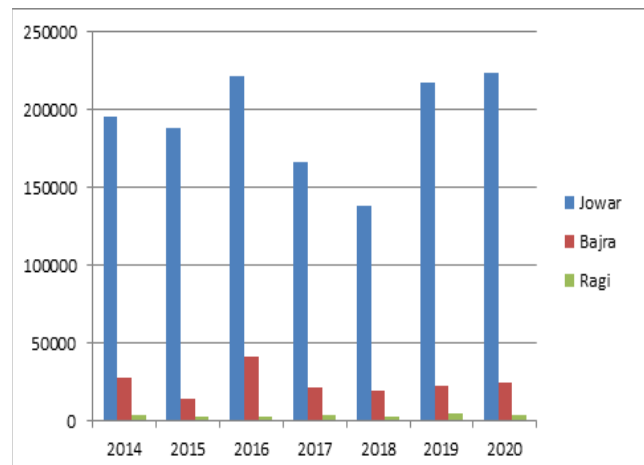
Ragi has the highest mineral content. Finger millet is the richest source of calcium (300-350 mg/100 g). It contains lower levels of protein (6-8%) and fat (1.5-2%). Finger millet proteins are unique because of the sulphur rich amino acid contents. The grains have excellent malting properties and are widely known for its use as weaning foods. It has high antioxidant activity (FASSI 2019).

Cultivation of millets

The statistical data is gathered from 2014 to 2020, and statistical analysis is used to determine the average area and production of all three genotypes. Firstly, the mean is calculated year-wise as per the area and productivity of the varieties. Then, the mean, standard error, and standard deviation results are analyzed.

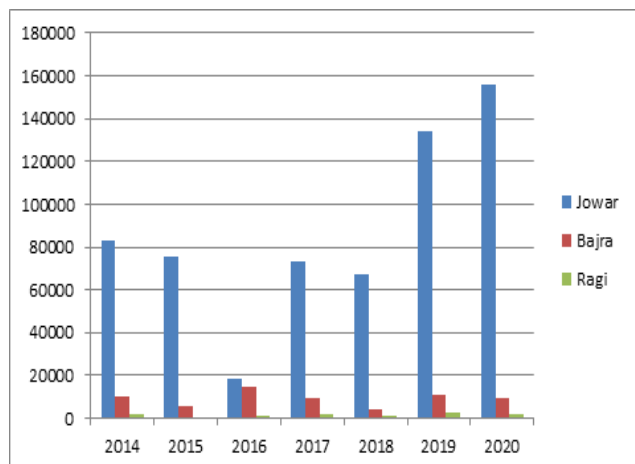
Year-wise mean cultivated

Year	Jowar	Bajra	Ragi
2014	195210	27718	3773
2015	188691	14581	2272
2016	221780	41259	2801
2017	166315	21647	3592
2018	138563	19712	2989
2019	217978	22417	4310
2020	224017	24759	3254



Year-wise mean productivity

Year	Jowar	Bajra	Ragi
2014	83267	10510	1748
2015	75703	5534	514
2016	18770	14514	1312
2017	73395	9259	1655
2018	67511	3964	1184
2019	133756	10723	2772
2020	155498	9309	1756

**Importance of millet**

Jowar act as an cancer, avoid premature ageing also increases red blood cell .Ragi helps in fiber sup plan And bring sugar levels optimal level and cures type-2 diabetes Bajra contain fiber with stimulate digestion parses also reduces secretion of bile acid and is liked to lowered rise of gallstone formation Bajra also act as an anti-cancer agent

RESULT AND DISCUSSION

Total cultivation jowar 2014 in 195210 hectares. And product is 83267 and 2015 in 188691 hectares. Product is 75703, 2016 in 221780 hectares product is 18770 2017-166315 cultivation but product 73395, 2018 in 138563 hectares and Product 67511, 2019 cultivation 217978 product in 133756 and 2020 cultivation 224017 Product in 155498.

Total cultivation Bajra 2014 in 27718 hectares. And product is 10510 and 2015 in 14581 hectares. Product is 5534, 2016 in 41259 hectares product is 14514

Mean of area and production of all three genotypes

	Jowar		Bajra		Ragi	
	Area	Prod	Area	Prod	Area	Prod
Mean Standard	26155.86	11478.58	3915.72	1487.72	539	249.71
Error	8581.5	3528.47	1964.64	744.89	386.20	159.87
Standard Deviation	22704.52	9335.46	5197.94	1970.82	422.98	1021.80

Total mean area wise

S.No	Genotype	Area
1.	Jowar	26155.86
2.	Bajra	3915.72
3.	Ragi	539

Total production

S.No	Genotype	Production
1.	Jowar	11478.58
2.	Bajra	1487.72
3.	Ragi	249.71

2017-21647 cultivation but product 9259, 2018 in 19712 hectares. Product 3964, 2019 cultivation 22417 product in 10723 and 2020 cultivation 24759 Product in 9309.

Total cultivation Ragi 2014 in 3773 hectares. And product is 1748 and 2015 in 2272 hectares. Product is 514, 2016 in 2801 hectares product is 1312. 2017-3592 cultivation but product 1655, 2018 in 2989 hectares. Product 1184, 2019 cultivation 4310 product in 2772 and 2020 cultivation 3254 Product in 1756.

Among all the three varieties Jowar variety has the most expansive area compared to Bajra and ragi, whereas the calculated mean in the production of all these genotypes shows a higher amount in Jowar, i.e. 11478.58. The standard error in terms of area of all three genotypes revealed that the highest was

shown in Jowar (8581.5, moderate in Bajra (1964.64) and least in Ragi (386.20), respectively. In the case of standard deviation, Jowar's area is 22704.52 and in production (9335.46), whereas Bajra covers an area of about 5197.94, and the production rate is 1970.82 and less in Ragi in terms of area and production.

CONCLUSION

In telangana state millets were cultivated which were used for daily food intake and for commercial salins. In mahaboobnagar district only korra cultivation is observed and that to cultivation. Used for cultivation in 2017-20. And productivity different is observed in Rabi and kharif crop of jowar, bajra, ragi as extrapolated in the. This indicates improve awareness on the cultivation of millets, and aware then by means of nutritional value.

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Consent And Ethical Approval

As per university standard guideline, participant consent and ethical approval have been collected and preserved by the authors.

Conflict Of Interest

We wish to declare that there are no conflicts of interest associated with these studies.

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