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Role Of Mass Media In Promoting Millets For Nutritional Security And Sustainable Agriculture: A Study With Special Reference To Bihar

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ABSTRACT

Millets, also known as Nutri-cereals, are extremely nutrient-dense and high-energy food crops that have been domesticated and grown for over 10,000 years. Usually, these crops are cultivated on marginal and degraded land with low soil fertility, especially low nitrogen content, and little rainfall. Finger millet, pearl millet, foxtail millet, barnyard millet, proso millet, kodo millet, and tiny millet are the main varieties of millets grown world wide. Millet output in India peaked in the 1980s, but since then, it has steadily decreased as a result of a major decrease in the area under cultivation, which was mostly caused by the domination of wheat and rice. Because millets are strong in dietary fiber, antioxidants, minerals, phytochemicals, polyphenols, and proteins, they are very helpful in reducing a number of diseases linked to certain lifestyle choices.

Due to their critical role in maintaining nutritional security and tackling new health issues, millets have drawn more attention from food scientists in recent years. Appropriate and effective processing methods can further improve their nutritional quality. Effective government policies that acknowledge the significance of millets in attaining nutritional security and encourage their reintegration into sustainable and climate-resilient agricultural systems are desperately needed, given their many health and environmental advantages.

Keywords-Millets Nutri-Cereals Mass Media Nutritional Security Agricultural Communication

INTRODUCTION

For thousands of years, millets have been grown for food and fodder, making them one of the oldest domesticated crops in the world. The French word "mille," which means "thousand," is where the word "millet" originates, signifying the many tiny grains that make up a single unit. The majority of these crops are cultivated on marginal and degraded land that has low soil fertility, little nutrient availability, and semi-arid weather with little rainfall. Millets give very steady yields even in challenging weather conditions, making them an essential source of food security, especially in areas vulnerable to poverty.

Millets are categorized as C4 plants because of their outstanding ability to produce dry matter, short growth time, and high photosynthetic efficiency. They are remarkably resilient to heat, drought, and unfavorable soil conditions, such as salty and acidic soils. Because of these qualities, millets are an excellent choice for mitigating the effects of climate change and creating agricultural systems that are robust to it.

With an annual production of about 12 million tonnes, India is one of the top producers of millets. A growing trend toward more sustainable and healthful food systems is driving up demand for millets worldwide. Millets are crucial for preventing lifestyle illnesses and guaranteeing nutritional security since they are high in dietary fiber, antioxidants, minerals, phytochemicals, and proteins. Due to their high nutritional value, millets provide a feasible solution to micronutrient deficiencies, sometimes known as "hidden hunger," which is still a major problem in areas like Bihar and Odisha.

Prior to the Green Revolution, millets were a staple diet in India. However, millet production and consumption decreased as a result of state support for wheat and rice. Due to growing health consciousness and environmental concerns, millets have received more attention in recent years. Organizations like the Indian Council of Agricultural Research and its ICAR-Indian Institute of Millets unit Through value addition, research, and the creation of millet-based goods, millets have been promoted. To improve the nutritional value of millets, a number of processing methods have been used, including sprouting, fermentation, fortification, and biofortification. These techniques enhance the bioavailability of nutrients and improve health results.

In this regard, mass media has become a potent instrument for spreading knowledge, raising awareness, and changing consumer eating habits. Information about the nutritional and environmental advantages of millets is being widely disseminated through print, radio, television, and digital media. Mass media is essential for encouraging millet use and supporting government programs meant to achieve food and nutritional security, especially in regions like Bihar where awareness levels are relatively low.

PRODUCTION OF MILLETS IN THE WORLD

Globally grown, millets are essential for maintaining food and nutritional security, especially in underdeveloped areas. Global millet production was anticipated by the US Department of Agriculture to be around 30.80 million metric tonnes in 2023–2024, which is a modest decrease from prior years. Over the past ten years, millet production has stayed comparatively steady despite this slight decline, demonstrating the crop's adaptability to climate change.

Nearly 97% of the world's millet is produced in Asia and Africa, where the majority of the crop is grown. Due to their minimal water requirements and excellent resistance to drought and poor soil conditions, millets are chosen in these arid and semi-arid areas. Pearl millet and sorghum are the most widely produced varieties worldwide. India is the world's top producer of millets, accounting for around 40% of global production. Niger, China, Nigeria, and Mali are among the nations that follow it. These nations' domination emphasizes the value of millets in areas with difficult climates and problems with food security.

Table 1. Production of millets in World**Global Millet Production and Consumption (2023–2024)**

Country	Production 2023–24 (000 MT)	Year-on-Year Change (%)	Global Share (%)
India	12,200	–9.7	39.7
Niger	3,400	–7.0	11.0
China	2,700	0.0	8.8
Nigeria	2,000	–1.5	6.5
Mali	1,800	–1.8	5.8
Sudan	1,600	–4.5	5.2
Ethiopia	1,100	+16.8	3.6
Burkina Faso	1,000	+10.1	3.2
Senegal	1,000	–8.8	3.2
Chad	700	+0.9	2.3
Others	3,302	+7.8	10.7
Total	30,802	–4.1	100

Source: United States Department of Agriculture (2024) – Millet Production Data
ICAR-Indian Institute of Millets Research (2024) – Global COE on Millets Report

Table 1 shows that India is the leading producer of millets, accounting for 39.7% of global production, followed by Niger and China. Despite its leading position, India experienced a decline of 9.7% in production during 2023–24. African countries such as Niger, Nigeria, Mali, and Sudan collectively contribute a substantial share, highlighting the importance of millets in drought-prone regions. The overall global production declined by 4.1%, indicating the impact of climatic variability and changing agricultural patterns.

PRODUCTION OF MILLETS IN INDIA

India is the largest millet-producing nation in the world and also one of the largest contributors to global millet production. Over 20 different Indian states cultivate millets, with Rajasthan, Maharashtra, Karnataka, Andhra Pradesh, Tamil Nadu, Telangana, Gujarat, Madhya Pradesh, and Uttar Pradesh accounting for most of the cultivation of the millets. India ranks highest in the production of different kinds of millets such as barnyard millets, kodo millets, tiny millets, finger millets, and pearl millets in the world and contributes almost 40% to the world's production of millets. New findings from the government reveal that variations in climatic conditions, cultivation areas, and policy support have resulted in fluctuations in millet production in India.

Table 2 shows the millets produced by Indian states between 2020–2021 and 2024–2025. According to the data, millet production is constantly dominated by states like Maharashtra, Karnataka, and Rajasthan, with other states contributing various shares over time. Variations in agricultural practices and environmental conditions are reflected in the overall production at the national level.

Table 2 Production of millets in india**State-wise Millet Production in India (Thousand Tonnes)**

State	2020–21	2021–22	2022–23	2023–24	2024–25*
Andhra Pradesh	411.39	259.61	283.78	328.56	290.61
Bihar	1.31	1.54	0.98	0.80	1.37
Chhattisgarh	2.73	0.91	1.10	0.43	0.48
Gujarat	57.43	57.55	46.12	66.13	45.72
Haryana	16.42	12.33	14.12	10.14	9.78
Jharkhand	1.23	1.28	0.76	1.07	3.24
Karnataka	903.53	731.48	681.68	942.78	815.65
Madhya Pradesh	217.00	236.04	169.46	162.86	181.35
Maharashtra	1746.61	1558.00	1312.25	1775.62	1870.92
Odisha	3.47	3.86	5.58	5.58	0.65
Rajasthan	589.91	535.66	567.18	451.34	542.63
Tamil Nadu	427.22	362.04	292.81	286.90	379.69
Telangana	155.69	117.07	119.54	238.73	287.81
Uttar Pradesh	274.57	269.84	315.41	462.40	446.49
Others	3.56	3.36	3.41	4.13	3.53
All India	4812.07	4150.57	3814.18	4737.47	4879.92

Source:Parliament of India (2025).

Unstarred Question No. AU335 – State-wise Millet Production Data.

Retrieved from: https://sansad.in/getFile/loksabhaquestions/annex/185/AU335_11GYcE.pdf

The table demonstrates that while production trends in other states fluctuate over time, millet production in India is dominated by a few significant states, including Maharashtra, Karnataka, and Rajasthan. Variations during the studied time are also reflected in the total national production.

PRODUCTION OF MILLETS IN BIHAR

The current production of millets in Bihar is low, but it has been increasing steadily. The cultivation of millets in Bihar includes pearl millet (bajra) and small millets such as kodo, kutki, and sama and mainly takes place in drought-prone districts including Gaya, Nawada, Jamui, Aurangabad, Rohtas, and Kaimur, as per the official information received through the Right to Information Act, 2005 from the Directorate of Millets Development, Government of India.

As per the RTI figures, the cultivation area of millets in Bihar has remained very low and has fluctuated between 0.07 and 0.10 lakh hectares during 2020–2021 to 2024–2025. Similarly, the yields have remained unchanged between 960–1000 kg per hectare and production has remained relatively low with fluctuations of 0.07 to 0.10 lakh tonnes.

As per the figures, there has been no significant growth in the production of millets in Bihar over time due to low adoption and specific concentration. However, the presence of various programs by the government including National Food Security Mission (Nutri-Cereals) and celebrations during International Year of Millets (2023) indicate an increased government interest in the production of millets in the state.

Table 3- PRODUCTION OF MILLETS IN BIHAR

Area, Production and Yield of Millets in Bihar

Year	Area (Lakh Hectares)	Production (Lakh Tonnes)	Yield (kg/ha)
2020–21	0.10	0.10	993
2021–22	0.08	0.09	1004
2022–23	0.07	0.07	1003
2023–24	0.07	0.07	962
2024–25*	0.09	0.09	974

Source: Directorate of Millets Development, Government of India (2025).

Information provided under RTI Act, 2005 regarding millet cultivation in Bihar

The table indicates that millet cultivation in Bihar has remained relatively stagnant in terms of area and production over the study period, while yield levels have remained fairly stable.

NUTRITIONAL STATUS OF MILLETS

Food and nutrition security is achieved when there is enough access to good quality food, which meets people's dietary needs and food preferences to enable them to lead a physically active and healthy life. This concept by the World Health Organization puts emphasis on access not only to food but also to health facilities, cleanliness, and proper care. For nutrition security, there should be a balance between food, health, and care.

Millets have always been cultivated and used in meals from the ancient periods of time and played a significant part in traditional eating habits in different parts of the world. The millets are native to Africa, but later on became known and used in Asia and some other parts of the world. The millets are usually split into minor and big millets. Minor millets include finger millet, kodo millet, barnyard millet, proso millet, foxtail millet, and small millets. The major millets include sorghum and pearl millets. Millets have been widely used in whole grains, as flour and some semi-processed foods and served as a food, feed and fodder.

Millets are valued because of their rich content of dietary fibers, proteins, vitamins and other minerals. They contain a high level of non-starch polysaccharides that work as prebiotics and are included in the dietary fibers. These factors help improve digestion through fermentation that produces short chain fatty acids and growth of beneficial microflora, such as Lactobacillus and Bifidobacteria. The millets are also healthy for maintaining blood glucose levels because of containing slowly digestible starch.

Millets form a healthy and nutritious nutritional choice in the light of present-day living where lifestyles and sedentariness go hand in hand with various diseases. Millets contain high quantities of manganese, magnesium, and phosphorus that play an important role in cell formation and metabolism of energy. Although other types of millets contain high quantities of iron and phosphorus, finger millet is rich in calcium (about 300–350 mg per 100 grams).

The protein content in millets ranges from 7 to 12 percent and fat content from 1 to 5 percent. Millets contain high amounts of dietary fiber and micronutrients compared to fine cereals such as wheat and rice. Since malnutrition problems are prevalent in rural communities and poor families, millets can be especially helpful to such communities. Taking everything into account, millets are crucial for increasing nutritional security since they provide a balance of macronutrients and micronutrients that contribute to better health and nutrition.

Table 4 NUTRITIONAL STATUS OF MILLETS**Nutritional Benefits of Millets (per 100 g)**

Crops	Protein (g)	Fiber (g)	Minerals (g)	Iron (mg)	Calcium (mg)
Sorghum	10.0	4.0	1.6	2.6	54
Pearl Millet	10.6	1.3	2.3	16.9	38
Finger Millet	7.3	3.6	2.7	3.9	344
Foxtail Millet	12.3	8.0	3.3	2.8	31
Proso Millet	12.5	2.2	1.9	0.8	14
Kodo Millet	8.3	9.0	2.6	0.5	27
Little Millet	7.7	7.6	1.5	9.3	17
Barnyard Millet	11.2	10.1	4.4	15.2	11
Teff	13.0	8.0	0.85	7.6	180
Fonio	11.0	11.3	5.31	84.8	18
Brown Top Millet	11.5	12.5	4.2	0.65	0.01

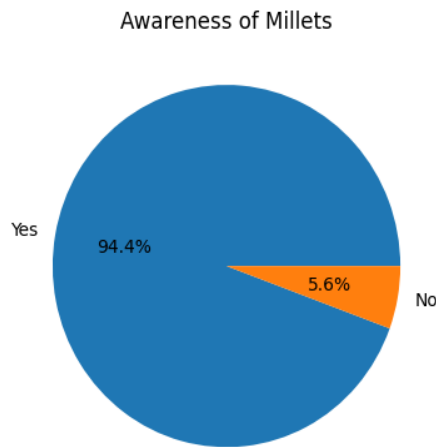
Source:ICAR-Indian Institute of Millets Research (2020)..

The rich nutritional makeup of many millets is seen in Table 4. Millets are clearly a great source of dietary fiber, protein, and other minerals. The highest calcium level is found in finger millet, whereas the highest iron content is found in pearl millet and barnyard millet. In a similar vein, brown top millet, kodo millet, and foxtail millet all have significant dietary fiber content, which is good for digestive health. Overall, the chart shows that millets can significantly improve dietary quality and correct micronutrient shortages and are more nutritious than many traditional cereals.

ROLE OF MASS MEDIA IN PROMOTING MILLETS**Awareness Regarding Millets-****Table 5.1: Awareness of Millets among Respondents**

Response	Frequency	Percentage
Yes	118	94.4%
No	7	5.6%
Total	125	100%

Source: Primary Data collected through Google Form Survey, 2026.



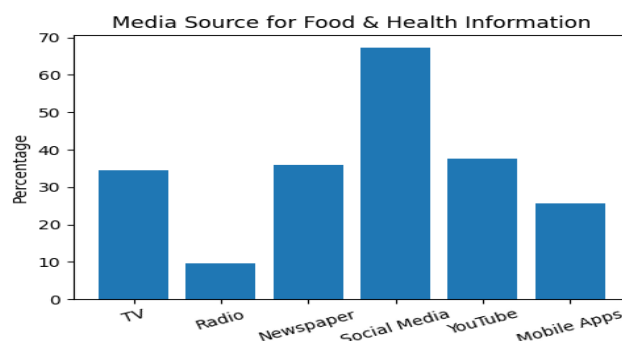
The results of the poll show that respondents in Bihar had a high degree of knowledge of millets. The nutritional and health benefits of millets including Bajra, Ragi, Jowar, Kodo, and Kutki are becoming more well acknowledged. Just 5.6% of the 126 respondents said they were unfamiliar with millets, compared to 94.4% who said they were. The results indicate that government campaigns, media promotion, health awareness initiatives, and internet communication platforms have all contributed to a notable growth in millets' awareness in recent years. Information about the nutritional worth and environmental advantages of millets has been widely disseminated through television, newspapers, social media, and YouTube. The public's evolving views on sustainable agriculture and good eating practices are reflected in the rising awareness of millets. Nevertheless, regular millet consumption is still relatively low among respondents despite high knowledge levels, suggesting the need for more successful behavioral communication and awareness campaigns.

Sources of Food and Health-related Information-

Table 5.2:Media Sources for Food and Health-related Information

Media Source	Percentage
TV	35%
Radio	10%
Newspaper	37%
Social Media	68%
YouTube	38%
Mobile Apps	25%

Source: Primary Data collected through Google Form Survey, 2026.



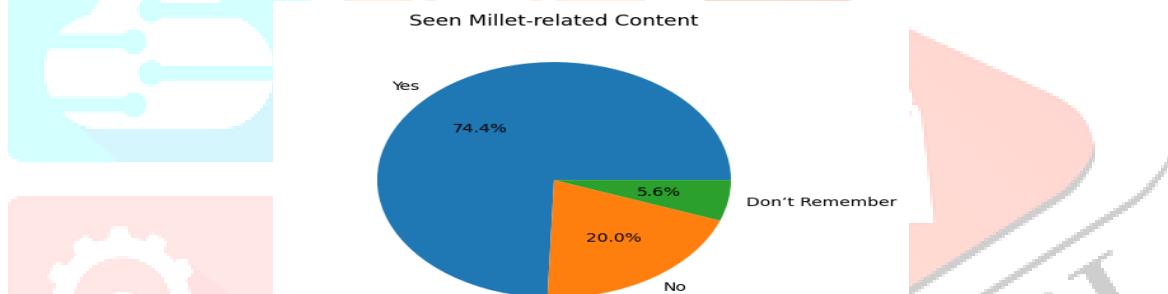
The results of the poll show that participants acquire information on food and health from a variety of media outlets. The most popular source among respondents was social media, which was followed by YouTube, newspapers, and television. The public's understanding of nutritional practices and good eating habits is being influenced more and more by digital platforms. Access to food-related information has been significantly improved by the increasing usage of cellphones and internet services. The results imply that digital communication and social media are important in raising knowledge of millets and their health advantages. Newspapers and television are examples of traditional media that still aid in the spread of knowledge. These findings demonstrate how crucial mass media is in encouraging good eating habits and nutritional security in Bihar.

Exposure to Millet-related Media Content-

Table 5.3:Exposure to Millet-related Media Content

Response	Frequency	Percentage
Yes	93	74.4%
No	25	20.0%
Don't Remember	7	5.6%
Total	125	100%

Source: Primary Data collected through Google Form Survey, 2026.



As per the outcomes of the survey, it can be concluded that most of the people have come across some information regarding millets through different media. About 74.4% people said that they were aware of some information related to millets, while the rest were not. As the popularity of millets has been increasing in television channels, newspaper articles, and other social media and digital campaigns, the awareness level of the population regarding the nutritious and environment-friendly qualities of millets has been growing. Perception and consumption of consumers largely depend on the media. Thus, the people of Bihar are gradually becoming more aware of millets due to the influence of media.

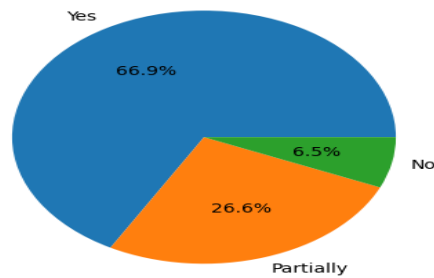
Effectiveness of Mass Media in Millet Promotion-

Table 5.4: Effectiveness of Mass Media in Millet Promotion

Response	Frequency	Percentage
Yes	84	66.9%
Partially	33	26.6%
No	8	6.5%
Total	125	100%

Source: Primary Data collected through Google Form Survey, 2026.

Mass Media Effective for Awareness



The results of the poll indicate that respondents' awareness of millets is largely raised by the media. 26.6% of respondents said the media was only moderately effective in raising knowledge of millets, compared to 66.9% who thought it was effective. Information about the nutritional and health benefits of millets has been widely disseminated through television, newspapers, social media, YouTube, and other digital channels. The public's interest in healthy eating practices has also been affected by media campaigns and web material. According to the results, mass media can be a useful communication tool for advancing sustainable agriculture and nutritional security in Bihar.

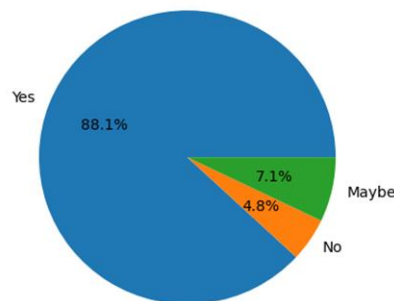
Consumer Preference toward Millet Purchase-

Table 5.5: Consumer Preference toward Millet Purchase

Response	Frequency	Percentage
Yes	110	88.1%
No	6	4.8%
Maybe	9	7.1%
Total	125	100%

Source: Primary Data collected through Google Form Survey, 2026

Increase Consumption if Proper Information Provided



According to the study, respondents in Bihar have a favorable attitude about buying millet. Only a small percentage of respondents gave unfavorable answers, with 95.2% saying they would prefer to purchase millets if they were readily accessible at fair rates. The results show that millet consumption behavior is significantly influenced by availability and affordability. Consumer adoption of millet-based products may increase with improved market access and effective marketing tactics. The findings also imply that media promotion and awareness efforts can play a major role in boosting consumer demand for millets and promoting sustainable eating habits.

PROMOTIONAL STRATEGIES FOR MILLETS

The major grains such as wheat, rice, and maize have been a priority in the food policy in India while the traditional small millets, which carry ecological and cultural importance, have been ignored. The emphasis on high yielding major grain crops during the Green Revolution saw an increase in their production, but the same also led to decreased cultivation of millets and other minor grains.

The traditional cereal based production system is under threat in today's context of climate change characterized by temperature increases, erratic rain patterns, and increasing levels of atmospheric CO₂. Scientific projections reveal that there will be a negative impact on the production of staple crops due to increasing temperature levels and reduced rainfall. In this respect, the low water requirement, adaptability to marginal soil types, and drought tolerance have made millets a climate resilient crop. Both public and private sectors have intensified their efforts in marketing millets through value addition and diversification into food and non-food products after realizing these advantages. However, government intervention is equally important in formulating and implementing successful marketing strategies. Prior to the recommendation of climate smart agricultural systems, these strategies need to factor in the socio-economic realities of the region.

High-yielding and climate-resilient millet varieties, as well as contemporary agricultural instruments like crop sensors, decision-support systems, and zero-tillage equipment, should be provided to farmers in order to increase millet production. In order to encourage farmers to cultivate millet, it is also crucial to provide fair prices through the announcement of the Minimum Support Price (MSP). Additionally, water management is crucial, particularly in dry and semi-arid areas. Water-use efficiency can be greatly increased by using methods like drip irrigation and rainwater collection. Finding appropriate millet varieties based on regional preferences, agronomic performance, and nutritional value can also be aided by participatory varietal selection techniques. Another important aspect of millet marketing is information dissemination. Real-time agro-advisory services should be made available to farmers via mobile-based communication technologies, radio, television, and newspapers. In a similar vein, print and electronic media may educate consumers about the health and nutritional advantages of millets, boosting demand and market potential.

The expanding market for nutraceuticals offers more chances to promote millet. A favorable environment for millet-based goods has been established by growing health and nutrition awareness as well as the growing demand for functional foods. The nutritional profile of millets can be further improved by biotechnology and biofortification advancements, which will help create "smart" crops that address chronic health problems and micronutrient deficits.

Because of its high calcium and vitamin content, finger millet has demonstrated considerable promise in the nutraceutical industry. But despite their enormous potential, little is known about the agronomic traits, nutritional advantages, and market integration of millets. Therefore, mainstreaming millets into sustainable food systems requires more funding for research, policy assistance, and awareness-raising.

CONCLUSION

Millet's superior nutritional value, climate adaptability, and health-promoting qualities set them apart from major staple grains. Because of these qualities, millets are positioned as prospective "future crops" that can address issues related to food and nutritional security in the face of changing climatic conditions. However, the public sector must make deliberate, long-term investments in interdisciplinary research and development projects in order to fully fulfill this promise via initiatives like the Initiative for Nutritional Security via Intensive Millet Promotion (INSIMP) and the promotion of nutraceutical-

based strategies, the Indian government has already made significant progress in this area. Due to a number of factors, including shifting climatic conditions, a lack of improved high-yielding varieties that can be mechanized, insufficient policy support, exclusion from the Public Distribution System (PDS), and inadequate minimum support prices, the area under millet cultivation has not increased significantly despite these efforts.

To create climate-resilient cropping systems and enhance the whole environment for millet production and consumption, researchers, farmers, legislators, and rural agro-service providers must work together more effectively. By raising awareness, providing current agricultural information, and highlighting the nutritional and financial advantages of millets for both farmers and consumers, the mass media may play a critical part in this process.

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