

Nutri-Cereals for a Healthy Economy

Benjamin Thomas Ipe and K J S Satyasai¹

As the world is gearing up to celebrate the International Year of Millets 2023², thanks to the initiative of Government of India, India has come a full circle where millets are competing with rice and wheat in the consumer's basket. Over last seven decades millets (known as coarse cereals) lost their area to rice and wheat and were considered inferior goods as their consumption declined with increase in consumer's income. With proven nutraceutical benefits, millets, rightly renamed 'nutri-cereals'³, now turned superior grains as higher income groups of the society are substituting them for rice and wheat. Several value-added products are coming into the market to enhance acceptability of millets. They are oldest known foods to mankind cultivated since 8000 B.C. This paper discusses the millet economy in brief.

1. What are Nutri-Cereals?

Millets or Nutri-cereals are small-seeded crops and are divided into three broad categories viz. Major (Sorghum aka Jowar, Pearl millet aka Bajra, and Finger millet aka Ragi), Minor (Foxtail, Kodo, Banyard, Little and Proso millets), and Pseudo (Amaranth and Buckwheat)⁴. Millets are termed nutri-cereals as they are highly nutritious and can contribute substantially towards food and nutritional security. India is the largest producer of millets in the world with 41% of global production. India, Niger, China, Nigeria and Mali account for 73% of millets produced. Top five countries in area include India, Niger, Sudan, Mali and Nigeria. India ranks 31st across the world in yield per hectare.

2. Three-fold Benefits of Nutri-Cereals

Millets have three-pronged benefits and are beneficial to farmers, consumers and the planet as a whole.

2.1 For Farmers-as Risk Mitigation Against Droughts

It is a fact that even after realising the full irrigation potential, about half of the net sown area in India will continue to remain rainfed⁵. This calls for a shift towards low water intensive crops like millets, which can grow on shallow, low fertile soils with a pH of soil ranging from acidic 4.5 to basic soils with pH of 8.0. They can survive droughts and thus, can be used as a good risk mitigation strategy. They have alternative uses as food, fodder and fuel, which is an added advantage.

2.2 For Consumers-the Nutrition Angle

India houses the largest undernourished population in the world. According to the Global Hunger Index, 2021 India is ranked 101st out of 116 countries with a score of 27.5 depicting serious levels of hunger. Millets contain 7-12%

protein, 2-5% fat, 65-75% carbohydrates and 15-20% dietary fibre and are also a natural source of iron, zinc, calcium and other nutrients that are essential for tackling the problem of malnutrition and anaemia in India. Millets can also help in several lifestyle diseases like obesity, diabetes, cardiovascular diseases and cancer due to the presence of slow digestible starch (SDS) which prolongs digestion and absorption of carbohydrates⁶.

2.3 For the Planet-for Combating Climate Change

Millets have a low overall water requirement, that too, over a limited growing period of 60 to 90 days. For example, pearl millet and proso millet require a rain-fall of 20 cm vs 120- 140 cm for rice. Being C4 crops, millets can absorb more carbon dioxide from the atmosphere and convert it to oxygen, have high water and input use efficiency, and hence are environment friendly. Millets can, thus, contribute towards mitigating climate change by phasing out climatic uncertainties and reducing atmospheric carbon dioxide.

3. Nutri-Cereals: What the Data Tells Us

3.1 All India Area, Production and Exports

The all-India area under production of nutri-cereals has been on a continuous decline since the early 1970s. The onset of the green revolution with its focus on rice and wheat could be one major reason for this.

Production of nutri-cereals while increasing, cannot match with that of wheat and rice. Expansion of area under nutri-cereals would remain a challenge due to competing demands for land (Figure 1A). Figure 1B captures 15-year moving CAGR and instability (measured in terms of detrended coefficient of variation). Growth in production of nutri-cereals has remained stagnant over time while wheat

¹ AM and CGM, DEAR, NABARD, respectively

² The United Nations General Assembly (UNGA) resolution declared 2023 as International Year of Millets. Government of India spearheaded the campaign to create domestic and global demand and to provide nutritious food to the people.

³ <https://egazette.nic.in/WriteReadData/2018/184777.pdf>

⁴ Guidance Note 12/2019, Food Safety and Standards Authority of India

⁵ (2012), Study Report No. 4 – Prioritization of Rainfed Areas in India, National Rainfed Area Authority, Government of India

⁶ NFHS 5 India Report 2022 shows that 59.1% of women are anaemic, 35.5% of children are stunted, 32.1% of children are underweight, 24.0% and 22.9% of women and men are obese, and 8.9% of the population is diabetic.

Figure 1A: Area and Production Trends

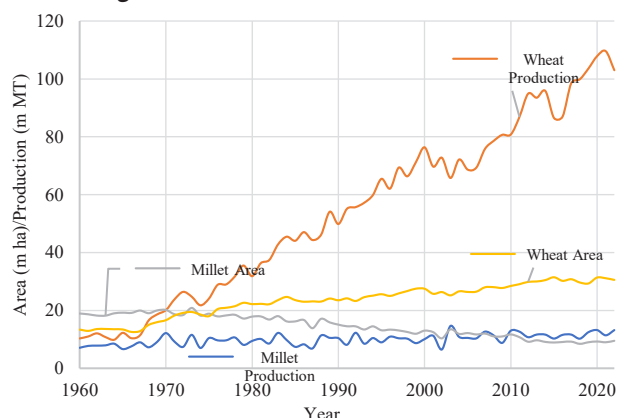
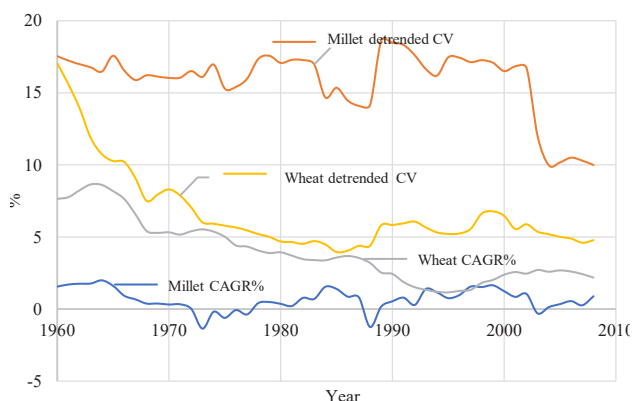


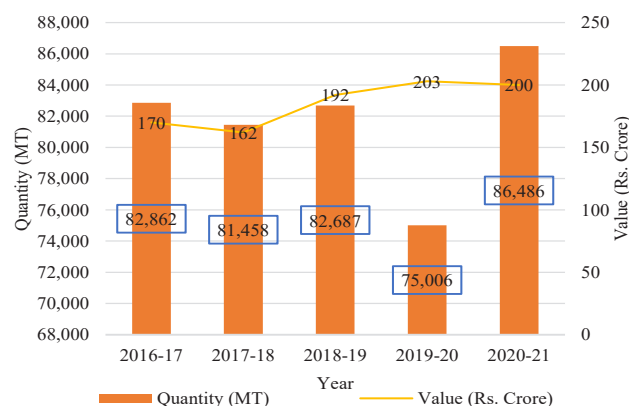
Figure 1B: Growth and Instability - 15-year Moving Period Trend



Source: Agriculture Statistics at a Glance, various issues.

production grew at higher rates in successive periods. Instability in wheat production has declined over time especially faster during initial decades. Instability in nutri-cereals production remained high even in recent period. Increase in productivity of millets is the only alternative,

Figure 2: Exports of Nutri-Cereals



Source: Agriculture Statistics at a Glance, various issues.

which is not possible in short run with the existing investment in research.

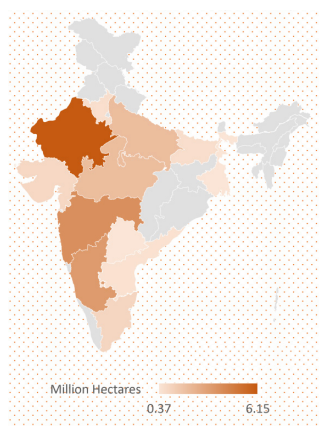
Exports of nutri-cereals (Figure 2) although picked up since 2018 is still not up to the mark as is seen from the fact that though India is the largest producer of nutri-cereals in the world but is only the fifth largest exporter of the same.⁷ Export is a very important tool for demand creation. India needs to tap into the millet export market. Corporates need to come forward for brand development of ready to eat and ready to cook products.

3.2 State-wise Area, Production and Yield

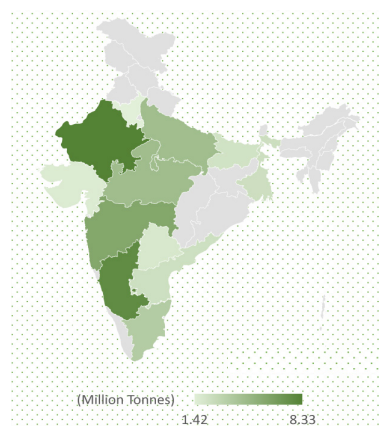
Among the states in India, Rajasthan has the maximum area under cultivation (6.15 million hectares) for millets and is the largest producer (8.33 million tonnes) as well. Telangana has the highest yield (6563 kg/hectare) for millets (Figure 3). West Bengal has seen the highest increase in area under cultivation as well as production between 2014-15

Figure 3: State-wise Area, Production and Yield of Nutri-cereals

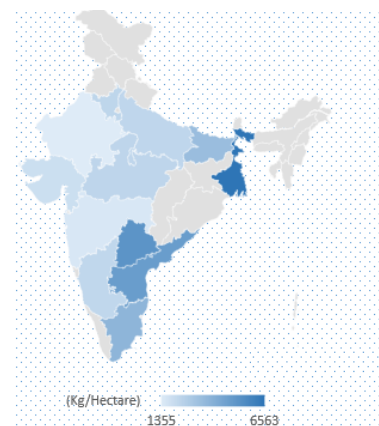
Area under Nutri-cereals (2020-21)



Production of Nutri-cereals (2020-21)



Yield of Nutri-cereals (2020-21)



Source: Agriculture Statistics at a Glance, 2021, Ministry of Agriculture and Farmers Welfare, Government of India.

⁷ Source: <https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1796514>

Table 1: CAGR (%) of Area, Production and Yield in Major Millet Producing States (2014-15 to 2020-21)

State	Area	Production	Yield
Rajasthan	0.44	1.81	1.37
Karnataka	0.49	1.79	1.31
Maharashtra	-5.38	3.09	8.91
Madhya Pradesh	1.95	6.74	4.79
Uttar Pradesh	0.08	4.28	4.14
Tamil Nadu	2.37	2.63	0.29
West Bengal	13.84	23.90	8.24
Andhra Pradesh	-0.64	0.99	1.51
Bihar	-1.42	-0.86	0.66
Telangana	-11.69	-3.40	9.25
Gujarat	-2.20	0.89	3.12
Haryana	4.72	9.58	4.88

Source: Authors' calculation using data from Agriculture Statistics at a Glance (2014-15 to 2020-21), Ministry of Agriculture and Farmers Welfare, Government of India

and 2020-21 while Telangana has seen the greatest increase in yield (Table 1). Maharashtra during the same period witnessed a 5.3% decline in area under millet cultivation but interestingly, the state's production has increased by 3.09%. A look at the state-wise production figures of nutri-cereals in 2020-21 shows that close to 70% of the production in the country is concentrated in the six states of Rajasthan, Karnataka, Maharashtra, Madhya Pradesh, Uttar Pradesh and Tamil Nadu⁸. Their production needs to be encouraged in other states as well. Moreover, cultivation on fallow and wastelands could be experimented upon in order to avoid competition with high remuneration crops as well as provide risk mitigation to the farmer in the event of failure to the main crop.

3.3 Consumption

The per capita consumption of millets fell drastically from 32.9 kg to 4.2 kg from 1962 to 2010⁹. The demand-side factors responsible include: (i) increasing urbanization and per capita incomes that changed consumer tastes and preferences, (ii) poor social status and inconvenience to prepare millet dishes, (iii) lower shelf life of milled grains, and, (iv) primacy of rice and wheat in the PDS. Supply-side factors include: (i) lack of industrial demand for value-added millet products discourages farmers from cultivating millets, (ii) low profitability, (iii) the Green Revolution has favoured the production of rice and wheat, including output price incentives and input subsidies, (iv) lack of access to quality seeds, (v) inadequate infrastructure such as processing technologies, and unique milling equipment to address the total value chain, (vi) weak value chain, including inadequate primary processing at the village level.¹⁰

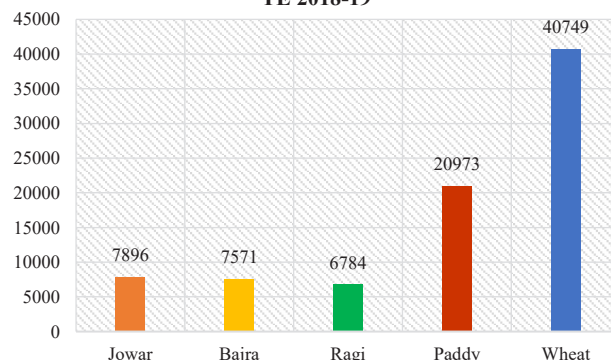
⁸ Agriculture Statistics at a Glance, 2021.

⁹ Kane-Potaka J, Anitha S, Tsusaka TW, Botha R, Budumuru M, Upadhyay S, Kumar P, Mallesh K, Hunasgi R, Jalagam AK and Nedumaran S (2021) Assessing Millets and Sorghum Consumption Behavior in Urban India: A Large-Scale Survey. Front. Sustain. Food Syst. 5:680777. doi: 10.3389/fsufs.2021.680777 <https://www.frontiersin.org/articles/10.3389/fsufs.2021.680777/full> accessed on 19 Sept 2022.

¹⁰ Neelam Patel and Saloni Bhutani, 2022. Increasing production and consumption of millets. <https://www.hindustantimes.com/ht-insight/public-health/increasing-production-and-consumption-of-millets-101658992530337.html>

Figure 4: Gross Returns of Major Millets vs Rice and Wheat

Gross Returns over CoC A2 + FL (Rs./Hectare); TE 2018-19



Source: CACP Kharif and Rabi Marketing Season Reports, 2021-22.

3.4 Profitability of Major Millets vs Rice and Wheat

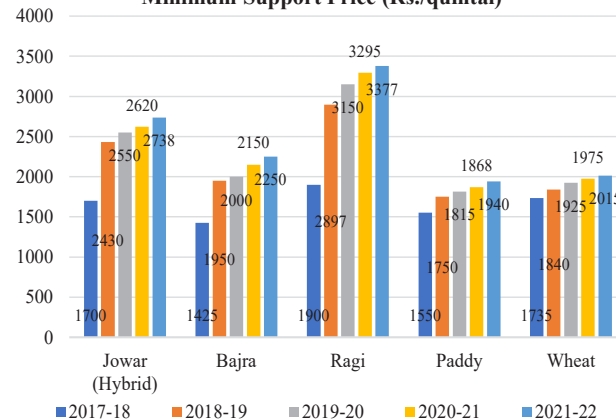
Comparing the profitability of major millets such as jowar, bajra and ragi with rice and wheat shows that millets have a lot of catching up to do. The gross returns over actual paid out costs plus imputed value of family labour (A2+FL) for rice and wheat are three to seven times on average more than that for jowar, bajra and ragi (Figure 4). Proper strategies are required for demand creation which is a key aspect in increasing price. Value addition will have an important role to play in this regard.

3.5 Minimum Support Prices (MSP) of Major Millets vs Rice and Wheat

Since 2017-18, the MSP of Jowar, Bajra and Ragi has steadily been increasing (Figure 5). Ragi saw the maximum increase

Figure 5: MSP of Major Millets vs Rice and Wheat

Minimum Support Price (Rs./quintal)



Source: Ministry of Agriculture and Farmers' Welfare, Government of India.

in MSP (78%) increasing from Rs.1900 per quintal in 2017-18 to Rs.3377 per quintal in 2021-22. During the corresponding period, the MSPs of Jowar and Bajra have also increased by 61% and 58%, respectively. This is a key supply side measure and may encourage farmers to bring larger areas under millet cultivation and to adopt best technologies and farm practices.

4. Recommendations

While millets are gaining popularity among consumers, the actual consumption is not increasing, and supply cannot match it if large sections start consuming millets. Hence, we need two-pronged strategies to manage supply and demand-side issues. Recently the University of Agricultural Sciences, Raichur & NABARD organized a **"Millet Conclave" on 26 and 27 August 2022 at Raichur where several important issues have been discussed.** On that occasion, the Union Finance Minister announced the "Millet Challenge" for start-ups, to be jointly organized by **Atal Innovation Mission** and the **University** of Agricultural Sciences, Raichur. A few important suggestions culled from the Conclave¹¹ and other sources have been listed below:

A. Promoting consumption

- a. Awareness campaigns involving celebrities and on the lines of those used for eggs in 1980s- '*Sunday ho ya Monday roz khao ande*'
- b. Serving millet-based food and snacks on flights and premium trains
- c. Include millets in flagship schemes of the government such as Mid-Day Meal Programme and the Integrated Child Development Services (ICDS) scheme
- d. Including millets in PDS (GoI issued guidelines and states like Karnataka implemented)
- e. Need to improve value chains and provide processing/value addition facilities so that consumers can get tasty and cheaper millet-based food. Indian Institute of Millets Research and other agencies have developed technologies for millet-based products and incubating entrepreneurs. They need to be scaled up. Ready to Eat and Ready to Cook millet products should be promoted for better acceptability among bachelors and youngsters

B. Improving the production and promoting value chains

- a. Enhancing the production base of millets
- b. Varietal improvement to enhance productivity and profitability
- c. Millet growers need to be incentivised through cash compensation and other measures
- d. Since there are several small producers in millet economy, organising them into FPOs, joining them through NRLM and SHGs is needed. There are several successful models in the field, which need scaling up. For instance, the Ramanar millets based FPO, incorporated in 2016 in Tamil Nadu, has been able to mobilise a large number of members within a short period and has increased its volume of business to over Rs.200 lakh within a period of three years. It has also made profit in all the three years and increased percentage of profits in the 4th year, 2019-20.¹² The Arogya Millets Producer Company Limited with 300 women members from 35 villages in Vizianagaram, Andhra Pradesh is another successful millets collective that aggregates, processes and markets millets products under the brand name Arogya Millets¹³
- e. Promoting millets in watershed and wadi projects of NABARD is being done and scaling up and linking to value chains is needed
- f. Special incentives for entrepreneurs /FPOs for purchase of processing machinery (the cost could be about Rs.15 lakh to Rs.30 lakh)
- g. Fiscal incentives including tax concessions along the value chains is recommended

To sum up, proper demand as well as supply side measures will pave the way for nutri-cereals to help bring sustainable evergreen revolution in resource poor region/area of the country.

¹¹ Suryakumar, P.V.S.S., Millet Conclave Raichur Karnataka <https://www.linkedin.com/pulse/millet-conclave-raichur-karnataka-suryakumar-p-v-s> accessed on 19 Sept 2022.

¹² NABARD Research Study – 25: Case Studies of FPOs in India, 2019-2021, Xavier Institute of Management, Bhubaneswar.

¹³ Showcase 4.4: Making Money Through Millets (Page 39), NABARD Annual Report 2021-22.

Chief Editor & Publisher: Dr. K.J.S. Satyasai, CGM, Department of Economic Analysis and Research (DEAR), NABARD, Head Office: Plot No. C-24, 'G' Block, Bandra-Kurla Complex, Bandra (E), Mumbai- 400051

Editorial Committee: Dr. Vinod Kumar, GM, DEAR, Dr. Ashutosh Kumar, DGM, DEAR, and Smt. Balwinder Kaur, DGM, DEAR, NABARD, Mumbai.

Disclaimer: "Rural Pulse" is the publication of the Bank. The opinions expressed in the publication are that of the authors and do not necessarily reflect those of the Bank or its subsidiaries. The contents can be reproduced with proper acknowledgement. The write-up is based on information & data procured from various sources and no responsibility is accepted for the accuracy of facts and figures. The Bank or the Research Team assumes no liability, if any, person or entity relies on views, opinions or facts & figures finding place in the document. dear@nabard.org www.nabard.org

Email: dear@nabard.org **Website:** www.nabard.org