An Analysis of Trends and Patterns of Area, Production, and Yield of Millets in Karnataka

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Abstract: The significance of millet has been acknowledged by both policy makers and nutrition professionals lately. As a result, concerted efforts are currently being made to boost millets output. It has been announced that 2023 would be the year of millets. In this regard, using the secondary data that is currently available, the research attempts to examine the trends and patterns in millet production throughout the Karnataka state. According to the research, Karnataka's yield has been rising over time despite a decline in the state's total production and area under millets.

Keywords : millet, nutrition, production, yield

Introduction:
India has a lengthy history of millet cultivation that dates back thousands of years as well as Karnataka Michaelraj & Shanmugam, April (2013). Grown for their nutritious grains, millets are small-seeded grasses that are staple foods in many parts of the nation. These resilient crops are best suited for rain-fed regions with low soil fertility since they can adapt to a wide range of agroclimatic conditions. India grows a variety of millets, including finger millet (ragi), foxtail millet (kangni), tiny millet (kutki), barnyard millet (sanwa), and pearl millet (bajra). Every variety has distinct qualities of its own and is suited to varying environments and growing situations. Millet cultivation in India is widespread, with major production states including Rajasthan, Maharashtra, Gujurat, Uttar Pradesh, Karnataka, and Tamil Nadu (Das, 2019). These states' favourable climates, which include scorching, dry summers, are perfect for millet farming. In India, millets are often grown as a rain-fed crop, using the monsoon rains for irrigation. On the other hand, irrigation techniques including tube wells and small-scale water-saving buildings are also used in some areas to raise millets. Millet crops are typically sown during the onset of the monsoon season, between June and July, when there is sufficient soil moisture. The crops require well-drained soils with good organic matter content. Millets are known for their ability to withstand drought conditions and can grow in areas with low rainfall Malathi, 2016. Millet is cultivated by farmers using classic agricultural methods, such as tilling the soil, broadcasting or using seed drills, and then taking care of weeds and pests. Millets are renowned for their capacity to thrive in low-input agricultural systems with no need for chemical pesticides and fertilisers. Millet crops are typically harvested 70–100 days after seeding, depending on the type and growth circumstances. The crops are harvested by cutting the stalks close to the ground and then threshed to separate the grains from stalks. After threshing, the grains are further processed and stored for consumption or sold in the market. Millet cultivation plays a significant role in Indian agriculture, particularly in dryland regions.

It provides food security for millions of people, especially in rural areas, and contributes to the livelihoods of small-scale farmers. Millets are highly nutritious, rich in dietary fiber, protein, and micronutrients, making them an important component of a healthy diet Michealraj 2013. Millets have garnered attention again in recent times because of their high nutritional content, ability to withstand climatic change, and potential to enhance soil health. In order to increase millet production and consumption in Karnataka, the government and a number of organisations have been pushing its cultivation through awareness campaigns, research and development, and policy assistance. Generally, millet farming has a long history in Karnataka’s agriculture and culture. It is still a significant crop that supports rural livelihoods, food security, and sustainable agricultural methods in the State. The current study attempts to examine the production and yield of millets, as well as trends and patterns in the field.

The study used secondary data pertaining to area, production, and yield of millets in Karnataka during the last five decades i.e., from 1966-67-51 to 2018-19, collected primarily from directorate of Economics and Statistics, government of Karnataka The data was analysed taking percentages and averages to examine the changes in area, production, and yield of major millet crops, viz., sorgum, pearl millet, finger millet, and small millets.
Data Analysis:

Graph : 1 Area of millet cultivation in Karnataka -1966-2019. (000 Hectares)

The shifting trend of millet farming in Karnataka is depicted in this graph, which indicates an overall drop since the 1960s. The development of high-yielding wheat and rice varieties in the 1960s, government policies supporting these crops, and shifting consumer preferences towards wheat and rice as a result of increasing affluence and convenience are some of the causes contributing to this drop. Given that millets are drought-resistant and high in vital nutrients, the autumn will have a detrimental effect on India's as well as Karnataka's food security and nutrition. In an attempt to encourage millet farming, the government has launched awareness campaigns, provided farmers with subsidies, and partnered with food manufacturers. Although there has been some progress with these initiatives, continued government backing and a change in public perception are essential to guaranteeing the long-term viability of millet farming.

Graph No: 2. % of millet cultivated area to total food grain area in Karnataka

Source: Directorate of Economics and Statistics, Agriculture Department GOK.

The graph shows how, between 1966 and 2019, India's overall Millet production decreased as a percentage of total food grain area. Water shortage, which affects millet agriculture, government policies favouring more profitable crops like rice and wheat, and shifting consumer preferences are some of the causes contributing to this decline. The decrease in the production of millet has detrimental effects on the ecosystem and the intake of nutrient-dense foods. Government programmes including subsidies, funding for research, and public awareness campaigns stressing the health advantages of millets are among the measures being taken to buck the trend. These initiatives, however yet in their infancy, have the ability to address the multifaceted problem and advance the cultivation of this sustainable crop.
Graph No: 3. Area in % of Jawar, bazra and ragi to total millets Cultivated area in Karnataka

Source: Directorate of Economics and Statistics, Agriculture Department GOK.

shows the percentage of area covered by three different millets (jawar, bajra, and ragi) in India from 1966 to 2018. Here's a critical analysis of the graph:

**Overall trends:**

- **Jawar:** Jawar dominates throughout the period, except for a brief dip in the late 1970s and early 1980s. Its share of total millet area fluctuates between 50% and 70%.
- **Bajra:** Bajra's share is much smaller and more variable than jawar, ranging from 10% to 35%. It shows a slight increasing trend over time.
- **Ragi:** Ragi has the smallest share, typically between 5% and 15%. It seems to have declined slightly over time.

**Production:**

Graph No: 4. % of millets production to total food grain production Karnataka 1966-2019

Source: Directorate of Economics and Statistics, Agriculture Department GOK.

The graph shows the percentage of millets production to total food grain production in Karnataka from 1966 to 2018. As you can see, the percentage of millets production has been decreasing steadily over the past few years. In 1966, millets accounted for only about 50% of total food grain production in Karnataka. By 2018, that number had decreased to 20%. There are a number of reasons for this decrease. Inadequate government intervention for procurement and
distribution of certain millet varieties, lack of processing and marketing facilities, lack of stable prices and non-availability of required machinery are discouraging farmers from taking up millet cultivation.

Graph No: 5. % of Jawar, Bajra and Ragi and Small millets production to Total millet production in Karnataka 1966-2019.

Source: Directorate of Economics and Statistics, Agriculture Department GOK.
It shows the percentage of jawar, bajra, ragi and small millets production to total millet production in Karnataka from 1966-67 to 2018-19. The graph indicates a decline in the percentage of jawar and bajra production to total millet production in Karnataka over the years, while the percentages for ragi and small millets have increased. Potential reasons for these changes include a shift in consumer demand towards more nutritious and drought-resistant crops like ragi and small millets. Government policies promoting ragi and small millet production may also contribute to these shifts. Overall, the diversification in millet production in Karnataka is seen as a positive development, providing farmers with a variety of crops and improving the nutritional status of the population.

Yield:
Graph No: 5. Over the Years Yield of Food grains and Millets (Kg / Hectare)
Source: Directorate of Economics and Statistics, Agriculture Department. GOK.
The above graph indicated an increase in the yield of food grains and millets in Karnataka from 1966 - 67 to 2018-19. Food grain yield rose from approximately 450 kg/hectare to around 1300 kg/hectare, while millet yield increased from about 250 kg/hectare to around 700 kg/hectare. Potential explanations for these increases include enhanced fertiliser and pesticide use improved irrigation practises, and a shift to higher yielding crop varieties. This rise in yields has positively impacted Karnataka’s economy by increasing food production, lowering food prices, and boosting farmers’ income. However, concerns include potential environmental pollution from fertilisers and pesticides and reduced crop diversity, making the agricultural system more susceptible to pests and diseases. Overall, while the yield increases is positive, it is crucial to address and mitigate potential and negative consequences. Additional details from the graph indicate yearly fluctuations with an overall upward trend, higher food grain yields compared to millets and a significant spike in food grain yield in the early 2000s.

**Graph No: 6 Over the years yield of jawar, bajra, ragi and small millets**

The graph illustrates the increasing yields of four crops—jawar, bajra, ragi, and small millets—in Karnataka from 1966 to 2015. Jawar experienced the most significant increase, reaching almost 1800kg per hectare in 2015 from around 300kg per hectare in 1966. Ragi also saw substantial growth, from about 400kg per hectare in 1966 to approximately 1200kg per hectare in 2015, while bajra and small millets had more modest increases.

Potential reasons for the yield increases include the adoption of improved crop varieties, enhanced cultivation practices like increased fertilizer or water usage, and favourable climate conditions. The positive impact of higher yields on farmers’ lives is evident, as increased income allows for improved living standards and farm investments.

**Findings and Suggestions**

The crops resilience to diverse agro-climatic conditions, contributing significantly to food security and farmer livelihoods. Millets exhibit low water requirements, making them suitable for rain fed and drought prone regions, which are prevalent in Karnataka. these crops also demonstrate high nutritional value, with millet-based diets offering health benefits such as reduced risk of diabetes and cardiovascular diseases. However, challenges such as limited market access, and low prices etc. To promote millet cultivation effectively, there is a need for comprehensive policy support, including investment in research and development for high yielding varieties, improving market linkages, providing financial incentives and promoting consumer awareness about millet’s nutritional benefits. Then extension services and farmer capacity building programmes can enhance agronomic practises, leading to improved yields and profitability for millet farmers in Karnataka.

**References**
1. Directorate of Economics and Statistics, Agriculture Department GOK.
