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Millet Production and Consumption in India and Their Nutritional Aspects

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ARTICLE ID: 46

Introduction

Millets are unique agricultural products from India which have significant demand in the global market. It is estimated that global demand for millets will soar to $12 billion by 2025, as the world looks at healthier food grains. India is one of the largest producers of millets, with an annual output of about 12 million tones, and could benefit from this trend. Millets are not water-or input-intensive and are suitable for "climate smart agriculture" as the world would increasingly be facing the challenges of drought and its adverse impacts on agricultural crop yields. They are also release oxygen while consuming maximum levels of carbon dioxide from the air and thus help to mitigating climate change.

Millets are an agronomic group of grasses that are widely grown for food and fodder. Most have relatively small seeds (compared to major cereals such as wheat and rice) and thrive in arid areas. The most widely grown is pearl millet (*Pennisetum glaucum*), while a secondary group of millets includes foxtail millet (*Setaria italica*), proso millet (*Panicum miliaceum*), finger millet (*Eleusine coracana*), kodo millet (*Paspalum scrobiculatum*), little millet (*Panicum sumatrense*), and barnyard millet (*Echinochloa colona*). Millet may also boost the good gut microbes and improve digestive health. It is rich in dietary fibres-soluble and insoluble fibres. In addition, millet is rich in potassium (support healthy kidney and heart function), Vit. A, Vit B, P, Ca, Fe and antioxidants.

Based on persistent efforts by the Government of India, the UN (in 2021) had declared 2023 as the International Year of Millets (IYOM23). In this context, the pre-launch celebration of the IYOM23 was organized jointly by the Ministry of External Affairs and the Ministry of Agriculture. On the occasion, India's External Affairs Minister named "Covid, Conflict, and Climate ate" as the world's primary food security challenges.

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The Department of Agriculture and Farmers Welfare (DA&FW) is implementing a Sub-Mission on Nutri-Cereals (Millets) under National Food Security Mission (NFSM) to enhance area, production & productivity of millets including bajra. Under this Sub-Mission, bajra is being promoted in 89 districts of 9 states including 14 districts of Gujarat. North Eastern States, Himachal Pradesh and UTs of Jammu & Kashmir and Ladakh have been given flexibility to include the districts under programme. Through the efforts made by the Government, the production of millets has increased from 14.52 million tonnes in 2015-16 to 17.96 million tonnes in 2020-21. The production of bajra has also increased from 8.07 million tonnes to 10.86 million tonnes during the same period. The State Governments can also promote cultivation of millets and bajra under Rashtriya Krishi Vikas Yojana – Remunerative Approaches for Agriculture & Allied sector Rejuvenation (RKVY-RAFTAAR) with the approval of the State Level Sanctioning Committee (SLSC) constituted under the chairmanship of the chief secretary of the State.

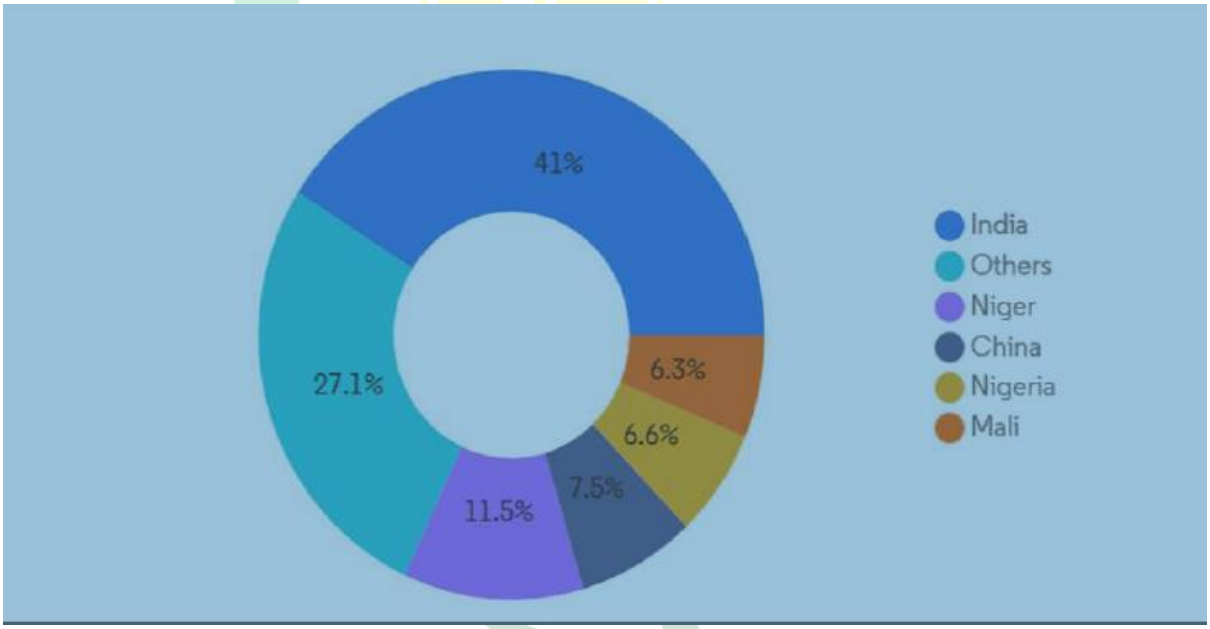

Fig 1: Millet Market Production: Volume share (%), Global 2020

In view of the nutritional value of the millets, the Government has notified millets as nutri-cereals in April, 2018. The proposal of India was supported by 72 countries and United Nation's General Assembly (UNGA) declared 2023 as International Year of Millets in March, 2021. The Government is popularizing nutri-cereals through Research & Development support and has established 3 Centres of Excellence (CoE). Support is also given to start-ups and entrepreneurs for developing recipes & value added products that

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promotes consumption of millets. 8 bio-fortified varieties/hybrids of Bajra have been released for cultivation from 2018 to till date.

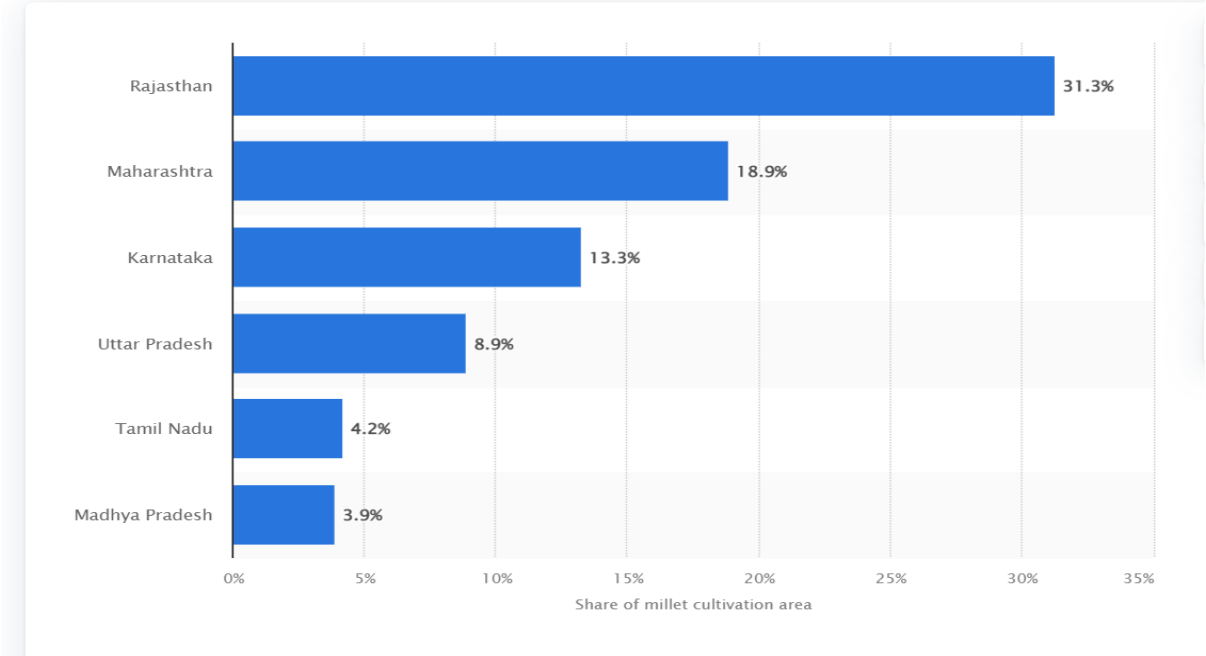

Fig 2: Distribution of area under millet cultivationin

Prerequisites must be met for millet production:-

Millets are a group of small-seeded grasses (*Poaceae* or grass family), widely grown around the world as cereal crops or grains. Millets provide food security to millions of households and contribute to the economic efficiency of farming.

Climate Requirements: Millets require warm temperatures for germination and development and are sensitive to frost. For these reasons, they are normally planted from mid-June to mid-July period. Optimum soil temperatures for seed germination are between 20°C and 30°C. They can grow in areas with annual rainfall range of ~30-50 cm.

Soil Requirements: Millets are highly adaptable to a variety of soil conditions, from extremely poor to very fertile, and can handle a degree of alkalinity. Alluvial, loamy, and sandy soils with good drainage are the ideal soils for millet cultivation.

Advantages of Producing Millet

Nutritional and health aspect

a. According to ICAR-Indian Institute of Millets Research, Hyderabad, Millets contain 7-12% protein, 2-5% fat, 65-75% carbohydrates and 15-20% dietary fibre. They are

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more nutritious compared to fine cereals. They contain higher protein, fat and fibre content;

b. They *are* **gluten free** *and non-allergenic.* ***They*** *have low Glycemic Index (*GI, value used to measure how much specific foods increase blood sugar levels*) and are rich in bioactive compounds and essential amino acids. Because of low GI, they are goof for diabetic persons;*
c. They are also rich in micronutrients like calcium, iron, zinc, iodine etc.;
d. They are three to five times more nutritious than wheat and rice in terms of proteins, minerals and vitamins;

Millets are considered to be the next super food or 'nutri-cereals' of the world because of their high nutritional content. They can be useful as a sustainable means for nutritional security.

Food Security

a. Millets are sustainable food source for combating hunger in a changing world climate. Millets secure sixth position in terms of world agricultural production of cereal grains and are still a staple food in many regions of the world. These are rich source of many vital nutrients and hence, promise an additional advantage for combating nutrient deficiencies in the third world countries**; (b)** Millets are resistance to climatic stress, pest and diseases;
b. They can be stored for long with ease.

Environmental

a. Millets have low water requirement and are drought resistant. They have short growing season and require less water during growth. Millets can grow in regions with <50 cm annual rainfall;
b. They can be grown in dry land areas using farmyard manures, thus reducing the dependence on synthetic fertilisers**.**

Economic

a. Millets offer farmers a stable source of income as they are drought-resistant and less susceptible to failure due to weather-related events;
b. Millet production requires a low initial capital investment;

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c. The global Millets market was valued at US$ 9.95 billion in 2020 and is projected to reach US$ 14.14 Billion in 2028, growing at a CAGR of 5% from 2021 to 2028 .

Social

a. SDG: Millets have the potential to help achieve the sustainable development goals (SDGs), mainly **SDG 2** (Zero Hunger), **SDG 3** (Good Health and Well-being), **SDG 12** (Sustainable Consumption and Production), and **SDG 13** (Climate Action);
b. Millets can be helpful in reducing gender nutrition gaps and inequalities; **(c)** Other social benefits include a doubling of farmers' income and an increase in human capital as a result of an increase in the availability of nutritious food.

Reason of Inconsistent Supply and Demand of Millets

a. According to NSSO household consumption expenditure survey less than 10% of rural and urban households reported consumption of millets. It is not the first choice of either consumers or farmers;
b. The Millets Mission has led to the inclusion of grain in the public distribution system, however the quotas are small;
c. The lack of access to HYV seeds has led to low crop productivity, the lack of public awareness about nutritional benefits of millets has led to limited adoption of millets. In addition, limited distribution and lack of market knowledge have resulted in sub-optimal reach, lower price realization and wastage.
d. Processed Millets (like millet flour) have poor shelf life due to its intrinsic
e. Enzyme activity (lipase activity, lipid oxidation etc.) that causes rapid development of rancidity and bitterness. Millet products are also prone to moisture and water activity. Quality assurance thus greatly depends on different pre-treatments and storage conditions.
f. Ease of Consumption: Wheat has gluten proteins that swell and form networks on adding water to the flour, making the dough more cohesive and elastic. The resultant chapattis come out soft, which isn't possible with millets (hard) that are gluten-free.

Steps have been taken to promote Millet Production:-

❖ **First**, In 2018, The Union Agriculture Ministry, declared millets as 'Nutri-Cereals', considering their 'high nutritive value' and also 'anti-diabetic properties'.

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- **Second**, The UN General Assembly adopted an India-sponsored resolution to mark 2023 as the 'International Year of Millets'.
- **Third**, The Government of India, through the revamped National Food Security Mission Operational Guidelines (NFSM), has laid specific focus on 212 millet districts in 14 states to provide incentives to farmers for quality seed production/distribution, field-level demonstrations, trainings, primary processing clusters and research support. The launch of 67 value-added technologies at the 'Centres of Excellence' has been supplemented with the release of 77 high-yielding and 10 bio-fortified varieties.
- **Fourth**, The US$ 14-billion Agricultural Infrastructure Fund has pushed investments across States to support millet entrepreneurs, primary processing machines for dehulling millets (removal of husk) and the formation of millet farmer collectives.
- **Fifth**, The 'One District One Product' (ODOP) initiative has identified 27 millet focus districts**.**
- **Sixth**, The promotion of 10,000 FPOs' programme (US$ 924 million) aims at the millet producers' effective market participation as member shareholders in these entities.

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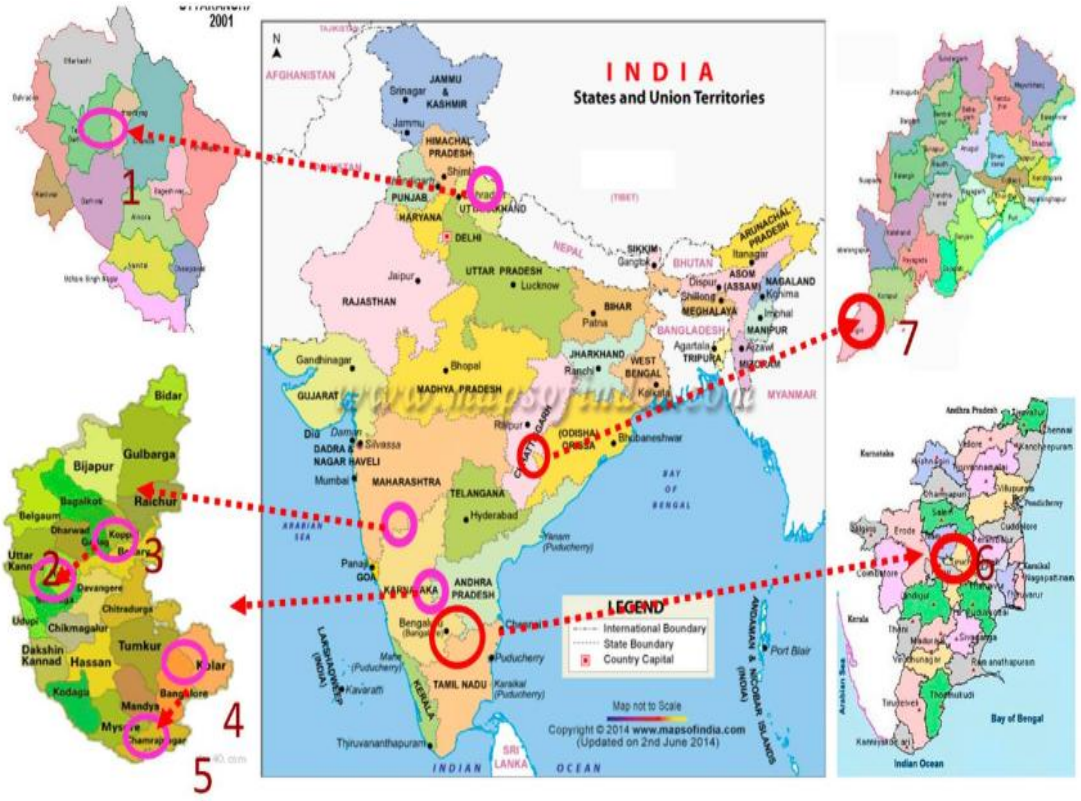

Figure 3: Project target areas (marked by red circles) across the four Indian states of Karnataka, Odisha, Tamil Nadu, and Uttarakhand

Opening ceremony for the value addition cum conservation units in one of the project sites of Kolli Hills in 2012 (S. Padulosi of Bioversity International and Rima Alcadi of IFAD taking part in the inauguration of the facilities).

In Uttarakhand, many of the common varieties of millets are the staple foods in the hills. The Uttarakhand government has been supporting organic farming. UKAPMB, through a unique initiative has been supporting thousands of farmers for organic certification. These farmers produce mainly millets such as ragi, barnyard millet, amaranthus etc.

Success in Odisha

The Odisha Millet Mission (OMM) has reportedly managed to motivate over one lakh farmers to cultivate millets across 15 districts in the state. But some states like Odisha, Karnataka and Tamil Nadu - have been reviving the cultivation of millets.

"Cultivation of millets is less expensive," said Kanak Nayak another successful tribal woman farmer hailing from Bada Dumuria village in Jhumpura block in Keonjhar. "Crops like cotton and rice need a lot of fertilizers and pesticides. But for millets, there is no need for the

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additional costs. Sometimes, if there are pests in millets, I apply neem oil to fix the issue," she explained.

Conclusion

Through this, our aim is to increase the domestic and global consumption of Millets." In order to facilitate the movement of the millets, Government has already revised the guidelines for movement of the surplus production of millets to other states. The provision of inter-state transportation of surplus millets through Food Corporation of India (FCI) is incorporated to cater for advance demand placed by consuming state before the start of procurement. The efforts should be scaled up to further enhance area under millet cultivation.

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