International Journal of Enhanced Research in Educational Development (IJERED)
ISSN: 2320-8708, Vol. 12 Issue 6, Nov.-Dec, 2024, Impact Factor: 8.376

Area, Production and Productivity Dynamics of Millets in India

Dr. Flowarin AD[1], Anagha Dev K V[2]

[1]Asst Professor on Contract, Kerala Agricultural University, Vellanikkara
[2]Research Scholar, Kerala Agricultural University, Vellanikkara

ABSTRACT

Millet is a family of cereals in the Poaceae family, also referred to as the grass family. Millions of people depend on millets, which are produced in a variety of agro climatic zones across India, for their food and nutritiona lsecurity. For ages, millet has been a staple crop in many countries of Asia and Africa. Prior to the Green Revolution, rice, millets, sorghum, wheat, maize, and barley were the main crops grown. Out of all the crops, rice and millets produced more than wheat, barley, and maize put together. The importance of millets and their cultivation through large-scale wheat and rice production has decreased as a result of industrialization and urbanization. The central government strategies which were centered on promoting rice and wheat crops due to food security has also led to the reduced production and consumption of these crops, following the start of the Green Revolution. After learning that people also require nutrition, in addition to food security, the central government started to promote the nutritive valued crops like millets. The crop is promoted mainly through spreading technology, providing high-quality seed through millet seed hubs, raising awareness, setting a minimum support price, and including millet into PDS. In 2012 an INSIMP was started for this purpose. In April 2018, the Union Agriculture Ministry designated millets as "Nutri-Cereals" due to their "high nutritive value" and "anti-diabetic properties". The UN General Assembly passed a resolution, proposed by India, designating 2023 as the "International Year of Millets" while 2018 was recognized as the "National Year of Millets" to create domestic and global demand and also to provide nutritional food to the people. The NFSM comprises the Government of India's Millet Mission which was launched in October 2007. The millet missions were also established by the central government to promote millet production and consumption such as the Odisha Millet Mission, Madhya Pradesh Mission on millets, Andhra Pradesh Millet Mission and Chhattisgarh Millet Mission. Thus the main aim of the study is to analyze the direction, magnitude, global competitiveness, market share and its position in the market. And from this it is concluded that the production and productivity of millets increased and its area is decreased.

INTRODUCTION

Agriculture is the foundation of any developing nation like India which is a self- sufficient food producer. But India's food production was so poor between 1947 and 1960 that there was a possibility of famine. Thus, the country launched the Green Revolution in the 1960s with the goals of feeding millions of people, increasing food production, and reducing extreme poverty and malnourishment. Prior to the Green Revolution, rice, millets, sorghum, wheat, maize, and barley were the main crops grown. Out of all the crops, rice and millets produced more than wheat, barley, and maize put together. HYVs of cereals were introduced as the main goal of the green revolution to reduce malnutrition and poverty (Nelson *et al.*, 2019). But this only ensures the food security and not the nutrition. However, thecrop having the nutritive value like millets are now produced at a lower rate, and within a few decades following the Green Revolution, the crops that were once consumed in every home were transformed into fodder (Eliazer *et a*l., 2019).

In addition, the importance of millets and their cultivation through large-scale wheat and rice production has decreased as a result of industrialization and urbanization. The central government strategies which were centered on promoting rice and wheat crops due to food security has also led to the reduced production and consumption of these crops, following the start of the Green Revolution (Nelson *et al.* 2019; Virmani and Takuji, 2003; Bhalla and Tyaji, 2006). The major causes of the decline in the consumption of millets include inadequate marketing infrastructure, inadequate processing methods and decreased availability of grains (Chandel *et al*., 2014; Sreekala et al., 2022). Yet, after learning that people also require nutrition, in addition to food security, the central government started to promote nutritive valued crops like millet (Das *et al*., 2019). The crop is promoted mainly through spreading technology, providing high-quality seed through millet seed hubs, raising awareness, setting a minimum support price, and including millet into PDS.

In Karnataka and Telangana, efforts are currently underway to incorporate the smaller,more nutrient-rich millets into the midday meal programs offered in government and government-aided schools. Urban areas like Delhi, Mumbai, Kolkata, and others are rapidly gaining millet awareness. In 2012 an INSIMP was started for this purpose. In April 2018, the Union Agriculture Ministry designated millets as "Nutri-Cereals" due to their "high nutritive value" and "anti-diabetic properties"(Sharma *et al.,* 2022; FAO, 2018). The UN General Assembly passed a resolution, proposed by India, designating 2023 as the "International Year of Millets,"(Sreekala *et al*.,2022; FAO, 2020; Muthamilarasan and Prasad,2020), while 2018 was recognized as the "NationalYear of Millets"(Kane-Potaka *et al*., 2021) to create domestic and global demand andalso to provide nutritional food to the people (Indian Superfood Millet, APEDA report,2023).

The NFSM comprises the Government of India's Millet Mission which was launched in October 2007. The millet missions werealso established by the central government to promote millet production and consumption such as the Odisha Millet Mission, Madhya Pradesh Mission on millets, Andhra Pradesh Millet Mission and Chhattisgarh Millet Mission (Kane-Potaka et al., 2021). Therefore, the primary focus of this study is the millet crop following the green revolution.

Looking into the Indian millets, they are a class of highly nutritious, which helps in improving the consumer's food and nutritional security (Rao et al., 2018). The crop isalso known as “coarse cereals” or “cereals of the poor” (Bouis, 2000). It is cultivated in the country’s arid and semi-arid regions and is considered the food for millions of people living there (Lancelotti et al., 2019). The poorest people’s main source of sustenance is millets, which is a group of small-seeded annual grass cultivated as graincrops (NAAS, 2013). It is primarily developed in 21 states in India which is the primary producer and consumer of millets (Bhat et al., 2023). The most makers were Rajasthan,Uttar Pradesh, Haryana, Gujarat and Madhya Pradesh (ASSOCHAM, 2022). It is developed in Asia, Africa, South America, India, Nigeria and Niger where India, Niger,and Nigeria are the top three producers (Kheya et al., 2023).

The crop millet has many nutritious and medical functions (Obilena and Manyasa,2002; Yang et al.,2012; Gopalan et al.,2009) which helps to prevent atherosclerosis and diabetic heart diseases (Gelinas et al.,2008) and is rich in calcium, dietary fiber, polyphenols etc. (Devi et al., 2011; Paschapur et al.,2021; Bravo, 1998). The crop is also richer in fat content than crops like maize, rice and sorghum (Obilana and Manyasa, 2002). They are drought-resistant crops that can prevent insect damageby storing them for a long time (Adekunle, 2012) and are also tolerant to high temperatures and floods (Behera,2017). In millets, different types were cultivated in India such as bajra, jowar, ragi and small millets (Sukumaran Sreekala et al., 2022; Sanjay et al., 2022). Among them both jowarand bajra are the major millets, ranking 3rd and 4th among total cereals and are cultivated as dual-purpose crops in India (Yadhav et al., 2011).

While analyzing each millet, the Sorghum which is known as jowar is an important source of B vitamins and minerals (Gazzaz et al.,19890) and is a gluten-free grain richin protein and fiber content (O.S.K Reddy,2017). It is considered to be one of the cheapest sources of iron and zinc (Parthasarathy Rao et al., 2006). In terms ofproduction and area, jowar ranks 5th in importance relative to crops like wheat, rice, maize, and barley accounting for 5 per cent of the world wheat production (Obilana, 2002). The crop may be produced in a variety of environmental conditions and is naturally resistant to drought. It also serves as a dual crop in semi-arid areas, both as a stover and grain.

The largest producer of jowar is the country India (FAO, 2003) in which the states growing the crop include Andhra Pradesh, Maharashtra, and Telangana (Rao et al., 2017). Whereas the pearl millet, also known as bajra, is a widely grown indigenous millet (Rao et al., 2018) and has the highest drought tolerance among all millets. It is an important cereal crop after rice, wheat, maize, barley and sorghum (Satyavathi et al., 2021) which produces the largest seeds and is used for human consumption (Mariac et al., 2006; ICRISAT, 2007). This crop is considered the 6th most important grain in theworld (Pattanashetti et al., 2016) and contains phytonutrients such as flavonoids, lignin etc. that help to prevent breast cancer and cardiovascular diseases (Thakur and Tiwari,2019). One of the few foods that lower stomach acidity and help prevent ulcers anddiscomfort from repeated acidity is pearl millet (Shukla and Bhise, 2023).

It is rich in protein and contains insoluble fiber which helps to reduce excessivebile system (Shweta, 2015). Because of its higher fiber content, bajra is used toproduce nutritious food for people (Nambiar et al., 2011). It is also used for non-food purposes such as poultry feed, cattle feed etc. (Basavaraj et al., 2010).It was mainly grown in states like Rajasthan, Maharashtra, Gujarat, Uttar Pradesh, and Haryana. The Finger millet is also known as ragi, which is an essential food source, particularly for the people living in rural areas of South India and East and Central Africa. This crop is considered a minor millet which has exceptional malting characteristics and is widely acknowledged as a food that aids in detoxification. The other minor millets include little millet (kutki), kodo millet, barnyard millet (sawan/jhangora), proso millet (cheena/common millet), foxtail millet (kangni/Italian millet), and brown top millet (korale).

Thus, when the government started to promote millet, 37 MT of millet were produced in the world in 1993-1994 (Agricultural Situation in India, 1993) andis known as the most important cereal grain in the world (Eric et al., 2012). The production increased from 13012.2 (1000ha) in 2000 to 13210 (1000ha) in 2021 (FAO, 2021). In 2021- 22, it was 32790.12 MT with 31835.04 MT of cultivated area (Madhu et al., 2023).In case of India, an increase in production can be seen from 14.52 MMT in 2015-16 to 17.96 MMT in 2020-21 as per the Ministry of Agriculture and Farmers

Welfare. In the country, the state of Karnataka contributes 58 percent to the global production of millet (Upadhyaya et al., 2007). According tothe Food and Agriculture Organization (FAO), millet production was estimatedat 28.33 MMT in 2019, which increased to 30.08 MMT in 2021. In 2021- 22, itwas 32790.12 MT with 31835.04 MT of cultivated area (Madhu et al., 2023). The country also has a 43 percent global market share in 2021. Thus, by comparing India with other countries like China, Niger, Sudan, Nigeria and Mali, it becomes the leading producer of millets (FAO Stat, 2021) and is in 2ndposition in having the largest agricultural land area in the world (Nelson et al., 2019).

Taking into account the global exports of the millets, the major exporters of the crop were Ukraine, the United States, France, Russia and India. An increase can be seen from 380 M in 2019 to USD 402.7 M in 2020 (Ministryof Commerce and Industry, 2022). It has climbed from $400 M in 2020 to$470 M in 2021. In the case of the country India, it exported millets of USD 26.97 M in 2020- 21 against USD 28.5 M in 2019. Also in 2021-22, millets worth $64.28 millionwere exported (Kheya et al., 2023) and it reached $75.46 M in 2021-23. Thus,India occupies the 4th position in the export of millets globally. Despite being the world's fourth exporter of millets, India exhibits notable variations in terms of output, acreage, and exports. Thus, finding out the trendsin the area, production, productivity, and export of millet is therefore relevant. Additionally, an analysis of market share and worldwide competitiveness of the crop is also required for this study.

Statement of the Problem.

In the developing world, millets form a staple diet, particularly in the arid regions of Asia and Africa. The majority of millets are native to Africa and were subsequently domesticated in other regions of the world. Millets are grown in 93 countries worldwide, although only 7 of those have more than 1 million hectares of millets under cultivation. In general, more than 97 percent of millets production and consumption is by developing nations. The crop millet has many nutritious and medical functions (Obilena and Manyasa,2002;Yang et al.,2012; Gopalan et al.,2009) which helps to prevent atherosclerosis and diabetic heart diseases (Gelinas et al.,2008) and is rich in calcium, dietary fiber, polyphenols etc. (Devi et al., 2011).

The Green Revolution period has significantly affected the production and consumption of millets, a decline in the area and cultivation of the crop can also be seen. However after the central government supported the crop due to its nutritive ability the production of millet, its area, production, productivity and exports started to increase. In 2021- 22, it was 32790.12 MT with 31835.04 MT of cultivated area (Madhu et al., 2023). This decline in the area is related to changing agricultural lands for other crops, dietary changes, and guaranteed yields from large commercial crops. However, global millet productivity has increased by 36 percent from 1961(575 kg/ha) to 2018 (900 kg/ha). Except for Africa, the average statistics overthe previous 58 years showed a decline in millet output over much of the world.The highest increment was recorded in West Africa, almost double that in the 1960s. In the Indian scenario, millet production was at its peak during the 1980s,there after decreased gradually due to a sharp reduction in cultivated area (R.P Meena et al., 2021). India is the largest producer of millet with 37.5 percent of the total global output followed by Sudan and Nigeria.

Thus, India is now in 4th position for exporting millets in the world and the country has exported millets worth USD 26.97 million in 2020-21 against USD 28.5 million in 2019- 20. India being the world leader in the production of millets with 41 percent globalshare in 2020, produces about 12 MMT of millets in a year (Ministry of Agriculture and Farmers Welfare, 2022). Hence, this study analyses the trend in area, production and productivity of millets in India.

Objectives of the Study

1. To analyze the trend in area, production and productivity of millets in India.

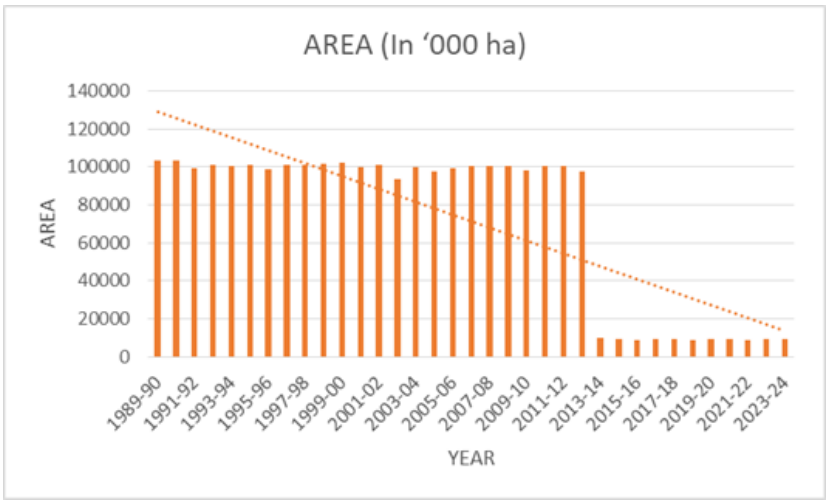
METHODOLOGY OF THE STUDY

In order to fulfill the mentioned objective, the study depended on the secondary data. For the data collection, WITS, UNCOMTRADE and the RBI handbook of the Indian economy from the period 1989 to 2023 was collected.

RESULTS AND DISCUSSIONS

India’s food security and agricultural economy both greatly benefit from the production of millet, a major grain crop. Thus, for the study area, production and productivity of millets from the period 1989-90 to 2023-24 are collected to analyze the trend line.

Area of Millet in India

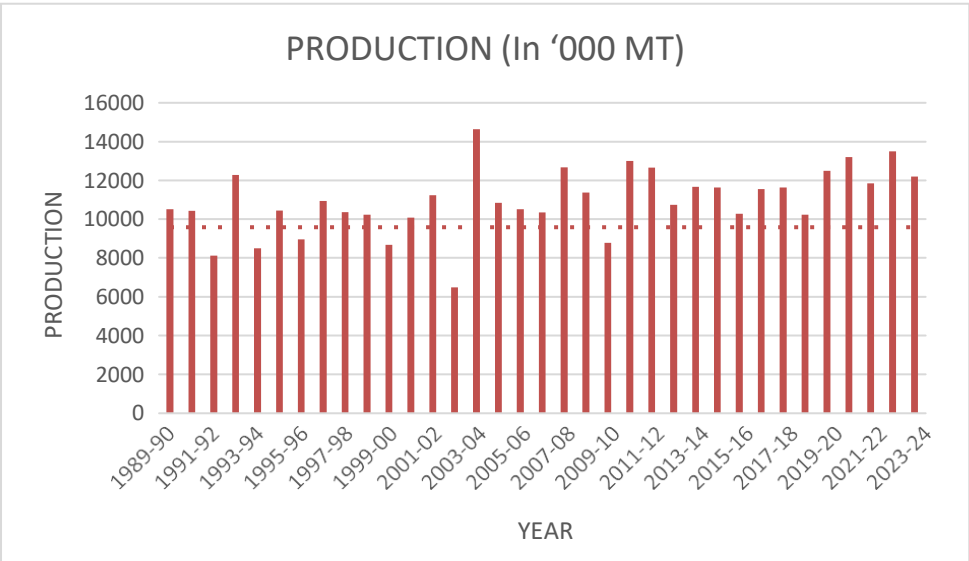


Source: Horticulture statistics at glance, 2021

Figure 1 Area of Millet in India

Here a decreasing trend line can be seen in the figure in the case of the area of millets in India during the period 1989-2023. Low compensation relative to other competitive crops, a lack of pricing incentives and input subsidies, subsidized availability of high-quality cereals through PDS, and shifting consumer tastes are the primary causes of the decrease of millets crops in India which leads to this declining trend. Due to these reasons, the nation as a whole began producing other competing crops such as rice, maize, wheat, cotton, sugarcane, and sunflower instead of millets after the Green Revolution period. Also, refined cereals like rice and wheat are becoming more and more preferred over traditional millets. Because of this change in eating patterns, millets are less in demand and less desirable for farmers to grow. Another reason is that millets are sometimes marginalized by policies that encourage the cultivation of other cereals through the use of mechanisms like the Minimum Support Price (MSP). Farmers are thus financially discouraged from growing millet. Farmers may be unaware of the advantages of millets or better farming techniques. Compared to other crops, millet farming is not as commonly promoted by extension services. This can also lead to the decreased cultivation of millet in the country.

Production of Millet in India



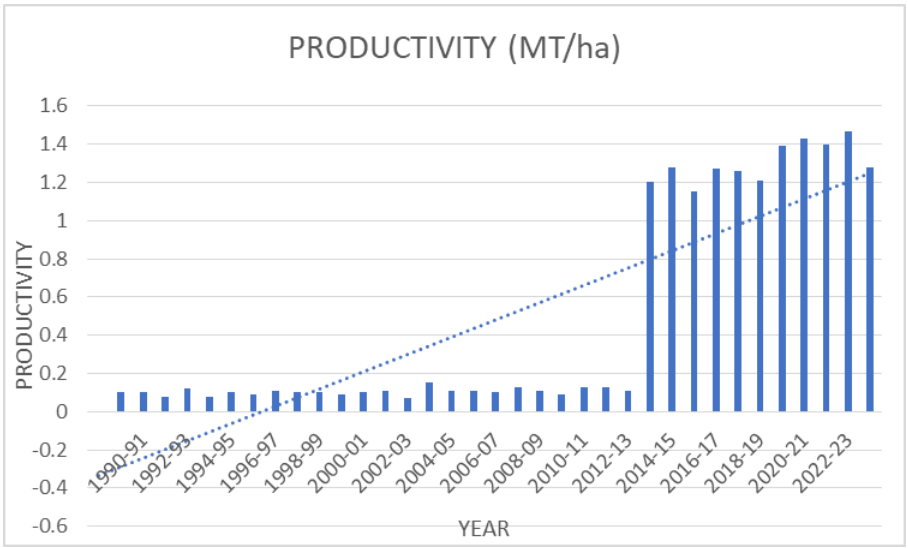
Source: Horticulture statistics at glance, 2021

Figure 2 Production of Millet in India

It is clear from figure 3.2 that there is an increasing trend in the production of millet during the period 1989-2023. This was because the government began to acknowledge the benefits of millets and put laws in place to encourage their cultivation. Subsidies, integration into public distribution networks, and UN programs such as the International Year of Millets 2023, which seeks to increase global millets production and consumption. Millet is one of the "superfoods" those customers are searching

for due to the growing popularity of health and wellness trends. Their advantages in controlling lifestyle disorders like diabetes and obesity are frequently emphasized which also leads to the increased production of the crop. Compared to other cereals, millets are a more environmentally friendly crop since they need less water and other inputs and are more resilient to pests and illnesses. They are therefore a desirable choice for sustainable farming methods. Diversifying one's diet and reintroducing old favourites oneself is becoming more popular. As a component of this trend, millets a pillar of many traditional diets is coming back. This also helped the farmers to increase their production of millets in the country.

Productivity of Millets in India



Source: Horticulture statistics at glance, 2021

Figure 3 Productivity of Millets in India

It is visible from figure 3.3 that the productivity of millets in India is showing an increasing trend during the period 1989-2023. This was because of the availability of high-yielding varieties, pest, and disease-resistant varieties, and improved cultivation practices of millets in the limited area. And the implementation of missions andprograms by the government also made it easier for its growth.

Thus, it is understandable from figure 3.1, 3.2 and 3.3 that the area has decreased fromthe period 1989-90 to 2023-24 due to low compensation relative to other competitive crops, a lack of pricing incentives and input subsidies, subsidized availability of high- quality cereals through PDS, and shifting consumer tastes. Although the area has decreased production and productivity have increased from the period 1989-90 to 2023-24. The reasons for the increase are the implementation of various missions, the declaration ofthe National and International Year of Millets in 2018 and 2023, the availability of high-yielding varieties, pests, disease resistant varieties, and improved cultivation practices ofmillets in the limited area. Thus, it can be concluded that production and productivity increased in India after the Central government support but the area decreased. So, when the government implements more programmes and enhances awareness through their support, then India can increase its exports gluten-free and healthy food options. The percentage of millet exports in India is affected by trends in the market and trade policies that affect the global trade of agricultural goods. Market trends, such as the growing preference for organic and natural food items, the increase in health-conscious consumer groups, and the desire for ethnic and traditional foods, have all played a role in the rising export share of millet.

Major Findings of the Study

India relies heavily on agriculture for the majority of its population's income, with over65 percent of people depending on this sector. Economic changes like globalization, liberalization, and privatization have contributed to the country's progress. Indian millets are considered highly nutritious and play a crucial role in enhancing food and nutritional security for consumers. These grains are often referred to as “coarse cereals” or “cereals of the poor” and are predominantly grown in India's arid and semi-arid regions, serving as a staple food for millions of people residing in those areas. India is among the leading millet producers globally, with important contributions to total production coming from states like Karnataka, Rajasthan, Andhra Pradesh, and Maharashtra.

Increase in the productivity and production of millets in India because of the availability of high- yielding varieties, pest, and disease resistant varieties, and improved cultivation practices of millets. But a decrease in the area of millets can be seen because of low compensation relative to other competitive crops, a lack of pricing incentives and input

subsidies, subsidized availability of high-quality cereals through PDS, and shifting consumer tastes.

SUGGESTIONS

- It is crucial to build consumer knowledge and stimulate interest in millet products in the worldwide market.
- Use online platforms and social media to feature recipes made with millets, stories of successful farmers, and endorsements from health professionals can help shape a favorable image of millets and spark interest from consumers.
- Use high yielding, disease and pest resistant varieties for the cultivation of millets.
- Provide funds for research and development to create millet cultivars with improved nutritional value, drought resilience, and yields.
- Give access to contemporary agricultural practices, such as integrated pest management, efficient irrigation methods, and conservation agriculture, as well as training and extension services.
- To lower post-harvest losses, enhance quality control, and enable prompt millet transportation to export markets, invest in the construction of roads, storage facilities, and processing factories.
- Establish and uphold certifications and quality requirements for the processing andproduction of millet.
- Start advertising initiatives to spread the word about millets' dietary advantages andculinary variety.

CONCLUSION

India relies heavily on agriculture for the majority of its population's income, with over 65 percent of people depending on this sector. Economic changes like globalization, liberalization, and privatization have contributed to the country's progress. Indian millets are considered highly nutritious and play a crucial role in enhancing food and nutritional security for consumers. These grains are often referred to as “coarse cereals”or “cereals of the poor” and are predominantly grown in India's arid and semi-arid regions, serving as a staple food for millions of people residing in those areas. Recent agricultural data suggests that the cultivation of millet in India as experienced fluctuations in total area over time due to factors like government policies, market demand, and climate conditions. The production of millets has also been inconsistent, with some years seeing abundant harvests and others facing challenges from unfavorable weather. Researchers and policymakers have shown interest in the productivity of millets, particularly in terms of the yield per hectare. Although traditional farming methods have been commonly used for millet cultivation, there is a growing focus on enhancing productivity through sustainable agricultural practices, the adoption of high-yielding varieties, and effective water management strategies. Thus, the significance of millets in ensuring food security, promoting sustainable agriculture, and addressing malnutrition has been acknowledged by the Indian government. To support millet cultivation, enhance productivity, and create market linkages for farmers, several initiatives and programs have been launched in this regard. Some of the key schemes aiming to promote millet cultivation and improve the livelihoods of smallholder farmers include the National Food Security Mission (NFSM) for millets and the Rashtriya Krishi Vikas Yojana (RKVY),). Additionally, the incorporation of millets into the Public Distribution System (PDS), mid-day meal initiatives, and nutrition programs has greatly increased the demand for these grains. The government's emphasis on promoting millets as healthy cereals and promoting their consumption through awareness campaigns and policy assistance has helped revitalize cultivation in India.

REFERENCES

[1]. Amadou, I., Gounga, M.E. and Le, G.W. 2013. Millets: Nutritional composition, somehealth benefits and processing-A review. Emirates J. Food and Agri.: 501-508.
[2]. Aman, Z., Singh, S., Pandey, M. and Chaudhary, A. History of Millets. Millets: Forgotten Grains Regaining Prominence. 1.
[3]. Bhat, B.V., Hariprasanna, K. and Ratnavathi, C.V. 2023. Global and Indian scenario ofmillets. Indian Farming. 73(1): 16-18.
[4]. Brahmachari, K., Sarkar, S., Santra, D.K. and Maitra, S. 2019. Millet for food and nutritional security in drought prone and red laterite region of eastern India. Int. J. Plant& Soil Sci. 26(5): 1-7.
[5]. Dayakar Rao, B., Bhaskarachary, K., Arlene Christina, G.D., Sudha Devi, G., Vilas, A.T. and Tonapi, A. 2017. Nutritional and health benefits of millets. ICAR_Indian Institute of Millets Research (IIMR) Rajendranagar, Hyderabad. 2.
[6]. DM, M., Gunadal, N.M., HC, H., Geetha, I., Sri, K.K. and Haripriya, S. 2024. A Comprehensive Analysis of Export Performance and Trade Competitiveness of Millets from India. J. Scientific Research and Reports. 30(5): 43-55.
[7]. Eduru, A., Kamboj, A., Reddy, P.M. and Pal, B. 2021. Nutritional and health benefits of millets, present status and future prospects: A review. The Pharma Innovation J. 10(5): 859- 868.
[8]. Eliazer Nelson, A.R.L., Ravichandran, K. and Antony, U. 2019. The impact of the Green Revolution on indigenous crops of India. J. Ethnic Foods. 6(1): 1-10.
[9]. Gangadhar, K. and Vineeth, H.T., Exploring the untapped potential of millets in India's agriculture industry.

[10]. Gupta, V., Singh, A.P. and Gupta, N. 2022. Importance of pearl millet and its health benefits. Just Agric Multidisc Newslett. 2(8) :1-3.
[11]. Harish, M.S., Bhuker, A. and Chauhan, B.S. 2024. Millet production, challenges, and opportunities in the Asia-pacific region: a comprehensive review. Frontiers in Sustainable Food Systems. 8: 1-16.
[12]. Karuppasamy, P. 2015. Overview on millets. Trends in Biosciences. 8(13: 3269-3273.Kumar, S.M., Lad, Y.A., Mahera, A.B. 2022. Trend Analysis of Area, Production and Productivity of Minor Millets in India. An Int. J. 14(2):14-17.
[13]. Meena, R.P., Joshi, D., Bisht, J.K. and Kant, L. 2021. Global scenario of millets cultivation. Millets and millet tech : 33-50.
[14]. Mishra, P., Prakash, H.G., Devi, S., Sonkar, S., Yadav, S., Singh, C.H. and Singh, R.D.2021. Nutritional quality of millets and their value added products with the potential health benefits: A review. Int. J. Current Microbiology and Applied Sciences. 10(10): 2319- 7706.
[15]. Nagaraj, N., Basavaraj, G., Rao, P.P. and Bantilan, C. 2012. Future outlook and optionsfor target crops: the sorghum and pearl millet economy of India.
[16]. Naorem, A.k., Saritha, M., Kumar, S., Panwar, N.R., Meena, K.K., Patel, A., Doodhawal, K., Jaajpera, T., and Ram, B. 2023. Pearl Millet (Pennisetum glaucum L.) Research in India: A scientometric journey through the last two decades (2000-2022). Annals of Arid Zone. 62(1): 1-17.
[17]. Kaur, G., Kumari, L. and Kumar, P. 2021. A technical review report on Millets as nutri-cereals of India. Int. J. Advance Engineering and Manag. 3(5) :1512-1523.
[18]. Parthasarathy Rao, P. and Basavaraj, G. 2015. Status and prospects of millet utilization in India and global scenario.
[19]. Paschapur, A.U., Joshi, D., Mishra, K.K., Kant, L., Kumar, V. and Kumar, A. 2021. Millets for life: a brief introduction. Millets and millet tech. 1-32.
[20]. Rao, B.D., Bhandari, R. and Tonapi, V.A., 2021. White Paper on Millets–A Policy Noteon Mainstreaming Millets for Nutrition Security.
[21]. Saini, S., Saxena, S., Samtiya, M., Puniya, M. and Dhewa, T. 2021. Potential of underutilized millets as Nutri-cereal: an overview. J. Food Sci.and Tech.: 1-13.
[22]. Saleh, A.S., Zhang, Q., Chen, J. and Shen, Q. 2013. Millet grains: nutritional quality, processing, and potential health benefits. Comprehensive reviews in food sci. and food safety. 12(3): 281-295.
[23]. Sendhil, R., Joseph, J., Akhilraj, M., Devi, T.S. and Swaminathan, N. 2023. 04. Statusof millets in India: trends and prospects. Sensitizing the Millet Farming, Consumption and Nutritional security: 15-25.
[24]. Sendhil, R., Joseph, J., Akhilraj, M., Mohapatra, S., Umamageswari, M., Devi, T.S., Agbugba, I.K., Swaminathan, N. and Pouchepparadjou, A. Global Status of Millets Ecosystem– Trends, Research Progress and Way Forward.
[25]. Shifiona, T.K., Dongyang, W., and Zhiguan, H. 2016. Analysis of Namibian Main Grain Crops Annual Production, Consumption and trade- Maize and Pearl millet. J. Agrl. Sci. 8(3):70-71.
[26]. Shukla, P. and Bhise, S. 2023. Mighty Millets: Bespoke for Multi Nutrients. Current J. Applied Sci. and Tech. 42(32): 54-62. 69
[27]. Singh, P., Arora, K., Kumar, S., Gohain, N., and Sharma, R.K. 2023. Indian millets trade potential-cum-performance: Economic perspective. Indian J. Agrl. Sciences. 93(2):200-204.
[28]. Sivaramane, N., Srinivastava, S.K., Nayak, S.H., Kumar, B.G., Kumar, S. and Meena, P.C. 2023. The millet movement: investigating production and consumption trends in India. Sensitizing the millet farming, consumption and nutritional security: 36-47.
[29]. Sivaramane, N., Srinivastava, S.K., Nayak, S.H., Kumar, B.G., Kumar, S. and Meena,Sujith, S., Sahoo, S., Dheeraj, C., Hemanth, M.S., Saha, S., Sarkar, A. and Niharika, N. 2023. Millet a Nutri-cereal: Nutritional Value, Health Benefits and Value Addition in Dairy Products. In Biological Forum–An Int.J. (Research Trend). 15(5): 1008-1017.
[30]. Sukumaran Sreekala, A.D., Anbukkani, P., Singh, A., Dayakar Rao, B. and Jha, G.K. 2023. Millet production and consumption in India: where do we stand and where do we go. National Academy Sci. Letters. 46(1):65-70.