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Millets: From being entitled as Orphan crops to Smart crops

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ABSTRACT

Extreme weather is being highly prevalent all round the world. This condition is creating a threat from rising temperature changing patterns of monsoon, and there has been a rise in the occurrence of extreme weather-related incidents. This change is posing a considerable effect on crop growth yields and patterns and thus diverted us towards crops which can resist such climatic changes. Millet crops are particularly helpful in this regard since they are a nutrient-dense, climate change resistible crop having enormous potential to outperform other crops in terms of economic rewards under marginal conditions in comparison to others. By the government support, we can sustain long-term growth by identifying constraints and implementing relevant measures.

KEY WORDS: Smart crop, climate resilient, climate change, nutrition.

1. Introduction

Millets are easy to grow have short growth periods. Every variety of millet has ability to tolerate and withstand challenging environmental factors like drought, high elevation, and less fertile soil. These may be grown in semi-arid regions. They can help farming communities become more financially secure and due to their high protein, mineral content, fibre content and antioxidant content. They are hardy cereals that can guarantee food security while providing a nutrient-rich substitute and also reduce the negative consequences of climate change.

Millets are classified into three main groups on the basis of size of the type of plant, seeds and growth characteristics. These groups include:

a) Major Millets: This group mainly includes Sorghum [Jowar] & Pearl Millet [Bajra]

b) Minor Millets: This group mainly includes Finger Millet [Mandua/Ragi] along with Barnyard Millet [Sawa/Jhangora/Sanwa], Kodo Millet [Kodo], Proso Millet [Cheena], Little Millet [Kutki], Foxtail Millet [Kangani/Kakun].

c) Pseudo Millets: This group mainly includes Amaranthus (Ramdana/Chaulai) and **Buckwheat (Kuttu**).

2. History of Millets

Millets were widely consumed in India, up to past 50 years. But since the 1960s, as the Green Revolution increased emphasis on food security, millets were relegated to the status of "orphan crops". Before Green Revolution, millets accounted for about 40% of the cultivated grains; over time, this percentage has decreased to about 20% and thus they lost their popularity and virtually were forgotten. Millets being climate-resilient crop got their recognition back due to the need of the hour created by climate change and this time are entitled as "Smart crops".

3. Millets as Smart-Foods: Significance and Benefits

a) Nutritiously Wealthy: Millets are more nutrient-rich than wheat and rice because they contain more protein and a more balanced amino acid profile. Similarly, compared to other staple grains, millet has a higher level of dietary fiber. Furthermore, millets feature a range of phytochemicals with antioxidant and anti-inflammatory properties that have medical benefits.

b) Resilient to Climate Change: Millets are the cornerstone of dryland agriculture. These hardy, robust plants with little carbon and water footprints are referred to as the "miracle grains" or the "crops of the future" because they can survive on poor soils or less fertile

soils with little to no external dependency. Millets being more climate-adaptable crops under extreme hot conditions (up to 50°C) and drought, they are regarded as the most secure crops for marginal and small farmers.

c) Benefits to Health: Compared to cereal grains, millet grains are a better option because they are higher in magnesium, calcium, potassium, zinc, iron, manganese, and vitamins [B complex], and these are rich in nutrients like protein, carbohydrates, dietary fiber, and healthy fat. Millets were named "Nutri-Cereals" by Union Agriculture Ministry in the month of April [2018] due to their "high nutritive value" and "anti-diabetic properties."Comparing millet grain to other cereals and fruits, sorghum fractions in particular have higher antioxidant activity in vitro. (Awika & Rooney, 2004)

Millets help to tackle health challenges such as diabetes, obesity, and lifestyle problems as they possess low glycaemic index and are Gluten-free. Potential health benefits of millets have been demonstrated by epidemiological studies, which indicate that eating millets can reduce the risk of heart diseases, protect against diabetes, can lower the risk of cancer, help in detoxification process in the body, can enhance the digestive system, can strengthen the immune system for respiratory wellness and boost up energy levels.

d) Environmentally Friendly: The use of artificial fertilizers is not as dependable in millet production. and they are resistant to diseases. Millet crops usually are not affected by storage pests as they don't attract pests which reduce the use of pesticides. Besides broadening the scope of the food system, it is seen that millets have the potential to revolutionize the livelihoods of small farmers, particularly women.

e) Achieving global food and nutrition security requires a focus on millet.

f) Millets aid in the advancement of sustainability. Objectives [SDGs]: 3, 12, 13, 2

SDG 2: To promote sustainable agriculture, attain food security, end hunger, and improve nutrition.

SDG 3: Make sure everyone, regardless of age, leads a healthy life.

SDG 12: To ensure patterns of production and consumption which are sustainable.

SDG 13: “Take urgent action to combat climate change and its impacts.”

4. Constraints in millet cultivation

a) Lack of acceptable varieties/hybrids: Traditionally, cultivation is done using farmer- saved seeds and all the minor millets being self-pollinated self-save the seeds. But these days, Nationwide research initiatives and breeding operations are progressing rapidly in order to replace the traditional seeds with high yielding varieties.

b) Post-harvest technology: Lack of efficient machinery, including a colour sorter, centrifugal husker, sifter, unhull separator, and fine cleaner, is seen. These tools are necessary for managing crops properly after harvest in order to maximize earnings and minimize losses. Small farmers are unable to afford expensive machinery, which results in a lack of postharvest infrastructure and ultimately leads to an annual loss of about 30% of crops. To address this issue, the public sector should provide assistance to FPOs and start-ups, or offer specialized recruiting services to millet growers. This will help facilitate the processing and packing of millets, which can fetch a higher price on the market.

c) Lack of market facilities: One of the major challenges that the millets market is facing is the lack of infrastructure. Despite the huge demand for millets, there is no proper market chain established for it. To empower farmers to market their produce, it is essential to form more Farmer Producer Organizations. To ensure a stable market for millets, the government should consider including them in the MSP program, setting a higher price for millets, and encourage farmers to cultivate them by incorporating them into the public distribution system.

d) Lack of support: It is important to enhance knowledge and understanding regarding the advantages of consuming millet and encourage people to include it in their daily diets. This can be achieved by promoting processed and value-added millet products like baby food (malt), millet cake, biscuits, muffins, fried sticks, etc by doing so, it can draw the attention of the population, increase demand in the market, and consequently boost production. The government of Karnataka has launched a trial project that serves millet-based foods such as bajra/jowar roti and bisibelebath as midday meals twice a week, with the aim to

double farmers' income and ensure malnutrition-free India. It is crucial to implement such initiatives in all regions of the country.

e) Farmer acceptability: Many farmers prefer to grow commercial crops instead of millet, as it provides better financial benefits. However, nowadays, marginal and resource-poor farmers are more inclined towards planting millets. To tackle this issue, the government should develop a plan to supply farmers with the required inputs and high-quality seeds. This will ensure that they have access to the necessary resources to grow millets successfully.

5. Improvement of Millets' Productivity and Production:

a) Strengthening the Quality Seed chain

By enhancing support to Foundation and Certified seeds.

Enhanced support to Breeder Seed Procurement.

b) Improved focus on Crop Diversification in favour of Millets.

c) By increasing the demand by proper awareness and by increasing the consumption rates.

d) States should implement procurement measures.

6. How government is working to energise this field:

The Indian government recognized the potential of millets to feed the world and create a demand for them both domestically and internationally. As a result, the UNGA passed a resolution and designated the year 2023 as The International Year of Millets. 72 nations conceded to India's request, and in March 2021 the UNGA promulgated the year 2023 to be the International Year of Millets.

The government has taken a variety of steps to encourage millets to promote and expand demand for millets both domestically and globally and to provide people with healthy food.

In October 2007, Government of India launched the National Food Security Mission (NFSM), which encompasses the Millet Mission.

- To incentivize millet production, the Indian government raised the Minimum Support
- Price for millet.

- The Center's Millet Mission will prioritize value addition and aggregate production while expanding farm-gate processing and empowering farmers through collectives.
- As part of Poshan Mission Abhiyan 1, millets have been incorporated by the Ministry of Women and Child Development.
- Additionally, entrepreneurs and startups are supported to create recipes and value-added items of millets which promote and increase the consumption of millet.
- In order to raise awareness of millet and build millet processing facilities, Andhra Pradesh established the millet board in 2020.

Conclusion:

It is acknowledged that millets have enormous potential for Food security and nutrition in the face of rising agricultural expenses, global population growth, and changing climate conditions. They are naturally resistant to the majority of biotic and abiotic challenges, are nutrient-dense, have extra health advantages, and require substantially lower input expenses for growth. These characteristics highlight millets as the world's preferred crop in light of the rising concerns about climate change. Millet is regarded as a smart crop because of its advantages including minimal care requirements, resistance to disease and pests, nutritional benefits, fodder value, market demand and ecological benefits. Returning to millets makes sense because they are hardy and climate-smart. This is a significant solution that may address a variety of health problems. Even though there are few problems with millets regarding quality, supply chain, and processing all Indian stakeholders' united efforts will eventually find a solution. Finally, millets symbolize the future of agriculture and food production.

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