SUSTAINABILITY CHALLENGES IN AGRICULTURE: THE CASE FOR MILLETS REVOLUTION (SHREE ANNA)

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Dr Murali Kallummal & Dr Akanksha Pratik Sonker[1]

Shree Anna got a global stage in 2023. Area still fell, returns stayed negative, and procurement flatlined. This paper asks why, how and provides some broad recommendations.

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Centre for Research on International Trade (CRIT)
Centre for WTO Studies (CWS), IIFT, New Delhi

[1] The views expressed in this paper are those of the author(s) and do not necessarily reflect the views of the Centre for WTO Studies, the Indian Institute of Foreign Trade, or the Government of India. Errors and omissions, if any, are the author's own. For any clarification, please contact muralik@iift.edu, muralikallummal@gmail.com.

Abstract

India placed millets on the global stage: the National Year of Millets in 2018 and the UN International Year of Millets in 2023, on the argument that awareness and demand creation would revive a crop that once made up roughly 40 per cent of India's cultivated grain and now accounts for about 20 per cent. This paper tests that proposition against the production, cost, procurement and trade record, and finds no revival. Area under Shree Anna fell from 350.6 lakh hectares in the 1970s to 128.7 lakh hectares in the 2020s; yields more than doubled over the same period, yet production has been essentially flat. Returns over cost C2 are negative for jowar, ragi and bajra in most major producing states across most of the period, barley being the exception because it is grown largely for industrial use. Procurement of Nutri-cereals did not rise even in the International Year of Millets, and procurement as a share of marketed surplus fell from 7.2 to 5.6 per cent. Coarse cereals account for 3.8 per cent of rural and 2.4 per cent of urban cereal consumption. The binding constraint, therefore, lies in profitability, processing capacity, and assured offtake, not in awareness.

The paper further shows that price support and exports operate on separate axes: procured grain is confined to decentralised procurement and welfare distribution within the procuring State, while exports are sourced entirely from open markets, remain under one per cent of rice export value, and move as raw grain at unit values below those realised on rice. On market access, it corrects a common assumption. Millets are named individually in Codex Group 020, in Annex I to Regulation (EC) No 396/2005 and in the 2022 expansion of US Crop Group 15-22; what is scarce is not classification but millet-specific residue data, so that the European default of 0.01 mg/kg and the United States zero-tolerance rule operate as a de facto barrier, with mycotoxins the more binding practical constraint. The effective regime confronting millets is thus stricter, not laxer, than that facing rice and wheat. India's negotiating ask should accordingly be technical rather than declaratory: JMPR sponsorship, residue trials through ICAR-IIMR, and Codex MRLs for small millets, alongside remunerative procurement, credit, and post-harvest investment at home.

Keywords: Shree Anna; millets; Nutri-cereals; minimum support price; procurement; crop diversification; dryland agriculture; food security; climate resilience.

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Part -I: Context and Policy Architecture

1. Introduction

India designated 2018 the "National Year of Millets" and pressed the case internationally; in 2021, at India's proposal and with the backing of over seventy countries, the UN General Assembly declared 2023 the "International Year of Millets." Millets were subsequently showcased at national and international events and served on menus for visiting dignitaries. The stated aim of these measures was to raise awareness, popularise the grains, and expand demand, thereby raising production and improving the livelihoods of their growers, who are largely small, marginal, and tribal-area farmers who retain much of their harvest for self-consumption. The demand that these campaigns generated, however, does not obviously reach that producer. Bajra has substantial feed-and-fodder offtake, and over half of urban millet consumption now takes the form of value-added products sold largely through e-commerce and online retail, a channel structurally disconnected from the subsistence grower (Sharma & Wardhan, 2017).

Millets were once the staple food and an indigenous crop of the people of India; however, with the introduction and expansion of the Green Revolution, there was a shift toward increasing the production and yields of superior grains like rice and wheat, especially in the context of twin droughts (1967–1968), impending food shortages, and the threat of the US withdrawing food aid to India.[2]. This was further complicated by market distortions such as price incentives and public procurement of these crops. Subsequently, these coarse cereals were relegated to cultivation on marginal lands with poor soil fertility and grown under rain-fed conditions, making them highly susceptible to production and price volatility. With the disappearance of these cereals, we also lost local seeds and traditional farming knowledge passed down through generations (Verma, 2026).

Millets are estimated to have made up around 40% of India's cultivated grains before the Green Revolution, a share that has since fallen to roughly 20%. [PIB, 2023][3] Consumption fell alongside; per-capita intake of millets and sorghum is commonly cited as declining from 32.9 kg a year in 1962 to 4.2 kg in 2010, against a near-doubling of wheat

[2] In the aftermath of the Second World War, the USA provided food aid to many developing countries like India under the Public Law-480 (PL 480) Programme or the Food for Peace Act, 1954 which could be repaid back in the recipient country's domestic currency. However, this was used as a strategic tool to further the interests of the USA by arm-twisting and securing support from the countries.

[3] Refer to https://static.pib.gov.in/WriteReadData/specificdocs/documents/2023/mar/doc2023318173501.pdf.

consumption from 27 to 52 kg over the same period. However, the 2010 figures are urban, and the comparison with a 1960s national average likely overstates the fall. (Kane Potake et al., 2021). However, this excessive reliance on wheat and rice has not only led to the degradation of natural resources (such as water) but has also induced fragility in food systems and reduced the diversity of food baskets (Nagaraj et al., 2013). It is estimated that about 60% of India's cultivable land is arid and semi-arid, and that these areas produce 40% of the total food. These regions are characterised by less fertile soils and erratic and inadequate rainfall (Gulati & Kelley, 2000).

However, humble coarse cereals, or Nutri-cereals, are extremely versatile crops. These crops hold great potential in a world grappling with climate change and environmental degradation, as they are more climate-resilient and adaptable and do not strain scarce natural resources, unlike other cereals. These grains are highly resistant to harsh weather and drought; most varieties have shorter cropping seasons and low seed requirements due to their small seed size (Anderson & Martin, 1949). This makes these crops an ideal/lucrative option for small and marginal farmers, as they require low-cost inputs and can be instrumental in ensuring livelihood security for the most vulnerable section of the farming community. Furthermore, these crops can contribute to food and nutritional security and to achieving the Sustainable Development Goals, as they are a good source of essential nutrients and minerals (CACP, 2024-25). These crops and their residues can also serve as fodder, feed, and biofuels.[4] This boosts the livestock economy in the drought-prone regions (Nadkarni, 1986). These hardy crops are also resistant to pests and diseases (FAO, 2024). Thus, given the above characteristics, millets are the most suitable crop for addressing the 21st-century challenges of the agricultural sector.

Table 1: Crop-wise Concentration by State (2023-24)

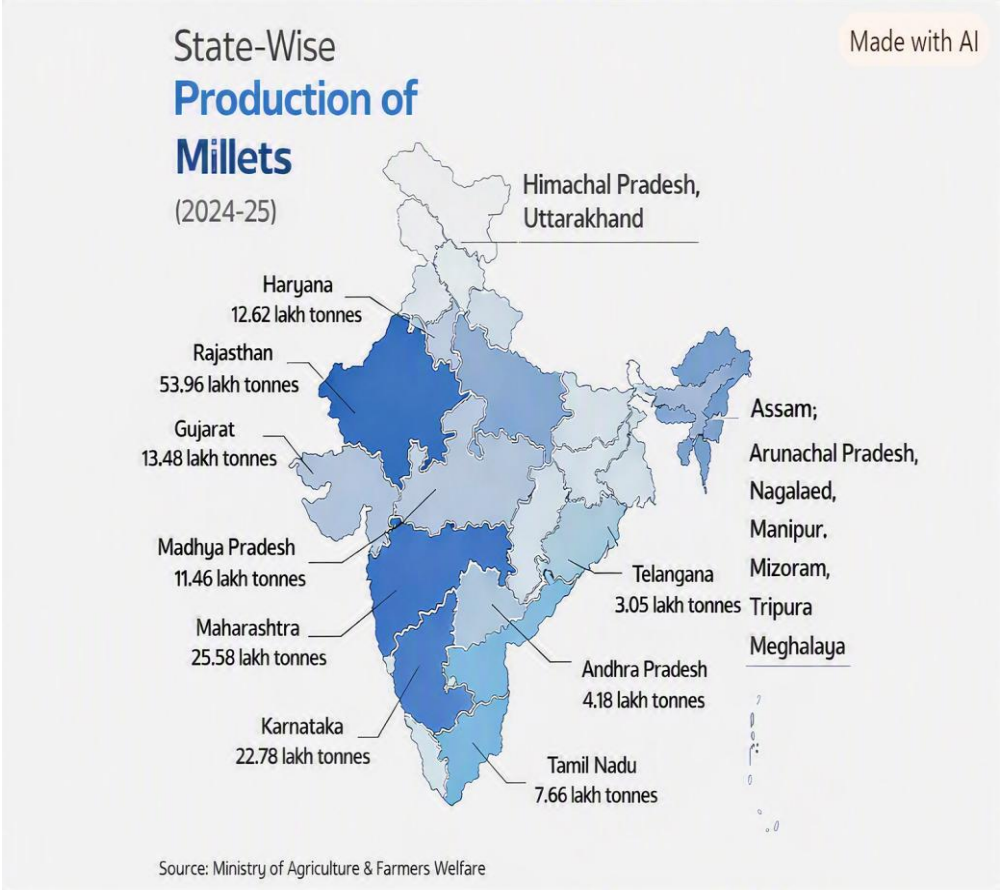
Millet	Leading States
Bajra (pearl millet)	Rajasthan (44.9% of production, 2023-24), followed by Uttar Pradesh, Haryana, Madhya Pradesh, Gujarat.
Ragi (finger millet)	Karnataka (62.4%), followed by Tamil Nadu, Uttarakhand, Maharashtra, Odisha.
Jowar (sorghum)	Maharashtra, Karnataka, Madhya Pradesh, Telangana
Small/minor millets	Madhya Pradesh (34.3%) and Uttarakhand (14.0%), plus the tribal districts of Odisha, Chhattisgarh and Jharkhand

Source: Directorate of Economics and Statistics production data, 2023-24.

[4] GoI, 2023, International Year of Millets: India Leading the Way, Significant rise in MSP over last five years helps raise production of Millets; boost farmers' income in the country, https://static.pib.gov.in/WriteReadData/specificdocs/documents/2023/mar/doc2023318173501.pdf.

Millets in India are overwhelmingly grown in rainfed, dryland, or smallholder-managed areas. The typical grower is a small or marginal cultivator in a semi-arid or upland region, often on low-fertility soil with no assured irrigation, growing partly for household consumption and partly for market. In hill and tribal belts, millets are an essential component of subsistence farming, functioning as both food and fodder. In tracts like the Andhra Pradesh agency areas, cultivation is dominated by small and marginal tribal farmers who grow finger millet, little millet, foxtail millet, and Kodo millet.[5] [6] (see Figure 1)

Figure 1: State-wise Production of Millets



Source: Based on the PIB, Press Note Details: Press Information Bureau.

[5] Sabyasachi Majumdar, Sangappa Sangappa, Hanamaraddi Kencharaddi, G. Bhuvana Priya, Laxmanarayanan Muruganantham, Madhusudhana R, Jyoti V. Vastrad, Dudekula Rafi, Nagabovanalli Basavarajappa Prakash, and Tara Satyavathi C, Tara Satyavathi C 22026, **Unlocking the ethnobotanical wisdom of millets: reviving ancient grains cultivation in the North Eastern Himalayan region of India for food, feed, fodder, and nutritional security,** Frontiers in Sustainable Food Systems, V10, https://doi.org/10.3389/fsufs.2026.1725027.

[6] Sangappa Sangappa, Dudekula Rafi, Eduru Charishma, Gundala Meghana, Laxmi Balaganoormath, Kurra Srinivasa Babu, and Chellapilla Tara Sathyavathi, Impact of FPO-led advanced millet production technologies on productivity, drudgery reduction and livelihoods among tribal farmers in Andhra Pradesh, Frontiers in Sustainable Food Systems, V10, https://doi.org/10.3389/fsufs.2026.1725027.

There are different varieties of millets grown in India: bajra (pearl millets), jowar (sorghum), ragi, Kodo, little millets, minor millets, great millets, foxtail millets and barnyard millets.[7] India is the largest producer and second largest exporter of millets in the world, thus giving it considerable advantages – both absolute and relative. The primary states engaged in the cultivation of coarse cereals are Karnataka, Tamil Nadu, Andhra Pradesh, Maharashtra, Gujarat, Haryana, Madhya Pradesh, Chhattisgarh, Uttar Pradesh, and Rajasthan. Hence, the growth performance of these crops, due to their concentration in certain states, especially those defined as "pockets of poverty", also has regional growth and socio-economic implications, as well as consequences for food security for the lowest strata of the population (Jodha, 1973).

The Prime Minister, in his address at the Global Millets (Shree Anna) Conference in Delhi in 2023, stated that

> "*Shree Anna is becoming a medium of holistic development in India. It is linked with Gaon as well as Garib (Village and the poor)". Shree Anna - a door to prosperity for the small farmers of the country; Shree Anna - the cornerstone of nutrition for crores of fellow citizens; Shree Anna - felicitation of the Adivasi Community; Shree Anna - getting more crops with less water; Shree Anna - a strong foundation for chemical-free farming. Shree Anna - a huge help in fighting climate change*."

Cereals and millets have moved in opposite directions. Cereal output, exports and stocks have all hit records; millets have been essentially flat in production, marginal in trade, and falling in per-capita consumption, despite the push in the years 2023 for the International Year of Millets. This is where the divergence is starkest, because cereal consumption is falling even as production climbs. Per capita monthly cereal consumption fell from 13.4 kg in rural areas and 10.6 kg in urban areas in 1993–94 to 9.4 kg and 8 kg, respectively, in 2023–24. The share of household expenditure going to cereals roughly halved over the last decade, from 11.24% to 5.13% in rural areas and 7.37% to 4.04% in urban areas between HCES 2011–12 and 2023–24.[8]

That creates a large accounting gap: India produces around 300 million tonnes of cereals a year, but household consumption is barely 150 million tonnes, with the difference absorbed by feed, seed, wastage, ethanol diversion, and public stocks. Millet consumption specifically has not recovered as a staple, although the growth that exists is urban and premium, largely in processed and value-added products rather than as everyday grain.

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[7] https://www.nabard.org/international-year-of-millets-2023.aspx#:~:text=To%20create%20domestic%20and%20global,millet%20products%20nationally%20and%20internationally%E2%80%9D

[8] Kapoor, M., Rajan, S., Dhamija, G. *et al. (2026).* Food consumption patterns and their micronutrient content in India: Evidence from the household consumption expenditure surveys, 2011–12 and 2023–24. European Journal of Clinical Nutrition. **80**. 583–593. https://doi.org/10.1038/s41430-026-01732-3.

India has been the world's largest rice exporter since 2012, holding a 30–35% global share. The decade's shape was set by policy: volumes peaked at 22.35 MT in 2022–23, fell to 16.35 MT in 2023–24 after non-basmati export restrictions were imposed, then recovered by 23.4% to 20.2 MT in 2024–25 once the curbs were lifted, with the industry projecting 23.5 MT for 2025–26.[9]

Table 2: Comparison of exporting possibilities of Millets and Cereals (rice).

	Cereals (rice)	Millets
Volume	17.73 MT (2020-21) → 20.19 MT (2024-25)	89,165 tonnes (2024-25)
Value	$8.82 bn → $12.47 bn	$37 million (2024-25)
Trend	Record-breaking, policy-driven volatility	Volatile, small, no clear upward break

Source: https://apeda.gov.in/Requirement_Export_Rice) and https://www.pib.gov.in/PressNoteDetails.aspx?ModuleId=3&NoteId=154991&utm=&reg=48&lang=2

Wheat is the exception. Commercial wheat exports have been banned since May 2022, though stocks are at 30.46 MT against a 20.52 MT buffer norm; the government proposed, in early 2026, allowing an initial 2.5 MT of exports. Millet exports remain tiny and have not broken out. India exported 169,049 MT worth $75.45 million in 2022–23; 146,300 MT worth $70.89 million in 2023–24; then the 2024–25 figure above. APEDA reports 138.69 thousand MT valued at $61.57 million for 2025-26. At peak, that is under 1% of rice export value.[10]

Roughly 2.5 crore small farmers are directly involved in millet production, and over 500 millet-focused startups have emerged. This paper seeks to analyse the growth and prospects of these coarse cereals against the background of recent policy measures. Sections 2 and 3 present an overview of the historical background of the marginalisation of millets in the domestic policy space and the country's cropping pattern, along with recent policy measures to restore the lost glory of these grains. The subsequent sections then investigate these claims. Section 4 evaluates the growth trends of Shree Anna, while Section 5 analyses the returns from cultivating these crops through a cost-to-gross value analysis. The following three sections explore the demand-side constraints on these crops, the lacunae in the procurement process, and their export potential. The next sections situate the Shree Anna within the global framework and evaluate their role through the Agreement on Agriculture, international negotiations, and the attainment of the SDGs. The final section makes concluding remarks and recommendations.

[9] Refer to https://apeda.gov.in/Requirement_Export_Rice.
[10] Refer to https://www.exportimportdata.in/blogs/millet-export-from-india.aspx.

2. Cultivation of Millets and Farm Size

Millets in India are overwhelmingly a rainfed, dryland, smallholder crop. The typical grower is a small or marginal cultivator in a semi-arid or upland region, farming low-fertility soil without assured irrigation, and producing largely for household consumption and partly for the market. **Smallholder farmers dominate millet cultivation, as they are efficient on small parcels of land with minimal water, which is precisely why they concentrate among resource-poor cultivators who cannot meet** the input requirements of intensive rice and wheat cultivation. It supports tribal and hill-based cultivation and is an essential component of subsistence farming, serving as both food and fodder. In tracts such as the Andhra Pradesh agency areas, cultivation is dominated by small and marginal tribal farmers who grow finger millet, little millet, foxtail millet, and Kodo millet. The small millets (Kodo, Kutki, little millet, barnyard millet) are grown almost entirely by tribal and marginal households in Madhya Pradesh, Odisha, Chhattisgarh, Jharkhand and the Uttarakhand hills, frequently as landraces under mixed cropping. India is the world's largest millet producer, contributing about 38.4% of global output. (FAO, 2023).

Indian government does not publish a millet-specific breakdown of growers by farmer category. The Agriculture Census tabulates all operational holdings by size class; its Phase-II reports give area under individual crops (jowar, bajra, ragi, small millets) by size class at state level, but there is no consolidated all-India table of "number of millet farmers, category-wise". Parliamentary replies on millets accordingly supply state-wise area and production figures rather than farmer categories.

The consolidated data in Figure 3 are therefore the official land-holding classification, which is what "small", "medium" and "large" farmer mean in Indian policy and in the eligibility criteria of every central scheme. The latest published data is the Agriculture Census 2015-16; the 11th Census (reference year 2021-22) was still being processed, and its national results had not been published as of early 2026.

Table 3: Agriculture Census 2015-16 (All India)

Category	Size class	% of holdings	% of operated area	Avg. size (ha)	Holdings (million, derived)
Marginal	Below 1.0 ha	68.5	24.0	0.38	~100.2
Small	1.0 - 2.0 ha	17.6	22.9	1.40	~25.8
Semi-medium	2.0 - 4.0 ha	9.6	23.8	2.69	~14.0
Medium	4.0 - 10.0 ha	3.8	20.1	5.72	~5.6
Large	Above 10.0 ha	0.6	9.2	17.07	~0.8
All holdings	-	**100.0**	**100.0**	**1.08**	**146.45**

Note: Agriculture Census 2015-16, All India. Total operational holdings: 146.45 million. Total operated area: 157.82 million hectares. Average holding size: 1.08 ha (down from 1.15 ha in 2010-11 and 2.28 ha in 1970-71).
Source: Agriculture Census 2015-16, Phase-I, All India Report on Number and Area of Operational Holdings. Holding counts in the final column are derived from the published percentage shares and are not separately published; figures may not sum exactly due to rounding.

Because millets are concentrated in exactly the rainfed and tribal districts where holdings are smallest, the millet-growing population is skewed further toward the marginal end than the national figure of 86% small-and-marginal suggests. That is the foundation of the livelihood argument and also where it runs into difficulty in practice. In 2024, a study by the Tata-Cornell Institute report found that millet farmers earn, on average, only 33% and 42% of the profits that wheat and paddy farmers, respectively, receive for their crops.[11] Annual production costs for millets are rising at roughly 1.2% per quintal. The identified binding constraint is the lack of processing and infrastructural support for the small and marginal farmers who mainly cultivate the crop. De-husking small millets remains laborious even with machinery and still requires manual intervention - a cost that falls hardest on the smallest growers.[12] Millet area has declined over the long run since 1968 even as yields improved, indicating that price and market signals have not favoured the crop relative to rice and wheat despite substantial MSP increases.[13] [14] This is why the policy instruments have centred on aggregation and value addition: millet-focused Farmer Producer Organisations promoted by ICAR-IIMR, the Production Linked Incentive Scheme for Millet-Based Products (outlay Rs. 800 crore), PM-FME support for micro food processing units, and crop diversification assistance under PM-RKVY.

3. Policy Measures Supporting Millets

India's support for millets is neither recent nor thin. From the Centrally Sponsored Special Food Production Programme for Maize in 1987, through ICDP-CC, the Accelerated Maize Development Programme, ISOPOM and INSIMP, to the Sub-Mission on Nutri-Cereals and the National Mission on Nutri-Cereals, the Centre has maintained an almost unbroken programmatic presence in coarse cereals for four decades. Since 2017, with increased focus and attention, supplemented by state missions in Odisha, Chhattisgarh, Karnataka, and elsewhere, by NABARD's promotional and producer-organisation funds, and by a research and standards apparatus centred on ICAR-IIMR Hyderabad. Taken together, the

[11] Chandra S. Nuthalapati, Anjani Kumar, Vinay K. Sonkar, Susanto K. Beero, and Mulla Areef, (2024), Indian Millet Cultivation Plagued by Low Yields, Prices, and Profits, https://tci.cornell.edu/?blog=indian-millet-cultivation-plagued-by-low-yields-prices-and-profits,

[12] Pushpa J. and Kumar G. A., (2023), Constraints Faced by Millet Farmers and Millets Processing Units in Madurai District, Asian Journal of Agricultural Extension Economics & Sociology, 41(5):25-28, DOI:10.9734/ajaees/2023/v41i51896.

[13] Bibas B.K., Sneha Dahal, Manisha Koirala, Rashmi Poudel, Bishnu Prasad Kandel, (2026), Role of Millets for Food Security Under Climate Change, Plant-Environment Interaction, Feb 20;7(1): e70128. DOI: 10.1002/pei3.70128, https://pmc.ncbi.nlm.nih.gov/articles/PMC12927949/.

[14] Refer to https://agcensus.da.gov.in/nationaltables.aspx.

instruments cover every point at which agricultural policy conventionally intervenes: seed, extension and area expansion on the production side; minimum support prices and central-pool procurement on the price side; welfare-scheme offtake and processing incentives on the demand side; and a dedicated promotion forum on the export side.

This section sets out that architecture, and does so for a specific analytical purpose. If awareness or promotional effort were the binding constraint, the record assembled here would predict a revival. The sections that follow establish that no revival occurred. Documenting the density of the policy effort is therefore the first step in locating the constraint elsewhere, in profitability, processing capacity and assured offtake.

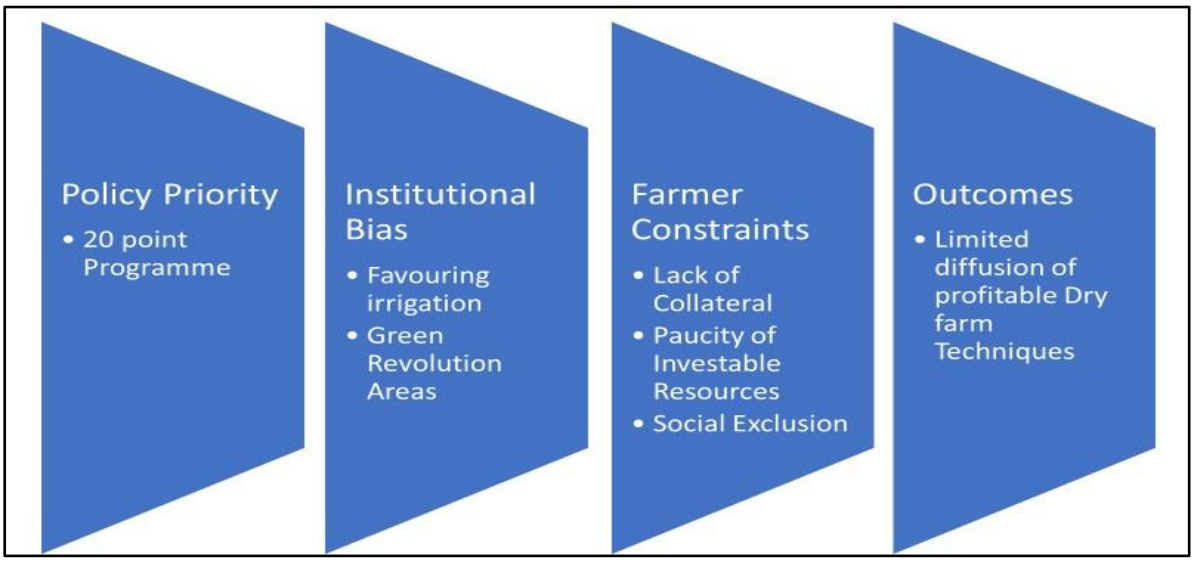
The section closes with a discussion of minimum support prices and their relation to trade, in which two instruments are commonly assumed to reinforce one another but, in fact, do not. Price support operates on the domestic axis, through the central pool and welfare distribution; exports operate on a separate private axis governed by open-market purchase and importing-country standards, and therefore the two channels do not meet.

3.1 Millet Supporting Schemes: Historical Antecedents and the Twenty-Point Programme

The 20-point programme (TPP) was a significant socio-economic initiative launched in India to address poverty and uplift the weaker sections of society. This comprehensive programme aimed at bringing about economic reforms and social justice across the nation. The TPP was initially launched by the Government of India in 1975, revised in 1982 and 1986, and reintroduced in 2006. It was a package of social sector schemes and programmes affecting the lives of the poor and underprivileged. In India, the interplay among rural credit systems, state policy priorities, and institutional biases shaped the country's agricultural development in the late 1970s and early 1980s. Figure 1 provides a flowchart illustrating the barriers to credit diffusion in dryland agriculture, including policy priorities, institutional bias, farmer constraints, and outcomes.

The programme's primary focus was poverty alleviation, improving the quality of life for people experiencing poverty, and related areas. The TPP-1986 remained in force until it was reintroduced in 2006, thereby significantly shaping India's agricultural priorities. While coarse cereals had historically been the traditional food crop for the vast majority of the country's population, dry agriculture still failed to receive financial support for research. Programmes like the watershed development for dryland farming covered areas under dryland farming have been merged with the - Rainfed Area Development Programme" by the Ministry of Rural Development in 2006 under the TPP. (Government of India, 2015-16).

Figure 2: Dry Land Agriculture Policy Priorities, Farmers' Constraints and the Outcomes.



Source: Authors

Despite being accorded priority in the Twenty-Point Programme, it still failed to receive credit advances from formal institutions (Harriss, 1983). Evidence from studies conducted by the Indian Council of Agricultural Research's (ICAR) "All India Co-ordinated Research Project for Dry-land Agriculture" suggested that new techniques were both profitable and productive; however, their diffusion could be impeded owing to paucity of investable financial resources (Harriss, 1983). At the same time, poor institutional and policy support, limited market opportunities, and capacity building for coarse cereals have contributed to their decline. This has reduced the diversity of our food basket (Nagaraja et al., 2013).

In recent years, this issue has gained greater attention as climate change and sustainability have become central to global discussion. It has been argued that the Green Revolution techniques (GRTs) were driven by a narrow focus on increasing output without a comprehensive approach to environmental protection and climate resilience (Davis et al., 2019). GRTs were primarily a technology-driven agricultural transformation (HYV seeds, fertilisers, pesticides, mechanisation), supported by infrastructure such as irrigation and rural electrification. However, it does share features with large infrastructure projects, including state-led investment, institutional coordination, and systemic impacts on productivity and livelihoods. Therefore, it is recommended that a broad, multifaceted strategy be adopted—one that goes beyond merely increasing production to develop sustainable, nutritious food systems that do not deplete scarce resources and are resilient to climate change (Davis et al., 2019).

It is against this background that Shree Anna fulfils these criteria, mainly because millets are C4 crops with carbon-fixing properties, are climate-resilient, less resource-intensive, and nutritious (Nagaraj, 2013). Hence, the government, through various measures, has

tried to correct this imbalance in demand and supply by increasing demand for these cereals through awareness-raising and influencing consumer tastes and preferences.

3.2 Production-side Schemes

Sub-Mission on Nutri-Cereals under the National Food Security Mission - implemented in all districts of 28 States and the Union Territories of Jammu & Kashmir and Ladakh. NFSM now sits under the rationalised Krishonnati Yojana umbrella, with an allocation of Rs. 11,200 crores for 2026-27. Schemes like the **PM-RKVY** promote coarse cereals and millets in line with their own priorities, with approval from the State Level Sanctioning Committee chaired by the Chief Secretary. Allocated Rs. 8,550 crores in 2026-27, 22% above 2025-26 revised estimates. The P**M Dhan-Dhaanya Krishi Yojana cover** nearly 100 districts with below-average credit access, moderate cropping intensity and low productivity, with objectives including crop diversification away from single-crop dependence. Millet-growing rainfed districts are the natural beneficiaries.

3.3 Demand-side and Value-addition Measures

PLISMBP - MoFPI's Production Linked Incentive Scheme for millet-based products, running 2022-23 to 2026-27 with an outlay of Rs. 800 crores, under which 30 millet-based proposals were approved. Note that this scheme reaches its terminal year now. PDS and nutrition programmes: the Department of Food and Public Distribution has revised guidelines to increase millet procurement under TPDS, ICDS, and the Mid-Day Meal scheme. The distribution period for millets was extended from 3 months to 6-10 months, with provisions for inter-state transportation and advance subsidy added. PM-FME (Rs. 2,000 crores, 2025-26) for micro food processing units; Agriculture Infrastructure Fund interest subvention on loans up to Rs. 2 crores for primary processing units. Exports - a dedicated Millets Export Promotion Forum was set up; millets were selected under One District One Product in 19 districts.

3.4 Institutional and State-level Initiatives

ICAR-IIMR Hyderabad was recognised as the Global Centre of Excellence on Millets during IYM 2023, and acts as knowledge partner to state missions in Odisha, Karnataka, Jharkhand, Tamil Nadu, Telangana and Chhattisgarh. Odisha Shree Anna Abhiyan is the template most often cited: launched in 2017 as a special programme for millets in tribal areas, implemented through women's SHGs and FPOs, with 2024-25 to 2026-27 targets including a 25% consumption increase over baseline, 1,000 post-harvest and processing units, and Millet Service Centres in every district.

3.5 Recent Initiatives Taken to Promote Shree Anna

The government at the Centre and the State level, through various agencies, has undertaken several initiatives to promote and popularise millets, especially in 2023, which was observed as the "International Year of Millets". Some of these measures include organising various programmes, such as "***Millets Mahotsavas***" across the country, to raise awareness about these grains and to recognise certain districts producing "***Shree Anna***" under the "***One District One Product***" scheme for millet-based products (Commission for Agricultural Costs and Prices, 2025-26).

One of the earliest programmes to encourage the cultivation of millets was the Centrally Sponsored "Special Food Production of Maize" (1987), which was later broadened to include millets. This was followed by the Integrated Cereals Development Programme in Coarse Cereals-based Cropping System Areas (ICDP-CC), launched in 1994, in major coarse cereals-growing States, namely: Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan & Sikkim. It was with the Accelerated Maize Development Programme (1995-96) that a mission-mode approach was adopted to enhance production and productivity of maize, and later the Integrated Schemes of Oilseeds, Pulses, Oil palm and Maize (ISOPOM) in 2004 and the Initiative for Nutritional Security through Intensive Millets Promotion (INSIMP) in 2011-12. It included the initiation of the "Sub Mission on Millets" under the National Food Security Mission in 2018, the National Mission on Nutri-Cereals in 2018-19, the inclusion of millets in the "POSHAN Mission" of the Ministry of Women & Child Development and the Integrated Child Development Scheme, and the take-home ration in Anganwadi centres. Some notable examples of State Missions include the Comprehensive Revival Of Millets Cultivation by Tribals and Drought Mitigation Project in Andhra Pradesh, Chattisgarh Millet Mission, the Bhavantar Bharpayee Yojana of Haryana, the Millet Village Scheme in Kerala in 2017-18, the Special Programme for Promotion of Millets in Tribal Areas under the Odisha Millet Mission (2017), along with the promotion of different types of millets in Madhya Pradesh, Tamil Nadu, Uttarakhand and Nagaland and supporting of millet-based start-ups by IIMR, Hyderabad (NABARD, 2023; NITI Aayog, 2023). The Department of Agriculture and Farmers' Welfare has also sought to raise awareness among consumers about the health benefits of millets, the economic prospects of millets' cultivation for farmers, the various high-value-added products, and their climate resilience. The Union Budget 2023-24 also recognised the ICAR-Indian Institute of Millet Research, Hyderabad, as a "***Centre of Excellence***" for advancing research and disseminating best practices and technologies to develop India as a global hub for Shree Anna (CACP, 2023-24). This was accompanied by the establishment of an "***Export Promotion Forum***" to promote millets globally. Another Regional Research Centre was inaugurated in Rajasthan

to promote bajra and to further research and innovation in the millets sector. [15] Further, the CACP has also made several recommendations to increase the yields of these grains through genetic modification and to strengthen the seed chain. It also recommends better storage practices to reduce wastage and diversifying to other high-value-added products (CACP, 2023-24).

NABARD has also been playing a pivotal role in promoting millets through programmes like the Farm Sector Promotion Fund (FSPF), National Adaptation Fund for Climate Change (NAFCC), Tribal Development Fund (TDF) and Watershed Development Fund (WDF), along with encouragement of millet-based Farmer Producer Organisations through funds like the Producers Organisation Development and Upliftment Corpus (PRODUCE) Fund and Producers Organisation Development Fund (PODF) (NABARD, 2023).

The additional strategies to stimulate demand encompass integrating millets into the National Food Security and other welfare schemes. Further measures involve encouraging industrial utilisation of these crops and fostering exports. An additional noteworthy initiative was the inclusion of the Production-Linked Incentive Scheme for the Food Processing Industry for Millet-based products (PLISMBP), which approved thirty millet-based products with an estimated expenditure of Rs 800 crore and facilitated loans amounting to Rs 90.8 crore for millet-processing facilities under the Prime Minister's Formalisation of Micro Food Processing Enterprises (PMFME) scheme, along with the establishment of seed hubs, start-ups, and Farmer Producer Organisations. [16]

The CACP (2023-24) has also recommended realigning price incentives and ensuring supportive marketing and procurement mechanisms to encourage diversification into these crops for sustainable agricultural practices, especially in response to the extensive rice-wheat cropping pattern and climate change. Therefore, a two-pronged strategy is needed to address both demand- and supply-side challenges.

3.6 MSP Support and its Impact on Trade

The Centre has continued to encourage Nutri-cereals ("Shree Anna") by offering relatively higher MSP increases than for cereals generally. For Shree Anna in the Kharif Marketing Season 2026-27, the Cabinet Committee on Economic Affairs approved increases for 14 kharif crops.[17]

[15] https://static.pib.gov.in/WriteReadData/specificdocs/documents/2024/feb/doc2024216311701.pdf
[16] https://static.pib.gov.in/WriteReadData/specificdocs/documents/2024/feb/doc2024216311701.pdf
[17] PIB Delhi, (2026), Cabinet approves Minimum Support Prices (MSP) for Kharif Crops for Marketing Season 2026-27, 13 MAY, Ministry of Agriculture & Farmers Welfare, https://www.pib.gov.in/PressReleasePage.aspx?PRID=2260618&reg=3&lang=1.

Crop	MSP 2026-27 (Rs. /quintal)	Increase over 2025-26
Jowar (hybrid)	4,023	+324
Ragi	5,205	+319
Bajra	2,900	+125
Maize	2,410	+10
Paddy (common)	2,441	+72

Source: CCEA decision on MSP for 14 kharif crops, Marketing Season 2026-27.

MSP is set on the A2+FL plus 50% margin formula recommended by CACP, against the Swaminathan Commission's proposed C2 plus 50%. Estimated margin over cost is highest for moong (61%), followed by bajra and maize at 56% each. The pattern is deliberate: ragi and jowar have received among the sharpest decade-long percentage increases of any mandated crop.

Part II - Empirical Assessment

4. Profiling and Growth of Shree Anna

The government has undertaken several measures to encourage diversification of crops away from water-depleting and resource-extractive crops toward coarse cereals. This has taken the form of initiatives discussed in the previous section.

However, most of these measures have not yielded the desired results, as shown in Table 1. The area under cultivation of millets has seen a secular decline since the Green Revolution, declining from about 350.6 lakh hectares in the seventies to 252.6 lakh hectares in the nineties, and then more swiftly to 150.7 lakh hectares by the 2010s, and to about 128.7 lakh hectares in recent years. The production of these crops increased briefly in the eighties, only to decline consistently from about 206 lakh tonnes in the eighties to 164.1 lakh tonnes in the 2010s. This decline was arrested in recent years, but that too has been rather underwhelming. Productivity growth has been the only redeeming factor for these crops, which has grown slowly but consistently over the study period.

Table 4 : Decadal Trend Growth: Shree Anna

PERIOD	YIELDS (Quintal/ha)	Rate of growth (%)	AREA (In Lakh Hectares)	Rate of growth (%)	PRODUCTION (In lakh tonnes)	Rate of growth (%)
1970s	5.5		350.6		193.5	
1980s	6.3	1.4	325.8	-0.7	206	0.6
1990s	7.8	2.2	252.6	-2.5	196.4	-0.5
2000s	8.7	1.1	206.7	-2.0	179.7	-0.9
2010s	10.9	2.3	150.7	-3.1	164.1	-0.9
2020s	13.3	2.0	128.7	-1.6	171.1	0.4

Source: Price Policy on Kharif Crops 2024-25

The instability index of the kharif Shree Anna is an important indicator of variation in crop production and yields. The instability index of yields for the cultivation of Shree Anna across the country declined from 22% in the 2000s to 6.9% in the 2010s, and further to 3.2% in the 2020s (Table 2). Among various states, the instability index of yields was highest in Rajasthan at 82.8%, but it showed an appreciable decline over the years. Haryana reduced its instability index to nil, followed closely by Uttar Pradesh and Madhya Pradesh. The other states, such as Gujarat, Karnataka, and Maharashtra, have shown varying levels of volatility over the period. This shows that the yields and instability index of these crops are higher in states where they are cultivated under favourable conditions, such as assured or reasonably stable irrigation.

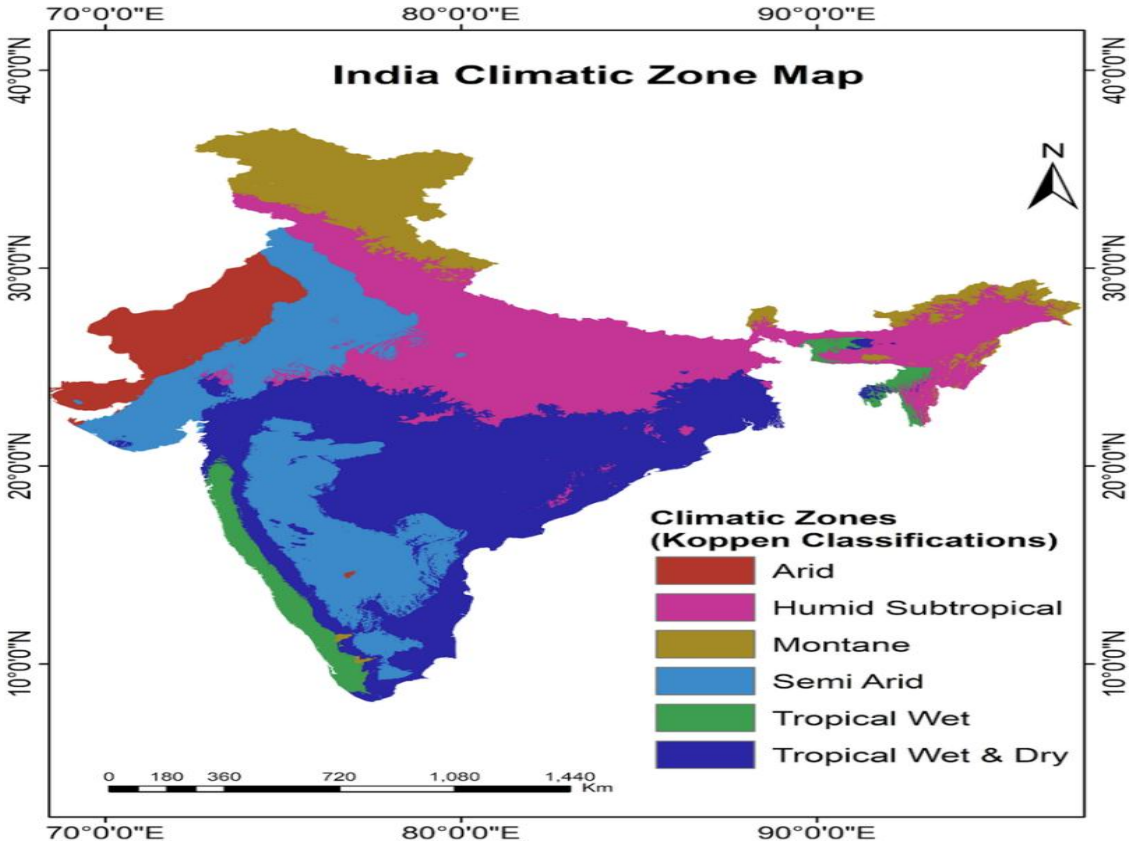
Table 5: Instability Index of Yields During 2000s, 2010s and 2020s of Kharif Shree Anna

States	YIELD INSTABILITY (%)		
	2000s	2010s	2020s
Gujarat	31.8	17.7	29.3
Haryana	31.2	14.1	0
Karnataka	29	15.8	20.4
Madhya Pradesh	16.5	9.6	7
Maharashtra	13.9	30.2	15
Rajasthan	82.8	15.3	11.9
Uttar Pradesh	8.8	5.3	1.5
All-India	22	6.9	3.2

SOURCE: CACP (2024) Price Policy for Kharif Crops 2024-25

However, these crops have an advantage: they grow well in areas where rice and wheat would either not sustain or yield uneconomically (Nadkarni, 1986).

Figure 3: Millet Cultivation and the Climatic Zones of India



Hence, since the coarse cereals thrive and are better suited for cultivation in dry and semi-arid regions, for our study, the selection of states is best on a dual criterion: the share in domestic production and those belonging to the arid and semi-arid regions as per the agro-climatic zones depicted in Figure 1.

Based on the figure, we could conclude that much of the land mass of India, except for tropical wetlands, is suitable for the cultivation of Shree Anna (Millet) and therefore ensures that a considerable number of small and marginal farmers benefit, making it possible for India to achieve the target of doubling farm incomes. Figure 1 shows that most regions[18] of the country are suitable for the agro-climatic conditions required to grow millets. Besides, these crops are highly adaptable to climate change and require minimal inputs, making them a favourable option for small and marginal farmers (CACP, 2023-24).

Table 6: Relative Water Requirement of Various Crops (In mm)

Crop	Water Requirement	Water Requirement as % of Rice
Rice	1250	100
Sugarcane	2200	176
Wheat	650	52
Ragi	350	28

[18] Doubling farm incomes falls under Sustainable Development Goal 2 (SDG 2), specifically Target 2.3, which aims to double agricultural productivity and incomes of small-scale food producers by 2030.

Jowar	400	32
Maize	500	40
Cotton	600	48
Groundnut	510	41
Sunflower	450	36

Source: CACP (2023-24), Price Policy for Kharif Crops and TNAU, Agritech Portal.

Table 3 shows the relative water requirement of various crops in India. Sugarcane and rice remain the most water-guzzling crops, with the water requirements of 2200 mm and 1250 mm, respectively. Wheat, a distant second, requires almost half that amount of water at 650 mm. Coarse cereals like ragi, jowar and maize meet only about 28%, 32% and 40% of that requirement, respectively. It is this characteristic that makes coarse cereals ideal for cultivation in dry, arid regions, for sustaining food and livelihood security during water crises and droughts, and for achieving the larger goal of climate sustainability.

5. Nutri-Cereals in India

This Section assesses the growth prospects and net returns from cultivating the various Nutri-cereals in India by examining cultivation costs (C2), crop gross value added, and by-product value.

5.1 Maize

Maize is the most important crop in India after rice and wheat. Amongst the various coarse cereals, maize outperforms the rest in terms of output and yields because of its multiple uses as food, fodder and in the agro-industry, increasingly for ethanol production (Nadkarni, 1986).

Some of the states that are the chief producers of maize are: Karnataka (15%), Bihar (12%), Madhya Pradesh (12%), and Maharashtra (9%). These states also ensure that the area under maize cultivation remains under assured irrigation- Kerala (100%), Haryana (100%), Andhra Pradesh (71.6%), Bihar (76.5%), Punjab (65.6%), Karnataka (33%), Tamil Nadu (30.6%), Maharashtra (12.7%) while the proportion of irrigated area in the other states remained below 10%[19].

Maize is one of the few coarse cereals that has shown output growth, driven by higher yields. Before the Green Revolution, maize showed strong growth across all three parameters: area, production, and yields. This was followed by a brief setback in the seventies, when this crop was displaced by rice and wheat. This recovered in the eighties despite shrinking acreage (Table 4).

[19] The figures in parentheses represent the proportion of the gross cropped area that is irrigated based on the data from Agricultural Statistics at a Glance-2023 for the year 2021-22.

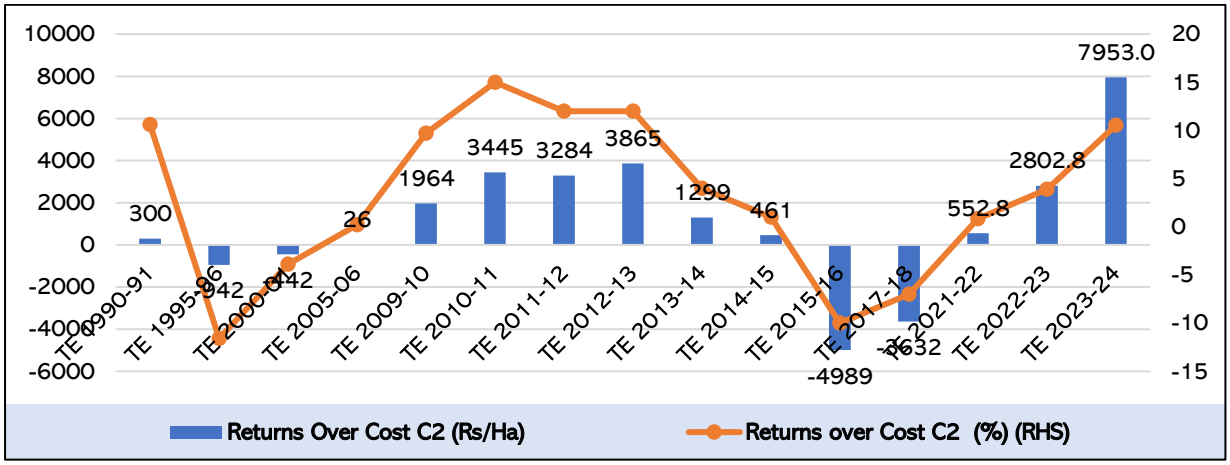
Table 7: Growth Trends of Maize (In per cent)

PERIOD	AREA	PRODUCTION	YIELD
1950-51 to 1960-61	3.46	9.79	5.99
1960-61 to 1970-71	2.91	6.93	3.89
1970-71 to 1980-81	0.32	1.05	0.43
1980-81 to 1990-91	-0.13	4.39	4.10
1990-91 to 2000-01	1.17	3.42	2.14
2000-01 to 2010-11	2.65	7.38	4.39
2010-11 to 2020-21	1.55	4.04	2.45
2020-21 to 2023-24	4.40	6.13	1.69

Source: Government of India, Agricultural Statistics at a Glance 2023-24.

Several initiatives were undertaken to encourage maize cultivation and increase its production and productivity, including its inclusion in the Technology Mission on Oilseeds and Pulses in 1995 and the Integrated Scheme of Oilseeds, Pulses, Oil palm and Maize (ISOPOM). Similarly, India introduced single-cross hybrid varieties in 2005 to help raise yields. The cumulative impact of these programmes was an improvement in maize output growth. In recent years, the area under maize cultivation and production has increased. This is in part owing to the National Policy on Biofuels, 2018, which permitted the use of maize for ethanol production, thereby boosting both output and farm incomes (CACP, 2019-20). Similarly, there have been several initiatives to enhance maize yields, notably the "All-India Coordinated Research Project on Maize," which recommended adopting best-practice technologies such as single-cross hybrids, zero tillage, weed and pest management, and improved fertilisation (CACP, 2023-24). These measures have yielded appreciable results in boosting production and acreage; however, productivity growth has decelerated in recent periods (Table 4).

Figure 4: Returns on Cultivation of Maize - All-India. (in Rs/Ha)



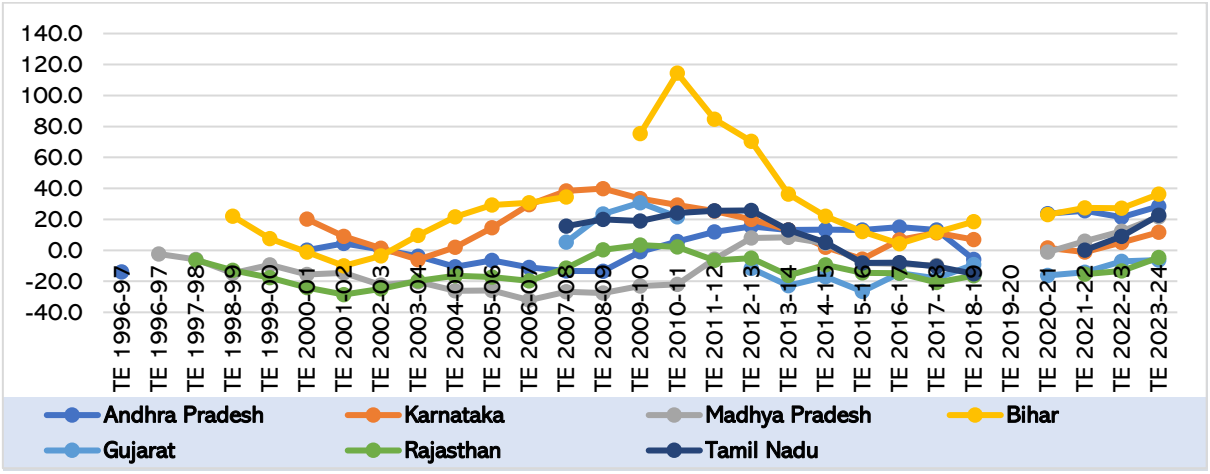
Source: Estimated from various issues of Price Policy on Kharif Crops, CACP

Unlike other coarse cereals, Maize exhibited better net returns over the cost of cultivation. Initially, the low returns prompted the crop to be brought under the Technology Mission

in 1995-96, and the returns remained negative until TE 2000-01. However, the initiation of the Integrated Scheme of Oilseeds, Pulses, Oil Palm & Maize (ISOPOM) in 2004-05 yielded appreciable results. The net returns over cost C2 increased from 0.2% in TE 2005-06 to 15% in TE 2010-11 (the period coinciding with the global rise in primary commodity prices) and then hovered around that level until TE 2012-13 (Figure 3).

A secular decline followed, with returns recording a 7% decline in 2017-18. In recent years, this trend has witnessed a positive turnaround, with the figures increasing gradually from 0.8% in TE 2022-23 to 10.5% in TE 2023-24.

Figure 5: Returns on the Cultivation of Maize. (In per cent)



Source: Estimated from various issues of Price Policy on Kharif Crops, CACP

Some of the major maize-producing states are Andhra Pradesh, Bihar, Gujarat, Karnataka, Madhya Pradesh, Rajasthan and Tamil Nadu. Among these, Rajasthan, Gujarat, Madhya Pradesh, and Tamil Nadu have shown negative returns from maize cultivation interspersed with brief periods of recovery. The only states that have shown modest margins are Andhra Pradesh, Karnataka and Bihar (Figure 4).

5.2 Jowar

Jowar is the second significant coarse cereal in India in terms of area and production (CACP, 2025-26). About 82% of jowar production is concentrated in five states: Maharashtra (37%), Karnataka (19%), Rajasthan (12%), Andhra Pradesh (7%), and Tamil Nadu (7%) (CACP, 2025-26). The area under irrigation for jowar remained below 3% in 1950-51 and remains low at about 10-12% in 2023-24 (GOI, 2024), indicating that this crop is still largely rain-fed. Except Kerala and Haryana, which have 100% irrigation coverage, and states like Andhra Pradesh (59.3%) and Gujarat (41.5%), other states restrict jowar cultivation to dry areas, as this crop is drought-resistant and requires low irrigation.

Jowar lost acreage gradually during the Green Revolution and steeply thereafter, especially in the post-reform period (Table 5). Despite that, it registered appreciable output growth,

driven by rising yields, until the eighties. However, the output growth languished thereafter despite reasonable yield growth.

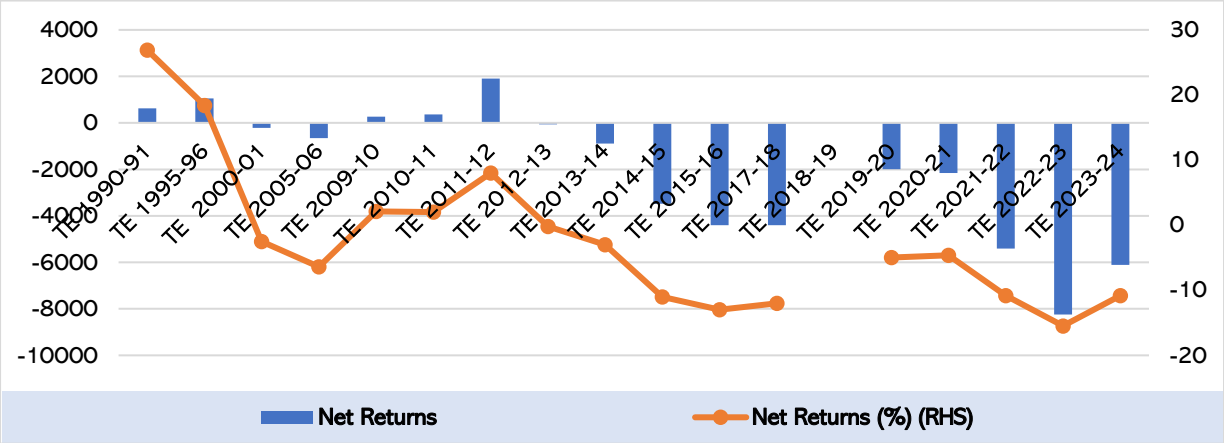
Table 8: Growth Trends of Jowar (In per cent)

PERIOD	AREA	PRODUCTION	YIELD
1950-51 to 1960-61	1.8	6.9	5.0
1960-61 to 1970-71	-0.5	-0.8	-0.5
1970-71 to 1980-81	-0.8	3.3	4.0
1980-81 to 1990-91	-0.9	2.4	3.1
1990-91 to 2000-01	-3.5	-1.3	1.5
2000-01 to 2010-11	-2.8	-0.5	2.6
2010-11 to 2020-21	-4.6	-2.2	2.4
2020-21 to 2023-24	-1.6	0.8	2.0

SOURCE: GOI, Agricultural Statistics at A Glance (Various Issues)

The cost of cultivating jowar was reported to be higher than that of maize and bajra (CACP, 2012-13).

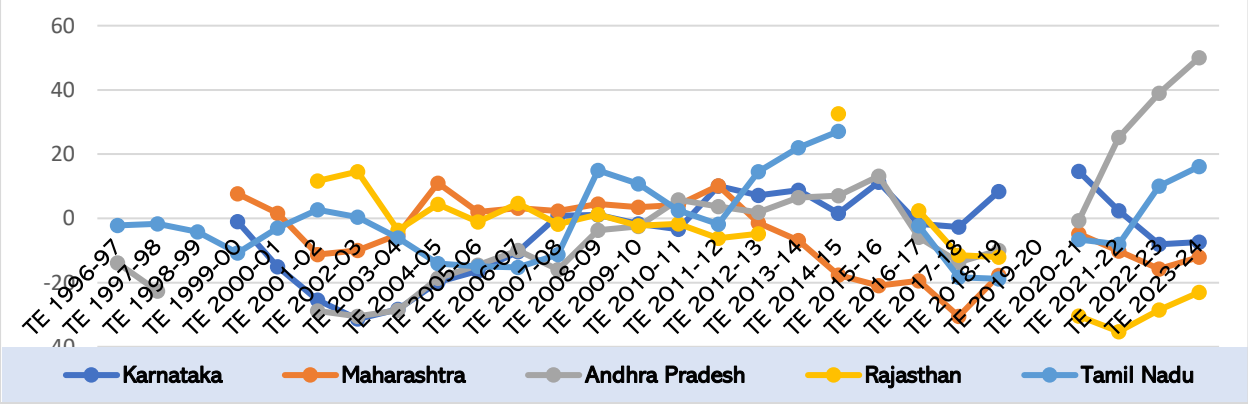
Figure 6: Returns on the Cultivation of Jowar -All India (in Rs/Ha)



Source: Computed from Price Policy for Kharif Crops (Various Issues)

The all-India returns on jowar cultivation dipped from a modest 26.9% in TE 1990-91 to 18.4% in TE 1995-96, before plummeting into losses in the subsequent period (Figure 5).

Figure 7: Returns on Cultivation of Jowar (In per cent)



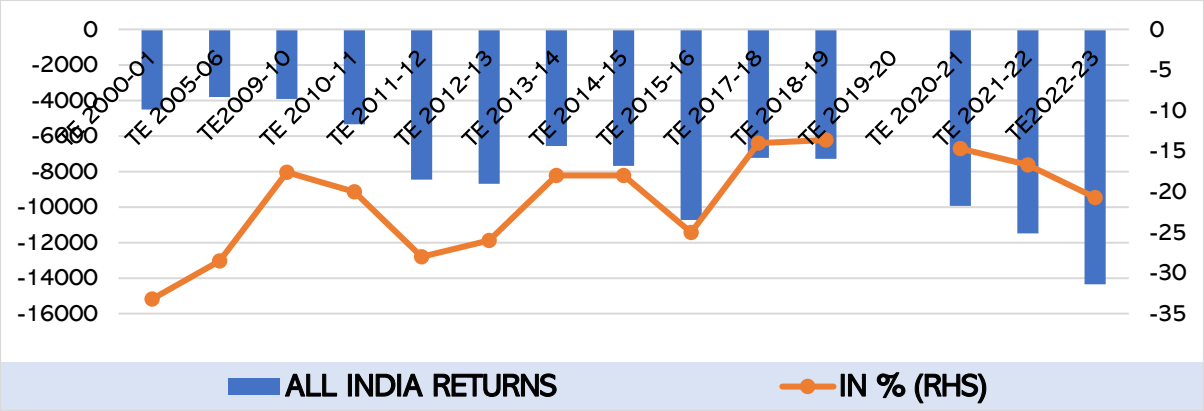
Source: Estimated from various issues of Price Policy on Kharif Crops, CACP.

A state-wise analysis also reveals that the major jowar producers were incurring losses per hectare. Andhra Pradesh and Tamil Nadu are the only two states that have registered positive margins in recent years. The remaining states, such as Maharashtra, Karnataka, and Rajasthan, exhibit a mixed trend of losses and modest gains over the period under analysis (Figure 6).

5.3 Ragi

Ragi is a highly resilient crop in dry conditions. Its seeds can withstand harsh temperatures, be stored for long periods, and even resist pests and insect attacks (CACP, 2010-11). It is a purely rain-fed crop with very high cultivation costs. It is a popular crop amongst the rural population in South India (Rao, 2025). Karnataka accounted for over 65% of the country's total ragi production in 2023-24. The second-highest share of production is in Tamil Nadu, accounting for about 14.5%. The all-India returns for ragi have mainly remained negative throughout the analysis period (Figure 7). This is because Karnataka, the largest producer of ragi in India, records negative returns on the cumulative cultivation costs.

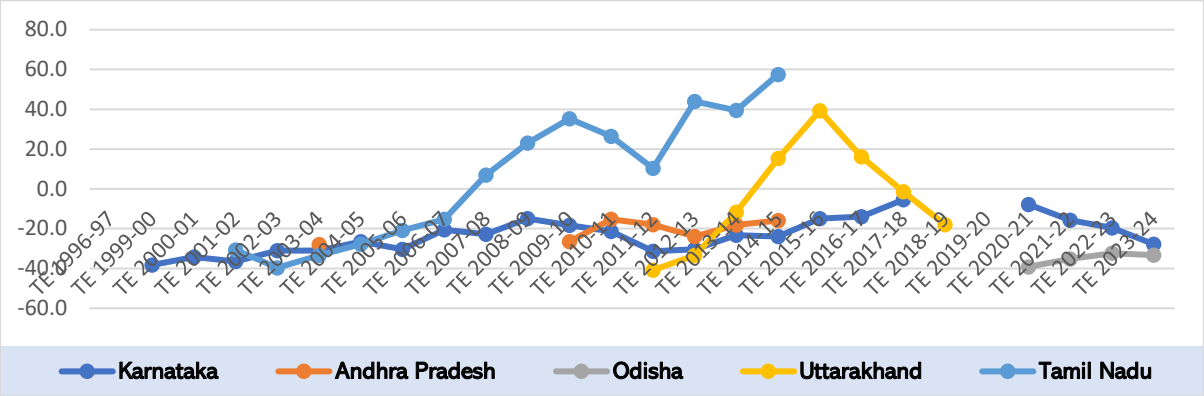
Figure 8: Returns on the Cultivation of Ragi (In per cent)



Source: Estimated from various issues of Price Policy on Kharif Crops, CACP.

Tamil Nadu too showed negative returns in the initial period; however, this was followed by a turnaround, with returns gradually turning positive after 2006-07 and then improving significantly to 57.5% in 2014-15 (Figure 8).

Figure 9: State-wise Returns over Cost on the Cultivation of Ragi-%



Source: Computed from various issues on Price Policy on Kharif Crops.

Data availability for other states, such as Andhra Pradesh, Uttarakhand, and Odisha, remains fragmented. However, for the years for which data are available, returns on cultivation were negative in Andhra Pradesh and Odisha. They showed short-lived positive returns in Uttarakhand before turning negative again.

5.4 Bajra

Bajra is the most cultivated crop after rice and wheat (Rao, 2025). It is a crop that has adapted well to harsh weather conditions, poor soil fertility, high temperatures, and low and erratic rainfall, and grows well in regions where wheat and maize cannot survive (CACP, 2010-11). However, erratic rainfall and the lack of assured irrigation have implications for growth, leading to fluctuating yields and output. Several problems hinder the expansion of this crop's cultivation, including localised demand, a short shelf life, and inadequate or absent storage facilities.

At the all-India level, the area under irrigation coverage has increased from 3.5% in 1950-51 to about 15-18% in 2023-24 (GOI, 2023-24). The irrigation coverage of bajra varies across states-Haryana (98.7%), Punjab (87.5%), Gujarat (74.1%), Himachal Pradesh (23.5%), Andhra Pradesh (22.9%) Karnataka (14.2%), Tamil Nadu (14.1%), Chhattisgarh (12.4%), Maharashtra (5%), Rajasthan (4.3%), Madhya Pradesh (3.3%) and Jharkhand (1.1%).

Other than the most recent period, 2020-24, Bajra has exhibited growth rates higher than those of the other coarse cereals. While acreage under bajra has declined consistently, bajra output continues to grow robustly, driven by higher yields. However, this growth has decelerated sharply after 2010, especially in recent years (Table 6).

Table 9: Growth Trends of Bajra (In per cent)

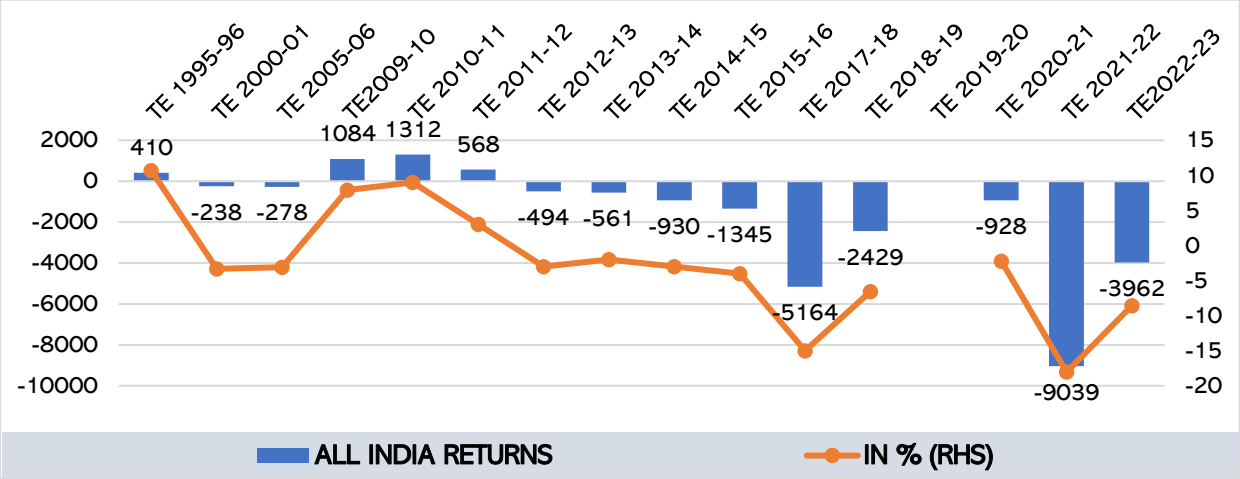
PERIOD	AREA	PRODUCTION	YIELD
1950-51 to 1960-61	2.7	4.4	1.2
1960-61 to 1970-71	1.3	11.7	9.9
1970-71 to 1980-81	-0.5	5.7	3.5
1980-81 to 1990-91	0.0	10.7	7.3

1990-91 to 2000-01	-0.4	6.8	5.4
2000-01 to 2010-11	0.7	14.8	9.7
2010-11 to 2020-21	-2.0	1.1	3.1
2020-21 to 2023-24	-0.8	0.2	0.8

SOURCE: GOI, Agricultural Statistics at A Glance (Various Issues)

The returns on bajra at the national level hovered around 5-10% until TE 1995-96, but subsequently declined and have remained mainly negative throughout the period of analysis, except for brief recoveries during TE 2009-10 and TE 2011-12 (Figure 9). Thereafter, this crop has recorded losses.

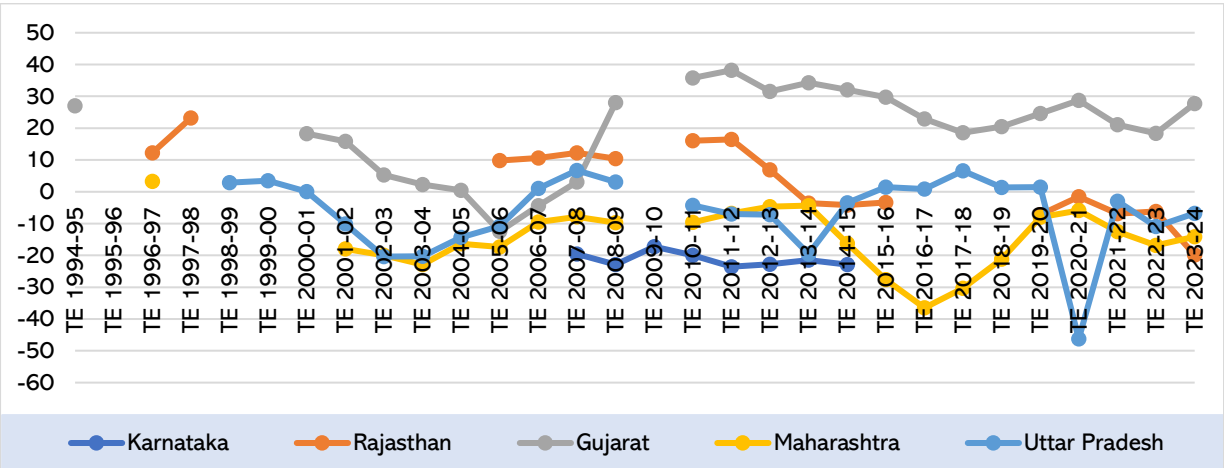
Figure 10: Returns on the Cultivation of Bajra (In Rs/Ha)



Source: Estimated from various issues of Price Policy on Kharif Crops, CACP.

About 88% of bajra production is concentrated in five states, primarily Rajasthan (42%), Uttar Pradesh (19%), Gujarat (12%), Haryana (11%), and Maharashtra (4%). Rajasthan, the largest producer of bajra, had registered decent net margins over cultivation costs till TE 2012-13, but thereafter these figures turned negative (Figure 10).

Figure 11: Returns over Cost of the cultivation of Bajra (%)



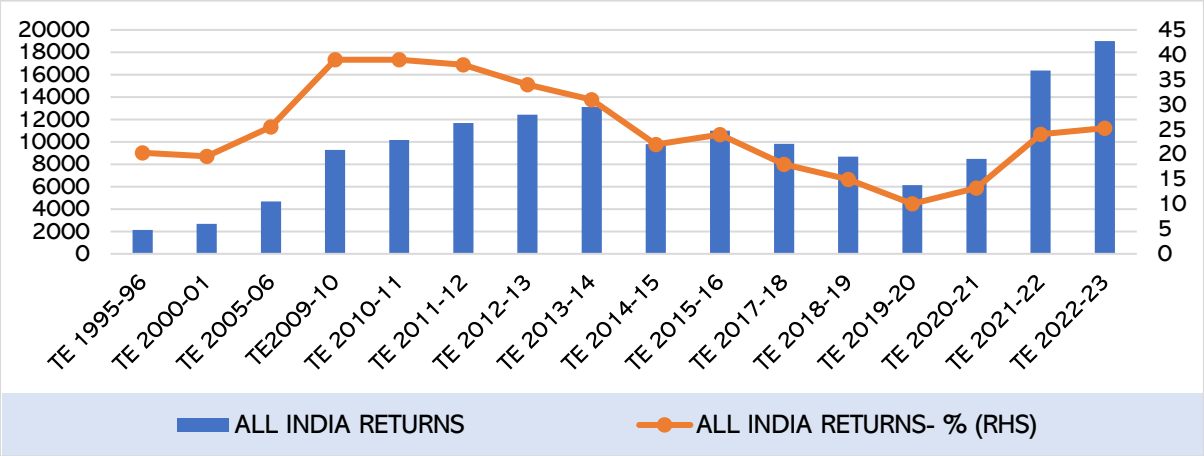
Source: Estimated from various issues of Price Policy on Kharif Crops, CACP.

Gujarat is the only state to have shown modest returns, especially after TE 2008-09, possibly owing to cultivation in better-irrigated regions. The returns in Uttar Pradesh have also oscillated between losses and meagre positive margins. Karnataka and Maharashtra have incurred losses due to cultivation costs.

5.5 Barley

Barley is mainly grown as a fodder crop and as an input for the brewery industry. Almost all barley production is concentrated in two states: Rajasthan (64.6%) and Uttar Pradesh (33.6%). Barley is often cultivated under well-irrigated conditions, with states like Gujarat (100%), Haryana (100%), Punjab (97.1%) and Rajasthan (98.1%) accounting for a significant proportion of their cultivated area under irrigation.

Figure 12: Returns on the Cultivation of Barley - (In Rs/Ha)



Source: Estimated from various issues of Price Policy on Rabi Crops, CACP.

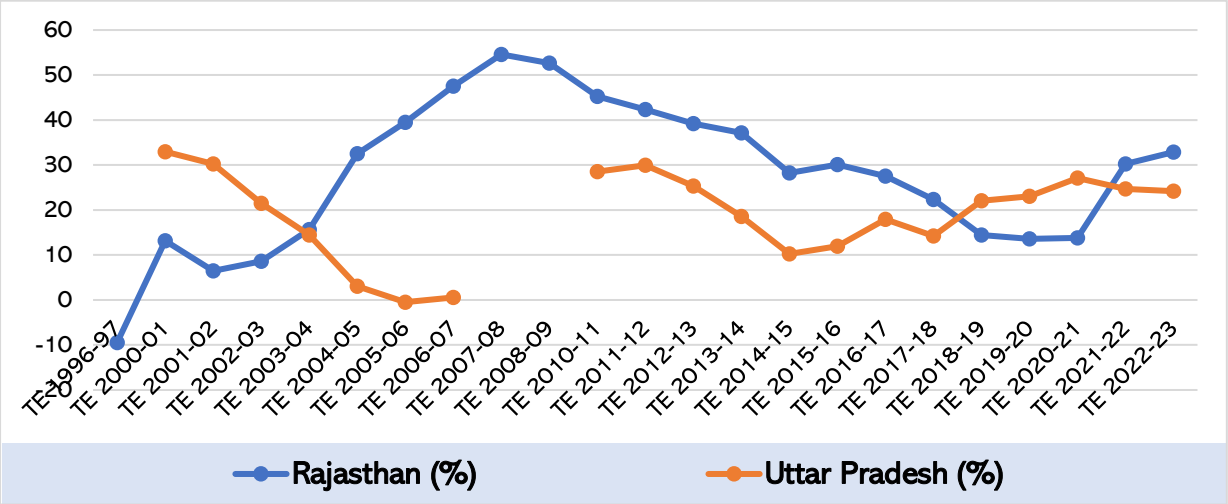
Other states, such as Bihar (43.7%) and Madhya Pradesh (58.2%), have also made appreciable improvements in their irrigation potential.

The ICAR and its affiliated institutes have developed several high-yielding barley varieties suited for the malt and brewing industries. Barley offers appreciable returns over costs because it is primarily cultivated for industrial uses. Hence, net returns over costs rose from 20.3% in TE 1995-96 to 39% in TE 2009-10 and remained at that level until TE 2012-13 (Figure 11). However, the returns declined to about 10% in 2019-20 before recovering to 25% in TE 2022-23.

Rajasthan, the chief producer of barley, registered tremendous growth in net returns on cultivation as this figure improved from losses to record a high of 55% in TE 2007-08 and then declined gradually to 13% in TE 2020-21 before recovering to 33% in TE 2022-23 (Figure 12). Uttar Pradesh, on the contrary, showed a declining trend in profitability, with returns falling from 33% to -0.5% between TE 2000-01 and TE 2005-06. This figure

averaged about 30% until TE 2010-12, but slumped again to 10% in TE 2014-15, with a modest recovery to 25% in TE 2022-23 (Figure 12).

Figure 13: Barley State-wise Returns Over Cost C2 (In per cent)



Source: Estimated from CACP, Price Policy of Rabi Crops (Various Issues).

6. Procurement of Shree Anna

The government has tried to boost demand for Shree Anna; however, the procurement of these grains remains abysmally low. The NSS 77th Round, Situation Assessment of Agricultural Households and Land and Livestock Holdings of Households in Rural India, 2019, reported limited awareness of MSP across various crops. It was the highest for crops such as paddy (46.8%), cotton (33.3%), and arhar (32.6%); however, it remained low or negligible for crops such as jowar, maize, ragi, and other pulses despite the announcement of minimum support prices. This was particularly true for dryland crops (Nagaraj et al., 2013). This is also reflected in the country's low procurement trends.

Table 7 indicates that the procurement of Nutri-cereals increased threefold in 2020-21; however, this growth could not be sustained in subsequent years. In fact, even in 2023, the year observed as the "International Year of Millets," procurement levels failed to rise. Even procurement as a proportion of marketed surplus has declined from 7.2% to 5.6%.

Table 10: Procurement of Nutri-Cereals (In Lakh Tonnes)

YEAR	PROCUREMENT	PROCUREMENT AS A % MARKETED SURPLUS
2019-20	3.2	2.6
2020-21	9.8	7.2
2021-22	6.1	5.2
2022-23	7.2	5.6
2023-24	6.3	5.6

Source: Price Policy On Kharif Crops-2024-25

Annex Table 1 shows that procurement has varied significantly not only at the all-India level but also across states. Haryana, Madhya Pradesh, Maharashtra and Uttar Pradesh are the most important states for the procurement of Nutri cereals, followed by Uttar Pradesh and Gujarat (especially in recent years). However, their share has fluctuated widely over the years. Procurement from states such as Chhattisgarh, Punjab, Rajasthan, Bihar, Tamil Nadu, Uttarakhand, and Odisha has remained negligible. At the same time, states like Andhra Pradesh (along with Telangana), which were earlier important contributors, have seen procurement halted. This is a deeply disconcerting trend because some of these states, such as Rajasthan, Andhra Pradesh, Bihar, Tamil Nadu, and Odisha, are important producers of Nutri-cereals, and procuring these crops would not only boost production but also provide cultivators with a steady, assured income.

This would not only encourage the production of these crops but also help farmers raise a marketable surplus above the quantity grown for self-consumption. Thus, there is a need to strengthen the procurement of these grains and ensure allocation through the National Food Security Mission and other welfare schemes (CACP, 2025-26). An article in *Punjab Kesari* (Jain, 2014) attributes the problem of maize non-procurement and storage to high moisture content. The article notes that the ideal moisture content for packing and storing maize is up to 13.5%; however, the market was swelling with maize with moisture content as high as 35%. This also emphasises the need to raise awareness amongst farmers about the conditions for storing these crops, while boosting public investment in research and development for them and ramping up storage facilities to enhance procurement.

6.1 Demand Constraints

The lack of a necessary increase in demand for these grains has compounded the problem of insufficient supply-side measures for coarse cereals. The coarse cereals face a severe demand shortfall, which is also localised and mostly restricted to states that grow these crops. The NSS surveys have shown a trend of declining coarse cereal consumption as incomes rise (CACP, 2006-07). The situation is further worsened by limited access to the public distribution system, which favours the distribution of “superior cereals” such as rice and wheat. It is estimated that the consumption of jowar (sorghum) declined by 75% in urban areas and by 87% in rural areas between 1972-73 and 2011-12 (Karnataka State Department of Agriculture and ICAR-IIMR, 2018). The latest NSS Survey (2024) on Household Consumption Expenditure - 2023-24 reflects this troubling trend. Except for four states-Gujarat (16.1%), Karnataka (12.1%), Maharashtra (12.4%), and Rajasthan (12.9%)—where rural coarse cereal consumption exceeds 10% of total consumption (Table 9), urban consumption figures are even more dismal: coarse cereals account for 15.1% of total consumption in Karnataka (though higher than in rural areas), 6% in Gujarat, 5.3% in Maharashtra, and just 2.2% in Rajasthan. All other states report substantially lower

shares of coarse cereal consumption. This indicates that coarse cereals still mainly constitute the staple diet of rural populations, while urban consumers are not changing their tastes and lifestyles to include these grains.

This is also compounded by the complex process of processing of coarse cereals entails in the form of cleaning and de-stoning, treatment, polishing, grinding, sieving and packaging before consumption which may not be feasible for the fast-paced, urban lifestyle and the absence of the easy availability of ready to eat alternatives of these grains for the consumers along with the short shelf-life of milled grains and flour of these cereals (NITI Aayog, 2023). It is also believed that the demand for coarse cereals may be rising indirectly (indirect demand or other demand) as animal feed (especially with the increase in livestock production and consumption, driven by higher incomes, dietary and lifestyle changes, and urbanisation). As an industrial input, there is insufficient evidence to substantiate this.

Part III - Trade, Market Access and Multilateral Disciplines

7. Export Potential and Performance

India holds immense potential for the production and export of Shree Anna, and for emerging as the "Hub of Millets," as it accounts for 80% of total millet production in Asia and about a fifth of the global production (CACP, 2023-24). Thus, India can exploit this opportunity to tap into the vast global market.

Table 11; International Comparison for selected Coarse Cereals (Area in Million Hectares, Production in Million Tonnes and Yields in Kg/Ha)

Crop	INDIA			WORLD			INDIA'S SHARE	
	Area	Production	Yield	Area	Production	Yield	Area	Production
Maize	10	33.7	3387	203.5	1163.5	5718	4.9	2.9
Sorghum	3.8	4.2	1092	40.8	57.6	1413	9.3	7.2

Source: CACP, Price Policy for Kharif crops-2025-26. .

Table 12: Percentage Share of Rice, Wheat and Coarse Grains In Total Consumption of Cereals in 2023-24

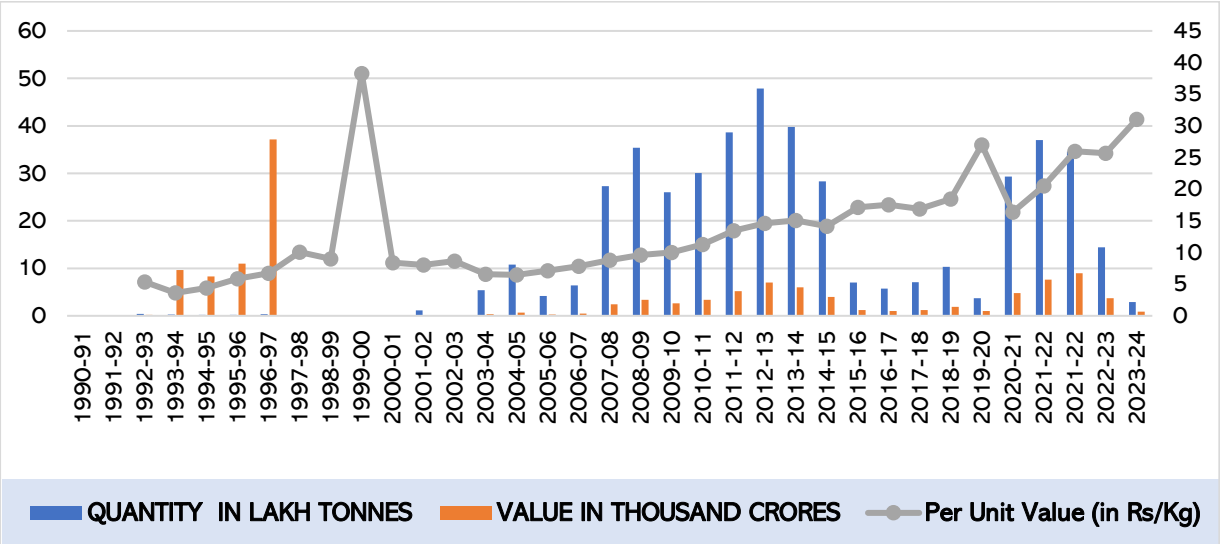
STATES	RURAL					URBAN				
	Monthly Per-capita Cereal Consumption (Kg)	RICE	WHEAT	COARSE CEREALS	OTHER CEREALS	Monthly Per-capita Cereal Consumption (Kg)	RICE	WHEAT	COARSE CEREALS	OTHER CEREALS
Andhra Pradesh	9.1	91.8	5.8	2.3	0.1	8.3	90.3	7.7	1.9	0.1
Assam	9.0	95.3	4.6	0.0	0.0	8.6	91.7	8.3	0.0	0.0
Bihar	10.5	52.4	47.3	0.3	0.0	10.3	51.4	48.5	0.2	0.0
Chhattisgarh	10.8	91.4	8.5	0.1	0.0	10.2	80.8	19.2	0.0	0.0
Gujarat	8.0	27.5	55.9	16.1	0.5	7.4	28.3	65.3	6.0	0.3
Haryana	8.4	7.6	87.0	5.3	0.1	7.3	13.8	84.0	2.1	0.1
Jharkhand	9.9	68.0	31.8	0.2	0.0	9.5	58.2	41.8	0.0	0.0
Karnataka	8.1	64.3	14.0	21.1	0.6	7.4	66.1	18.4	15.1	0.4
Kerala	6.8	87.3	12.4	0.1	0.2	6.7	86.9	12.7	0.3	0.2
Madhya Pradesh	9.2	27.0	71.0	1.9	0.1	8.5	23.6	76.0	0.2	0.2
Maharashtra	8.3	35.7	51.5	12.4	0.4	7.5	41.6	52.8	5.3	0.2
Odissa	11.5	90.7	8.6	0.6	0.1	10.0	81.8	18.1	0.1	0.0
Punjab	7.6	9.3	89.9	0.7	0.2	7.4	13.6	86.1	0.2	0.1
Rajasthan	10.3	3.8	82.8	12.9	0.5	9.6	6.4	91.2	2.2	0.2
Tamil Nadu	7.7	90.5	7.2	2.3	0.1	7.2	89.5	9.4	1.0	0.1
Telangana	10.2	91.4	6.0	2.6	0.1	8.7	87.0	11.1	1.7	0.2
Uttar Pradesh	9.1	37.6	61.8	0.5	0.1	8.1	31.6	67.9	0.4	0.1
West Bengal	10.5	81.2	18.8	0.0	0.0	8.9	73.8	26.2	0.0	0.0
All-India	**9.4**	**54.2**	**41.9**	**3.8**	**0.2**	**8.0**	**52.3**	**45.2**	**2.4**	**0.2**

Source: GOI (2024) NSS (2024) Survey on Household Consumption Expenditure: 2023-24 (August 2023-July 2024).

7.1 Maize

India is the sixth-largest producer of maize in the world, accounting for a modest 3% of global production (CACP, 2025-26).

Figure 14: Exports of Maize



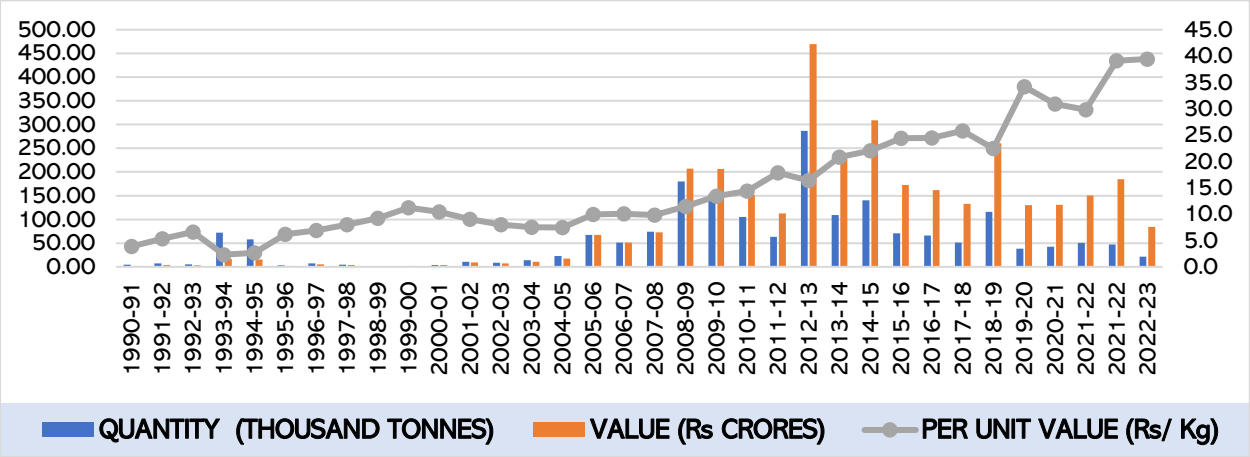
Source: CACP, Price Policy on Kharif Crops (Various Issues).

India exported small quantities of maize in the early nineties, generating significant export revenue amid rising global agricultural commodity prices (Figure 13). This increased substantially from 0.01 lakh tonnes in 1999-00 to 10.8 lakh tonnes in 2004-05 and peaked at 47.9 lakh tonnes in 2012-13. In value terms, it grew from Rs 4.86 crore to Rs 68 crore, then to Rs 7,000 crore during the same period. The significant increase from 2007-08 to 2012-13 was due to the introduction of a hybrid maize variety in 2005, which boosted productivity (CACP, 2019-20). Maize exports were mainly concentrated in Karnataka (CACP, 2012-13). These exports remained subdued during 2015-16 and 2019-20 due to higher domestic prices relative to global prices, but soon recovered as production in major exporting countries such as the USA, Argentina, and Ukraine declined (CACP, 2025-26). Recently, maize exports have declined again due to various factors, including increased domestic demand and higher local prices (CACP, 2025-26).

7.2 Jowar

The largest producer of jowar is the USA, with a share of about 13%, while India ranks fourth, accounting for 7.2% of global production (CACP, 2025-26).

Figure 15: Exports of Jowar



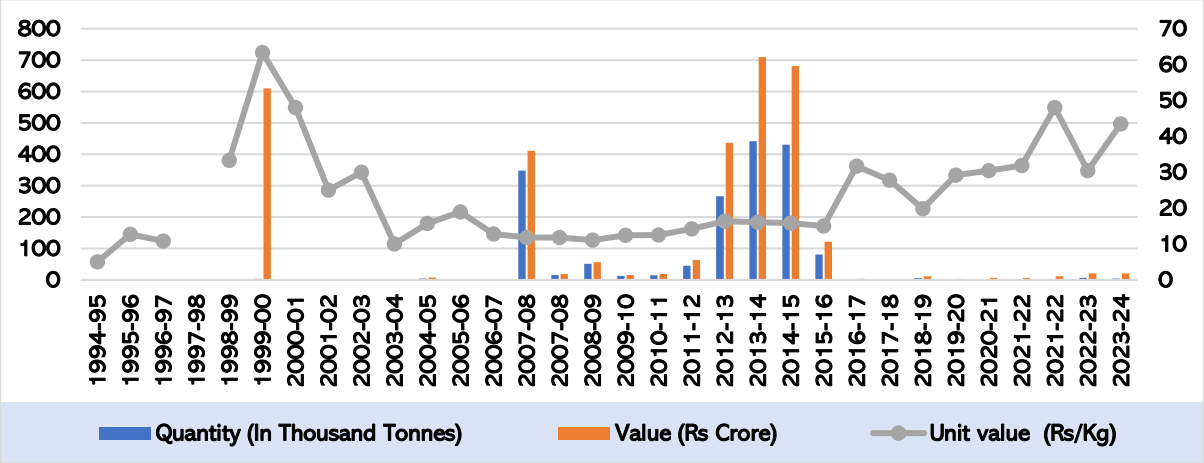
Source: CACP, Price Policy On Kharif Crops (Various Issues).

Similar to maize, India exported almost negligible quantities of jowar during the early nineties, except for 1993-93 and 1994-95, which were characterised by a global rise in the prices of primary agricultural products. Exports of jowar remained subdued, particularly until 1999-00. Thereafter, these figures have grown significantly, rising from 1.26 thousand tonnes in 1998-99 to 14 thousand tonnes in 2003-04, shooting up to 180.3 thousand tonnes in 2008-09 (global rise in the prices of agricultural commodities) and further to 286.8 thousand tonnes in 2012-13 (Figure 14). The corresponding figures in terms of value were Rs 1.16 crore, Rs 10.63 crore, Rs 206.8 crore, and Rs 469.7 crore, respectively, during the same period. This was, however, followed by a declining trend with a brief resurgence in 2018-19.

7.3 Barley

The quality of barley produced in India is mainly suited for feed rather than brewing or malting. India is a net importer of barley, and its exports have been negligible except for a few years during 2012-13 to 2014-15.

Figure 16: Exports of Barley



SOURCE: CACP, Price Policy on Rabi Crops (Various Issues).

This is mainly due to low barley production and high domestic prices (CACP, 2026-27). Despite a small share in global barley trade, India exports small quantities to countries such as Nepal, Oman, Bhutan, Qatar, Bahrain, and the UAE, due to the freight advantages it enjoys over other barley-exporting countries (CACP, 2018-19).

Hence, to boost exports, efforts must be directed toward encouraging the export of value-added products from these Nutri cereals, especially jowar and maize (CACP, 2025-26).

7.4 MSP, Procurement and the Export Channel

Procured grain is used for domestic welfare distribution, as Nutri-cereals are largely procured under Decentralised Procurement by state agencies, and allocation is to TPDS, ICDS, PM POSHAN (Mid-Day Meal), and state schemes. The Department of Food and Public Distribution (DFPD) revised the guidelines for the allocation, distribution, and disposal of coarse grains procured by State Agencies and FCI, and extended the distribution period to 6-10 months from the earlier 3 months. A provision for advance for subsidy and inter-state transportation of surplus millets through FCI was also incorporated, all of which are mechanisms for moving grain to *domestic* beneficiaries rather than to port. Trade (exports) is sourced entirely from private and open markets. Exporters buy from mandis, aggregators and FPOs, require APEDA RCMC registration, and increasingly need ISO 22000/HACCP for buyer acceptance. India exports millets to 139 countries, and the growth segment is in value-added products; the June 2026 shipment of ready-to-cook millet functional foods from Karnataka to New Zealand by a Bengaluru firm, facilitated by APEDA, is typical. Nothing in that chain touches public stocks. [20]

Millet exports remain overwhelmingly raw, unprocessed grain moving under HS 1008, at unit values of roughly USD 440 a tonne, below the USD 618 a tonne realised on rice exports, with feed-grade bajra to West Asian and West African markets forming the bulk. Value addition in millets has occurred in the *domestic* urban market, where processed products now account for over half of consumption, but has not translated into the export

[20] Refer to https://www.pib.gov.in/PressReleasePage.aspx?PRID=1908330&reg=48&lang=2.

basket. The growth segment celebrated in export promotion comprises consignments measured in single tonnes, against a total trade of 138,690 tonnes.[21]

8. Shree Anna and International Disciplines

Shree Anna can support bilateral trade and multilateral negotiations by boosting agricultural yields and expanding cereal varieties. Shree Anna (millets) can enhance India's position in bilateral FTAs by offering a niche, climate-resilient, and health-focused product line that aligns with partner countries' sustainability and nutrition goals. At the multilateral level (WTO), members back India's advocacy for food security, climate adaptation, and inclusive trade rules, positioning millets as a strategic crop in discussions on agriculture, subsidies, and sustainable development.

8.1 Agreement on Agriculture and the WTO

Special and Differential Treatment (SDT): Developing countries (such as India) can use Article 6.2 to exempt certain input and investment subsidies for low-income/resource-poor farmers. Millets often fall under this category.

India's Practice (Relevant for Millets)

- India notifies MSP and procurement subsidies for cereals (including coarse grains like bajra, jowar, ragi) under **DS:1**.
- Input subsidies (fertiliser, electricity for irrigation, etc.) are notified under **Article 6.2 exemptions**.
- Public stockholding for food security (including millets, especially after the UN declaration of 2023 as the *International Year of Millets*) is notified under **Green Box (DS:2)**, though contested by some Members.

As millets gain global recognition (for nutrition and climate resilience), India's notifications will increasingly highlight them in **food security programs** and **SDT exemptions**.

This creates an **asymmetry in transparency**: India's detailed notifications expose it to WTO scrutiny, while other producers avoid challenges by keeping millet support implicit.

Under the WTO framework, strategies for *Shree Anna* (millets) can focus on leveraging special and differential treatment (SDT), enhancing transparency in subsidy notifications,

[21] Economic Times. (2023). **What the Union Budget's focus on millet might mean for the humble grain. Economic Times. News Paper.**

positioning millets as climate-resilient crops in SPS/TBT discussions, and promoting them through export facilitation and Green Box programs.

- SPS/TBT measures: Highlight millets' nutritional and climate-resilient properties in Codex standards, ensuring they are recognised in international food safety and labelling frameworks.
- Climate resilience narrative: Frame millets as "climate-smart cereals" in WTO committees, aligning with global sustainability goals and reducing vulnerability to disputes.
- Biodiversity and heritage: Use the WTO's Committee on Trade and Environment to emphasise millets' role in conserving agro-biodiversity, drawing from initiatives like Odisha's Millet Mission

Market Access and Export Promotion

- **Tariff bindings:** Ensure tariff commitments on millet exports remain flexible, allowing India to expand exports without facing tariff escalation – please also refer to the US RT initiated on April 2nd 2025.
- **Export facilitation:** Promote Shree Anna through the **WTO's Aid for Trade programs**, linking millet exports to nutrition and sustainable agriculture.
- **Comparative advantage:** India can highlight its competitiveness in millet exports, as studies show rising demand in global health-conscious markets.

Table 13: Country-wise Disciplines on Millet Notifications: AOA Agreement

Country	Notification Practice	Millet Coverage	AoA Category	Key Observations
India	Regular notifications of MSP, procurement, and input subsidies (fertiliser, electricity, irrigation).	Bajra, jowar, ragi, kodo, foxtail, barnyard, etc.	DS:1 (Amber Box), DS:2 (Green Box), Art. 6.2 exemptions	India explicitly lists coarse grains/millets in DS:1 table; the US/Canada often challenges MSP for breaching de minimis.
Nigeria	Limited notifications; subsidies reported in aggregate for cereals.	Sorghum, pearl millet (major staples).	Mainly Green Box (food security, extension services).	Notifications are sparse; capacity constraints limit product-specific reporting.
China	Notifications emphasise rice, wheat, and maize; millets are rarely disaggregated.	Minor millet crops are included under "other grains."	DS:1 (Amber Box) + Green Box programs.	China focuses on staple cereals; millet support is implicit, not separately notified.
USA	Notifications cover maize, wheat, rice; no millet-specific entries.	Sorghum is included under coarse grains, but not millets.	DS:1 (Amber Box), Green Box (insurance, research).	The USA does not treat millets as a major crop; support is provided indirectly through broader cereal programs.

- Source: Authors

The FSSAI has now framed a comprehensive group standard for 15 types of millets specifying eight quality parameters such as maximum limits for moisture content, uric acid content, extraneous matter, other edible grains, defects, weevilled grains and immature and shrivelled grains, in order to ensure availability of good quality (standardised) millets in domestic and global markets. a) setting food safety standards for millet products, including maximum permissible limits (MPLS) for contaminants, labelling requirements and food safety management practices; (b) conducting inspections and audits of millet processing facilities to ensure compliance with food safety standards; and (c) promoting awareness campaigns on food safety practices for millet processors, traders and consumers. BIS contributes to the standardisation and quality improvement of millet products by (a) developing quality standards for millet products, covering parameters such as moisture content, protein content and aflatoxin levels, (b) certifying schemes for millet products, enabling producers to demonstrate adherence to quality standards and gain consumer trust, and (c) promoting the adoption of quality standards among millet stakeholders to ensure consistency and improvement in the overall quality of millet products.

9. Market Access Challenges (NTMs)

It can facilitate market access and promote export diversification by providing India with a distinctive export identity beyond rice and wheat. In free trade agreements with regions such as Africa, ASEAN, and the European Union, preferential tariff classifications for millet-based products may be incorporated. Moreover, it strengthens India's bargaining position by offering a product that aligns with global demand for superfoods (Rath et al, 2025).

Within the chapter on sustainability in India's FTAs, the inclusion of Shree Anna could be seen as establishing sustainability and climate-related provisions. Since these crops are more environmentally friendly, being low-input and climate-resilient, they can be promoted as a crop that supports green trade commitments. Furthermore, India can negotiate mutual recognition of standards (Codex, FSSAI, and organic certification) to facilitate millet exports. (PIB, 2025)

The Shree Anna can support the process of multilateral trade negotiations under the WTO by facilitating and providing an alternative to food security, thereby ensuring livelihood security. It enables and supports small and marginal farmers in dry, extremely low-rainfall areas, thereby indirectly alleviating pressure on public stockholding. (PIB, 2023).

India can argue that millets, as Nutri-cereals, deserve special treatment under the WTO's Agreement on Agriculture (AoA) in light of their role in providing food security and

nutrition, thereby strengthening India's case for flexibilities (easing the pressures) on public stockholding programs. As climate-resilient crops, millets support climate adaptation and thus align with the WTO's ongoing discussions on trade and the environment. India could advocate for special carve-outs for climate-resilient crops in subsidy disciplines. (Rathi, Jain, & Jain, 2024)

At the multilateral level, efforts such as South-South Cooperation enable India to leverage Shree Anna as a flagship crop in WTO coalitions (G-33, African Group, LDCs). Promoting millets as a shared solution for hunger and climate stress fosters solidarity and strengthens collective bargaining. In terms of value chain development, the FTAs can promote investment in the processing and packaging of millet-based products and enable India to create many of these value chains. Facilitating this creates jobs and income in rural areas, aligning with SDG-linked trade cooperation. Thus, India can push for joint R&D and technology transfer in millet cultivation and processing.

Table 14: Usage of SPS Measures and Shree Anna

S.N.	Dimension	Rice & Wheat	Shree Anna - (Millets)
A	Codex Standards	Well-established, detailed	Limited, grouped under "other cereals" #
A.1	*Harmonised Standards - Compliance Costs*	*Lower (harmonised MRLs)*	*Higher (due to fragmented standards) **
A.2	*Non-Harmonised - Compliance Cost*	*Higher (Deviated MRLs)*	*Lower (Need for identification at the International Standards Setting Organisation - ISSOs)*
A.3	*MRLs & Testing*	*Harmonized globally*	*Fragmented, inconsistent and not identified$*
B	Food Safety Risks	Nearly all identified pesticides, fertilisers and agrochemical residues	Post-harvest contamination is less regulated
C	Trade Negotiations	Central in SPS disputes	Emerging needs recognition
D	Risk assessment capacity	Mature RA frameworks and data	Emerging RA; data-poor for millet chains

Note: # = Millets are individually named in Codex Group 020, EU Annex I and US Crop Group 15-22; * = higher and unlisted active ingredients default to 0.01 mg/kg in the EU and to zero tolerance in the US; # =Identified, but **derivative,** set by extrapolation from sorghum or proso millet rather than from millet-specific residue trials;
Source: Authors based on the CWS Database on SPS measures.

SPS (Sanitary and Phytosanitary) measures for rice and wheat are more established, codified, and harmonised worldwide than those for millets, which face fragmented standards and limited international recognition. Rice and wheat benefit from long-standing Codex Alimentarius guidelines, extensive testing protocols, and harmonised import/export requirements, whereas millets are only beginning to be incorporated into SPS frameworks, often regarded as "minor cereals" with less regulatory clarity. India can advocate for standard harmonisation (Codex Alimentarius, SPS measures) to lower barriers to millet

trade. This can position Shree Anna as a globally recognised commodity, facilitating entry into developed markets. Millets are identified in all three major regulatory systems.

9.1 Codex Alimentarius

- Millets sit within **Group 020, Cereal Grains** of the Codex Classification of Foods and Animal Feeds (CXA 4-1989). On the feed side, AS 0646 Millet fodder expressly covers *Echinochloa crus-galli*, *Eleusine coracana*, *Panicum miliaceum*, *Pennisetum typhoides* and *Setaria italica*, cross-referenced to the specific millets listed in Group 020.[22]
- The classification has recently been overhauled: the extensive revision of CXA 4-1989 was completed at CCPR54 in Beijing in 2023. Group 020 now includes subgroups, and the portion-of-commodity rule names millet directly. For wheat, rye, triticale, maize, sorghum, pearl millet, and similar cereals whose husks separate readily during threshing, the MRL applies to the kernels.[23] [24]
- Codex also maintains commodity standards for millets. CXS 169, on whole and decorticated pearl millet grains, requires that the grains comply with the maximum residue limits and maximum mycotoxin limits established by the Commission for that commodity.[25]

The distinction on which the argument should turn: Codex has classified millets comprehensively but has set relatively few millet-specific numeric CXLs. Coverage arises principally through group extrapolation from representative commodities, not from millet residue trials.

9.2. European Union

- Regulation (EC) No 396/2005 lists common (proso) millet and sorghum as distinct commodities in Annex I, and EFSA derives MRLs for them by name. In the aminopyralid

[22] EU. (2005). **Pesticide residues in food and animal feed.** Regulation (EC) No 396/2005 on maximum residue levels of pesticides in or on food and feed of plant and animal origin. https://eur-lex.europa.eu/EN/legal-content/summary/pesticide-residues-in-food-and-animal-feed.html.

[23] FAO. (2018). DRAFT REP18/PR - Appendix X. https://www.fao.org/fao-who-codexalimentarius/sh-proxy/en/?lnk=1&url=https%3A%2F%2Fworkspace.fao.org%2Fsites%2Fcodex%2FMeetings%2FCX-718-50%2FREPORT%2FDRAFT+REPORT%2FDRAFT_REP18PR_App10e_IMPACT.pdf.

[24] IR-4 Project. (2024). Adopted Codex Classification of Foods and Animal Feeds and Representative Commodity Tables. https://www.ir4project.org/fc/crop-grouping/adopted-updated-codex-classification-of-foods-and-crop-groups/.

[25] Rouamba A., Shimelis H., Drabo I., Mrema E., Ojiewo C. O., Mwadzingeni L. and Rathore A. (2023). Genome-wide association analyses of agronomic traits and Striga hermonthica resistance in pearl millet. **Scientific Reports: natureresearch**. https://pmc.ncbi.nlm.nih.gov/articles/PMC10567810/. doi: 10.1038/s41598-023-44046-1.

assessment, the submitted data were deemed sufficient to derive MRL proposals for barley, rye, sorghum, millet and oats.[26]

- The absence of a specific MRL does not amount to absence of regulation. Where no specific MRL has been set, a default of 0.01 mg/kg applies, and that default operates as an enforceable MRL in its own right alongside those in Annexes II and III.[27] [28]

An Indian millet consignment carrying an active ingredient with no EU entry faces the strictest available limit, in effect the limit of quantification, which is a harder barrier than that confronting rice or wheat, for which negotiated crop-specific MRLs are generally set above 0.01 mg/kg.

9.3. United States

The United States position is the most explicit and the most recent.

- Millets fall within **Crop Group 15-22, Cereal Grain Group** (40 CFR 180.41), which now comprises 60 commodities.[29]
- The 2022 expansion added the Indian small millets by name. The twenty-four new commodities include barnyard millet, finger millet, foxtail millet, little millet, teff, black fonio, white fonio, Job's tears, amaranth and quinoa.[30]
- The representative commodities for the group are wheat, barley, field corn, sweet corn, rice, and either grain sorghum or proso millet, with a dedicated grain sorghum and millet subgroup (15-22E).[31]
- Once a crop group tolerance is established, it applies to every commodity within the group.[32]

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[26] European Commission. (2025). Information note on Article 20 of Regulation (EC) No 396/2005 as regards processing factors, processed and composite food and feed. SANTE/ 10704/2021 Rev 1. European Commission Directorate General for Health and Food Safety. Food and feed safety, innovation. Pesticides and Biocides. https://food.ec.europa.eu/system/files/2022-02/pesticides_mrl_guidelines_proc_imp_sante-2021-10704.pdf.

[27] Duong Anh Son and **Tran Vang-Phu. (2021).** Regulation of the European Union on the Maximum Residue Levels of Pesticides - Comments and Criticisms. **Journal of Legal, Ethical and Regulatory Issues.** 24 (1). https://www.abacademies.org/articles/regulation-of-the-european-union-on-the-maximum-residue-levels-of-pesticides--comments-and-criticisms-10955.html.

[28] Food Safety Authority of Ireland. ( ). **Pesticides Residues in food.** https://www.fsai.ie/enforcement-and-legislation/legislation/food-legislation/pesticides-residues-in-food.

[29] Cornell Law School. (N.D.). 40 CFR § 180.41 - Crop group tables. https://www.law.cornell.edu/cfr/text/40/180.41.

[30] Ibid.

[31] Idid.

[32] Refer to https://www.ecfr.gov/current/title-40/chapter-I/subchapter-E/part-180/subpart-B/section-180.40.

A single Group 15 tolerance, as routinely granted, for instance, sedaxane at 0.01 ppm on grain, cereal, Group 15, therefore covers ragi, kodo, kutki and barnyard millet automatically. Absent a tolerance, United States law treats the consignment as adulterated.

9.4. Australia and other jurisdictions

The Australian Pesticides and Veterinary Medicines Authority applies MRLs to all commodities in Codex Group 020 (Cereal Grains) and adopts the Codex structure directly. Japan's Positive List System operates on comparable logic, with a uniform limit of 0.01 ppm for unlisted substance-commodity combinations.[33]

To summarise, the market access challenges confronting Shree Anna are not the absence of standards but the absence of **millet-specific residue data generated under Indian good agricultural practice**. Group tolerances extrapolated from proso millet or grain sorghum may not reflect the pesticide use patterns of kodo, kutki or ragi grown in mixed-cropping tribal systems. Where an active ingredient used in India carries no CXL and no importing-country tolerance, the default limit of quantification becomes a de facto zero-tolerance barrier. India's negotiating ask should accordingly be concrete rather than declaratory: sponsor JMPR evaluations for millet-relevant active ingredients, generate residue-trial data through ICAR-IIMR, and seek CXLs for small millets, rather than arguing for recognition in the abstract. Two further points belong on the non-pesticide side. **Mycotoxins** are the more binding constraint in practice: aflatoxin and fumonisin limits, together with ergot in kodo millet, and the existing FSSAI and BIS material in the paper fits naturally at that point.

Part IV - Development Outcomes, Conclusions and Recommendations

10. Shree Anna and the Attainment of SDGs

Shree Anna (millets) directly supports the attainment of several Sustainable Development Goals[34] (SDGs), especially SDG 2 (Zero Hunger), SDG 3 (Good Health and Well-being), SDG 12 (Responsible Consumption and Production), and SDG 13 (Climate Action). It also contributes indirectly to goals like poverty reduction (SDG 1) and decent work and economic growth with sustainable livelihoods (SDG 8).

[33] Need to reconfirm the same based on the MHLW database https://www.pmda.go.jp/english/safety/info-services/drugs/medical-safety-information/0002.html.

[34] The Sustainable Development Goals were adopted by the United Nations in 2015 as part of the 2030 Agenda for Sustainable Development with the underlying principle of "leaving no one behind". The 17 Sustainable Development Goals were a universal call for action to achieve certain inter-linked goals like ending poverty and hunger, gender discrimination and socio-economic inequalities and environmental degradation by 2030 through international cooperation.

10.1 How Shree Anna (Millets) Contribute to SDGs -Direct Contributions

10.1.1 SDG 2: Zero Hunger

India is placed in the "serious category" as it ranks 102nd out of 123 countries on the Global Hunger Index 2025. Shree Anna can help achieve SDG 2 by reducing hunger. Zero Hunger is a broad-based term that encompasses not just the availability of food but also its affordability and access. Although hailed as "the poor man's food", millets are highly nutritious and rich in protein, fibre, and micronutrients. Hence, they can help improve **food security and affordability** by diversifying diets and **reducing dependence on rice/wheat monocultures, especially for lower-income** communities. Also, since these are drought-resistant crops, they ensure **stable yields even in climate-stressed regions**.

10.1.2 SDG 3: Good Health and Well-being

Millets promote good health and overall well-being owing to their numerous nutritional and health benefits, as they are packed with essential minerals, vitamins, and dietary fibre (Rao et al., 2017). Millets are **gluten-free** and have a **low glycaemic index**, making them suitable for people with diabetes and celiac disease. They help prevent hypertension and **non-communicable diseases like obesity, cardiovascular issues**, **degenerative** diseases and metabolic syndromes (Rao et al, 2017). Their therapeutic properties promote overall well-being.

10.1.3 SDG 12: Responsible Consumption and Production

The cultivation of millets and their integration into diets through government welfare programmes advance the goal of responsible consumption and production by creating sustainable agricultural systems. These crops draw less heavily on scarce resources like water, require **fewer chemical inputs, are less susceptible to pests and have shorter growing cycles**, making them environmentally sustainable. Hence, encouraging **millet-based diets reduces ecological footprints** compared to the cultivation of rice and wheat (Mukherjee et al., 2025). Millet cultivation also promotes a **circular economy in food systems by supporting local farmers and processors.** Thereby, promoting **sustainable agricultural practices.**

10.1.4 SDG 13: Climate Action

In a world combating global warming and climate change, which has impacted crop production through a decline in yields of chief food crops like rice and wheat, threatening food security, millets offer a viable alternative. Not only are these crops **climate-resilient**, promote efficient consumption of inputs, thrive in harsh, unfavourable climatic conditions, require shorter cropping duration (12-14 weeks as compared to 20-24 weeks for rice and

wheat), but are also C4 crops.[35] (carbon fixing) Moreover, contribute to climate change mitigation, as their cultivation reduces greenhouse gas emissions compared to water-intensive crops (Mukherjee et al., 2025). Hence, they contribute to **adaptation strategies** for agriculture under climate change.

10.2 Indirect Contributions

SDG 1: No Poverty - Millets support the goal of poverty alleviation by encouraging small and marginal farmers and providing them with a steady and assured income. Additionally, the promotion of millets through government incentives and welfare schemes, especially value-added products, can help alleviate poverty by creating rural employment, boosting farmer incomes and empowering rural communities.

SDG 8: Decent Work and Economic Growth. The expansion of millet-based industries creates jobs and opportunities in processing, packaging, and marketing, especially for women, tribal communities, and smallholders of land, aligning with the goal of decent work and economic growth.

SDG 15: Life on Land- The SDG 15 seeks to "protect, restore, and sustainably manage terrestrial ecosystems, forests, and biodiversity." It aims to prevent biodiversity loss and promote the sustainable use of land and ecosystems (Deshpande and Asthana, 2024). Millets support biodiversity by encouraging crop diversification and mixed cropping systems which in turn support other plants and insects and breaking pest-cycles. It also encourages conservation of biodiversity and promotes healthier ecosystems by reduced chemical inputs and fertilizers and preventing soil degradation (Deshpande and Asthana, 2024).

SDG 17: Partnerships and Indigenous Knowledge[36]- The revival of millets can also help to achieve the SDG 17 by helping foster better cooperation and partnerships amongst the various stakeholders including the farmers at the grass root level, the Government at various tiers and both national and international research institutions and organisations and strengthening local communities. It also helps to preserve our traditional, indigenous knowledge and agricultural biodiversity.

11. Summary and Conclusion

[35] Millets are carbon fixing crops which means that they have a higher rate of conversion of the atmospheric carbon di-oxide to oxygen as compared to crops like rice and wheat that release methane (Samtani et al, 2024).

[36] https://milletsnow.com/blogs/27-07-28/millets-the-sustainable-superfood-that-can-help-achieve-sustainable-development-goals?srsltid=AfmBOoowrzSEN_P1yH_IRbXct4UvII9FyxaEx5bHO2NlOfTN__zD_gBM

This paper set out to test a proposition rather than to restate it. The proposition is that millets declined because they were forgotten, and that awareness, promotion and demand creation would therefore reverse the decline. That was the stated logic of the National Year of Millets in 2018 and of the International Year of Millets in 2023. Measured against the production, cost, procurement, consumption and trade record assembled here, the proposition does not hold. The constraint is not awareness. It is profitability at the farm gate, processing capacity in the producing districts, and assured offtake.

The historical account is not in dispute. Millets were the staple of much of the population before the Green Revolution, accounting for around 40 per cent of cultivated grain against roughly 20 per cent today. The reorientation of the late 1960s, driven by the twin droughts of 1967-68, the threat to food aid and the price and procurement incentives that followed, moved land, research effort and institutional attention to rice and wheat. Coarse cereals were relegated to marginal, rainfed land, and with them went local seed material and the cultivation knowledge attached to it. The cost of that shift is now visible in groundwater depletion, narrowed food baskets and a cropping pattern poorly matched to the roughly 60 per cent of cultivable land that is arid or semi-arid and that produces about 40 per cent of the country's food.

The grower profile explains why the policy problem is hard. Millets are overwhelmingly a rainfed, dryland, smallholder crop, concentrated in precisely the districts where operational holdings are smallest, and the small millets are grown almost entirely by tribal and marginal households in Madhya Pradesh, Odisha, Chhattisgarh, Jharkhand and the Uttarakhand hills, frequently as landraces under mixed cropping. Against that, the policy record is dense rather than thin. From the Special Food Production Programme for Maize in 1987 through ICDP-CC, ISOPOM and INSIMP to the Sub-Mission on Nutri-Cereals, the Production Linked Incentive Scheme for millet-based products, PM-FME, PM-RKVY, NABARD's promotional funds, the state missions and ICAR-IIMR's designation as a global centre of excellence, the Centre has intervened at every point at which agricultural policy conventionally intervenes. Documenting that density matters analytically: if promotional effort were the binding constraint, the record would predict a revival.

No revival appears in the growth data. Area under Shree Anna fell from 350.6 lakh hectares in the 1970s to 128.7 lakh hectares in the 2020s. Yields more than doubled over the same period, from 5.5 to 13.3 quintals per hectare, and yield instability fell sharply, from 22 per cent in the 2000s to 3.2 per cent in the 2020s. Production, however, has been essentially flat, recovering only to 171.1 lakh tonnes. Productivity gain has been absorbed by area loss, which is the signature of a crop that cultivators keep growing better and growing less of.

The returns analysis identifies why. Returns over cost C2 are negative for jowar, ragi and bajra in most major producing states across most of the period examined, including in

Karnataka for ragi and Rajasthan for bajra, the largest producers of each. The exceptions are instructive: Tamil Nadu for ragi, Gujarat for bajra, and barley throughout, and in each case the explanation is either better irrigation or an industrial buyer. Barley returns hold up because malting and brewing demand exists. Where a crop is grown for a buyer, it pays; where it is grown because nothing else will grow, it does not.

Procurement and demand close the circle. Procurement of Nutri-cereals rose threefold in 2020-21 and then fell back; it did not rise in the International Year of Millets, and procurement as a share of marketed surplus declined from 7.2 to 5.6 per cent. Procurement has lapsed entirely in states such as Andhra Pradesh and Telangana that remain significant producers, and awareness of minimum support prices among dryland cultivators is negligible on the evidence of the NSS 77th round. On the demand side, coarse cereals account for 3.8 per cent of rural and 2.4 per cent of urban cereal consumption, with shares above 10 per cent in only four states. Urban demand has grown, but in premium processed form through e-commerce and organised retail, a channel structurally disconnected from the subsistence grower who was the stated beneficiary.

On trade, the paper establishes that two instruments commonly assumed to reinforce one another do not meet. Procured grain moves under decentralised procurement and must be distributed through TPDS or other welfare schemes within the procuring state; exports are sourced entirely from mandis, aggregators and FPOs by private exporters holding APEDA registration and, increasingly, ISO 22000 or HACCP certification. Nothing in the export chain touches public stocks. Millet exports accordingly remain under one per cent of rice export value and move predominantly as raw grain at unit values of roughly USD 440 a tonne against USD 618 for rice. Value addition has occurred in the domestic urban market and has not entered the export basket.

At the multilateral level, minimum support prices and procurement for coarse grains are notified under DS:1, input subsidies under Article 6.2 and public stockholding under the Green Box. This produces an asymmetry in transparency: India's disaggregated notifications expose it to challenge while other millet producers keep comparable support implicit within aggregate cereal reporting. It follows that diversification into millets does not, by itself, reduce India's exposure to aggregate support, and the case for Shree Anna cannot rest on that assumption.

The most substantial correction concerns market access. It is frequently assumed that because millets are not codified in the manner of rice and wheat, they escape the scrutiny that constrains India's principal cereal exports. The examination of non-tariff measures here does not bear that out. Millets are named individually in Codex Group 020 following the revision completed at CCPR54 in 2023; they appear as distinct commodities in Annex I to Regulation (EC) No 396/2005, for which EFSA derives maximum residue levels by name; and the 2022 expansion of United States Crop Group 15-22 added barnyard, finger, foxtail

and little millet, along with teff and fonio, by name. What is scarce is not classification but millet-specific residue data generated under Indian good agricultural practice. Group tolerances extrapolated from proso millet or grain sorghum may not reflect the use patterns of kodo, kutki or ragi in mixed-cropping tribal systems. Where an active ingredient carries no established tolerance, the European default of 0.01 mg/kg and the United States zero-tolerance rule operate as a de facto barrier. The effective regime confronting millets is therefore stricter, not laxer, than that confronting rice and wheat. Mycotoxins are the more binding constraint in practice, particularly aflatoxin, fumonisin, and ergot in kodo millet, and the FSSAI group standard for fifteen millets, together with BIS certification schemes, represents the beginning of corrective action.

This reframing sharpens rather than weakens the case for Shree Anna. The developmental argument stands on its own terms. Millets require 350 to 400 millimetres of water against 1,250 for rice and 2,200 for sugarcane, are C4 crops with carbon-fixing properties, mature in 12 to 14 weeks rather than 20 to 24, and support food security, nutrition, biodiversity and rural livelihoods in ways that map directly onto SDGs 2, 3, 12 and 13 and indirectly onto SDGs 1, 8, 15 and 17. What the evidence changes is the instrument. A crop that loses money for its grower will not expand because it is celebrated, and a trade strategy premised on the absence of standards will not survive contact with an importing country's laboratory.

The conclusion is therefore a two-pronged domestic strategy joined to a technical trade agenda. Domestically, profitability must be restored before promotion can work: remunerative and reachable price support, aggregation and primary processing in the producing districts, and assured offtake through welfare-scheme procurement that is local and predictable. Externally, India's negotiating ask should be concrete rather than declaratory, sponsoring JMPR evaluations for millet-relevant active ingredients, generating residue-trial data through ICAR-IIMR, and seeking Codex maximum residue limits for the small millets. The two agendas converge on the same investment, since the post-harvest infrastructure, grading, drying and testing capacity that would raise farm-gate realisation is also what export compliance requires. Standards, on this reading, are a technical agenda to be met rather than a scrutiny to be avoided.

11.1 Recommendations

11.1.1 Why millets (Shree Anna)?

1. Requires a two-pronged strategy driving both demand and supply.
2. Anchor the case on resource use and livelihoods, which the evidence supports: ragi, jowar and maize need about 28, 32 and 40 per cent of the water rice requires, and roughly 60 per cent of cultivable land is arid or semi-arid while producing about 40 per cent of the country's food.

3. Do not rest the case on an assumed absence of WTO scrutiny. Minimum support prices and procurement for coarse grains are notified under DS:1 and therefore add to aggregate support. At the same time, millets are individually named in Codex Group 020, in Annex I to Regulation (EC) No 396/2005, and in US Crop Group 15-22. The available flexibilities are Article 6.2 for low-income and resource-poor farmers and Green Box classification for public stockholding, not exemption by omission.

4. Treat awareness as settled and profitability as unresolved. Neither area nor procurement responded to the 2023 promotional effort, so further expenditure on promotion alone should not be expected to shift either.

11.1.2 Price and market support

5. Assured, remunerative procurement prices backed by a robust marketing mechanism.

6. Distribution via PDS, poverty alleviation, employment generation, and welfare schemes.

7. Small and marginal farmers lack stable market access and institutional support (Nagaraja, 2013).

8. Close the gap between the announced price and the realised one. Ragi and jowar have received among the sharpest decade-long MSP increases of any mandated crop, yet returns over cost (C2) remain negative in most producing states, indicating that the binding failure is access to a purchase point rather than the price level.

9. Where procurement infrastructure is thin, consider a deficiency-payment mechanism on the model of Haryana's Bhavantar Bharpayee Yojana, so that price support does not depend on the physical presence of a procuring agency.

10. Publish returns computations inclusive of by-product and fodder value, which is a material part of millet economics and is understated when returns are assessed on grain alone.

11. Pair every MSP announcement with a named purchase point, a purchase window and a payment timeline communicated in the local language; awareness of MSP among dryland cultivators is negligible on the evidence of the NSS 77th round.

11.1.3 Benefits for small and marginal farmers

12. Approximately 86% of Indian landholdings are small/marginal (below 2 ha); these farmers cannot afford costly inputs or equipment.

13. Millets ensure food security, including for tribal farmers whose traditional practices sustain millet biodiversity (Rao, 2025).

14. Better yields → marketable surplus → higher farm incomes → less rural-to-urban migration and more inclusive growth.

15. Set an explicit parity trajectory rather than generic support: on the Tata-Cornell estimate, millet farmers earn about 33 and 42 per cent of the profits realised by wheat and paddy farmers respectively, and that gap is the measurable target.

16. Route support through millet-specific FPOs with de-husking, cleaning and grading capacity at cluster level, because de-husking the small millets remains labour-intensive even with machinery and the cost falls hardest on the smallest growers.

11.1.4 Credit and input support

17. Some millets like hybrid maize are profitable but investment-heavy (CACP, 2011-12).

18. Needs input and credit subsidies, plus easy access to affordable farm credit.

19. Address the dryland credit gap directly. Priority status without credit flow is the failure Harriss identified under the Twenty-Point Programme, and it has not been resolved; the

PM Dhan-Dhaanya Krishi Yojana districts, selected for below-average credit access, are the natural delivery vehicle.

20. Strengthen the seed chain for the small millets specifically, whose landraces are maintained outside the formal seed system and are therefore not reached by conventional seed replacement programmes.

11.1.5 Research and development

21. Step up public spending on dryland farming, technology, extension, and crop- and location-specific research (Harris, 1983).

22. Caution on HYVs: they cut the fodder-to-grain ratio, local jowar and bajra at 3:1 and 2:1 versus 0.5:1 for HYV (Rajpurohit, 1975), forcing communities to buy or separately grow fodder.

23. Preferable to breed varieties that raise grain yields without sacrificing fodder (Nadkarni, 1986).

24. Fund millet-specific residue and mycotoxin trials at ICAR-IIMR. The same data supports agronomy at home and standards compliance abroad, making it the highest-return research investment available in this crop group.

25. Commission shelf-life research on milled millet flour, which currently limits both welfare-scheme distribution and organised retail, and on which the extension of the distribution window to six to ten months depends.

11.1.6 Value addition and processing

26. Widen the product basket: millet snacks, biscuits, flakes, ready-to-eat meals, Nutri-foods, via investment in nutrition technology (Nagaraja, 2013).

27. Rural ancillary units near farms would build post-harvest infrastructure and make the village a unit of industrialisation.

28. Decide now on a successor to the Production Linked Incentive Scheme for Millet-Based Products, which reaches its terminal year in 2026-27; thirty approved proposals will not by themselves establish processing capacity at the scale the crop requires.

29. Weight incentives toward primary processing located in producing districts rather than toward branded urban products alone, since value addition has so far accrued in urban retail and has not reached the grower.

11.1.7 Procurement and awareness

30. Educate farmers on FAO standards for moisture content and damaged or broken grains.

31. Direct investment in village-level grain storage and post-harvest processing.

32. Publicity campaigns on MSP and procurement in regional languages, using panchayats, farmer organisations, APMCs, and mandis (CACP, 2024).

33. Treat moisture as an infrastructure problem rather than a farmer failure. Maize arriving at moisture levels far above the 13.5 per cent storage norm reflects the absence of drying and cleaning capacity at the mandi and village level, and that capacity should be funded before rejection rates are attributed to cultivator practice.

34. Set state-wise decentralised procurement floors and restore procurement where it has lapsed, notably in Andhra Pradesh and Telangana, which remain significant producers; procurement as a share of marketed surplus has fallen to 5.6 per cent.

35. Use the DFPD provisions actively, both the extension of the distribution period to six to ten months and the facility for inter-state movement of surplus millets through FCI, which together allow procurement to exceed local absorptive capacity.

11.1.8 Standards and Market Access

36. Sponsor JMPR evaluations for active ingredients used on millets, and generate residue trial data through ICAR-IIMR under Indian good agricultural practice.

37. Seek Codex maximum residue limits for the small millets specifically, rather than relying on extrapolation from grain sorghum and proso millet, whose use patterns differ from mixed-cropping tribal systems.

38. Treat mycotoxins as the binding practical constraint: aflatoxin, fumonisin, and ergot in kodo millet, and align the FSSAI group standard for fifteen millets and BIS certification with importing-country requirements.

39. Build testing and certification capacity at FPO and cluster level, so that a single investment serves both domestic grading and export compliance.

40. Shift the export basket from raw grain to processed product. Unit values of roughly USD 440 per tonne for rice, compared with USD 618, reflect composition rather than quality, and the domestic value addition already achieved has not been carried into the export basket.

41. Seek mutual recognition or equivalence for the FSSAI group standard and BIS certification schemes within the SPS and TBT chapters of India's free trade agreements, so that a single compliance investment is accepted in more than one market.

11.1.9 Demand creation and welfare-scheme offtake

42. Fix a minimum millet share in TPDS, ICDS and PM POSHAN allocations in producing states, and issue it at parity with rice and wheat, so that millet is not presented to households as the inferior grain.

43. Source welfare-scheme millet locally wherever it is grown, which converts an existing welfare outlay into assured local demand without new expenditure.

44. Reduce the household preparation burden that deters urban consumption, namely cleaning, de-stoning, milling and the short shelf life of flour, through decentralised primary processing rather than through consumer awareness campaigns alone.

45. Distinguish food demand from feed and industrial demand in scheme design. Feed offtake for bajra is real but does not raise the subsistence grower's realisation, and conflating the two overstates the livelihood effect of aggregate demand growth.

11.1.10 Data, measurement and monitoring

46. Publish a millet-specific count of growers by holding size class. No consolidated all-India table exists, so the livelihood argument currently rests on inferences drawn from the Agriculture Census, and the resulting policy cannot be targeted precisely.

47. Release the results of the 11th Agriculture Census, with a reference year of 2021-22, on which the current holding-size distribution depends.

48. Disaggregate the small millets in production and procurement statistics rather than reporting them as a single residual category, since kodo, kutki, little millet and barnyard millet differ in agronomy, processing requirements and market.

49. Adopt returns over cost C2 and procurement as a share of marketed surplus as the headline indicators of scheme performance. Area and production alone did not reveal the failure this paper documents.

11.1.11 Trade negotiation and multilateral strategy

50. Continue detailed notification, but address the resulting asymmetry openly. India reports coarse cereal support at the product level. At the same time, other producers maintain

comparable implicit support in aggregate cereal reporting, and transparency should be pressed as a systemic issue rather than borne as a unilateral cost.

51. Build a coalition around climate-resilient crops through the G-33, the African Group and the LDC group, where millets are a shared staple and the negotiating interest is common.

52. Use Aid for Trade to finance millet post-harvest infrastructure, testing and certification, which links a development instrument to a market access constraint.

53. Seek preferential tariff treatment and dedicated classification for millet-based products in ongoing FTA negotiations, and place millets within the sustainability chapters where their low-input, climate-resilient profile is directly relevant.

11.1.12 Sequencing and institutional accountability

54. Sequence the intervention in the order the evidence implies: profitability first, then aggregation and primary processing, then assured offtake, then standards and market access. Promotion in advance of the first three did not move area or procurement in 2023 and should not be expected to.

55. Assign a single accountable agency for each link in the chain. Responsibility is currently divided among DA&FW, DFPD, MoFPI, APEDA, FSSAI, BIS, ICAR-IIMR, and the state missions, and no institution owns the outcome.

56. Publish annual reporting against measurable milestones, covering area, returns over cost C2, procurement as a share of marketed surplus, and export unit value, so that the effect of each instrument can be attributed.

Annex — Appendix

Annex Table 1: Monthly average value of consumption of different cereals per person for State/UT and All-India (Rural)

STATES	RICE	WHEAT	COARSE CEREALS	OTHER CEREALS	TOTAL CEREALS
Andhra Pradesh	213.93	27.52	8.53	0.34	250.32
Arunachal Pradesh	244.35	14.81	2.03	0.27	261.45
Assam	185.3	18.96	0.11	0.07	204.44
Bihar	110.04	131.12	0.59	0.08	241.83
Chhattisgarh	70.17	35.38	0.17	0.14	105.85
Delhi	76.2	148.46	1.08	0.17	225.9
Goa	191.01	95.66	8.93	5.86	301.47
Gujarat	46.29	101.53	35.76	1.41	185
Haryana	33.11	117.44	6.28	0.28	157.11
Himachal Pradesh	102.26	120.26	10.87	0.55	233.93
Jharkhand	148.81	83.18	0.48	0.18	232.64
Karnataka	118.77	52.27	61.27	2.13	234.43
Kerala	173.94	34.43	0.65	0.84	209.86
Madhya Pradesh	37.96	116.9	3.91	0.72	159.49
Maharashtra	62.64	95.81	37.34	1.51	197.29
Manipur	325.34	3.53	0.02	1.1	329.99
Meghalaya	171.79	8.31	-	-	180.1
Mizoram	125.97	1.79	-	-	127.76
Nagaland	250	3.92	1.9	2.86	258.67
Odisha	205.76	42.97	2.15	0.59	251.48
Punjab	38.29	107.77	2.04	0.63	148.72
Rajasthan	20.01	144.89	32.64	1.4	198.94
Sikkim	227.92	34.22	18.86	1.59	282.58
Tamil	208.86	30.6	7.89	0.4	247.75
Telangana	234.11	30.28	15.16	0.42	279.97
Tripura	238.89	11.42	0	-	250.31
Uttar Pradesh	52.61	104.06	0.34	0.21	157.21
Uttarakhand	87.47	129.47	1.86	0.44	219.24
West Bengal	203.44	30.35	0.03	0.05	233.86

Source: NSO

Annex Table 2: Monthly average value of consumption of different cereals per person for State/UT and All-India Urban

STATES	RICE	WHEAT	COARSE CEREALS	: OTHER CEREALS	TOTAL CEREALS
Andhra Pradesh	243.86	34.36	6.34	0.44	285.01
Arunachal Pradesh	317.92	28.67	1.95	0.18	348.72
Assam	257.67	34.68	0.07	0.06	292.47
Bihar	144.52	147.7	0.57	0.05	292.84
Chhattisgarh	139.52	80.08	0.01	0.32	219.93
Delhi	67.13	147.9	0.34	0.42	215.8
Goa	180.35	94.86	9.1	4.16	288.47
Gujarat	93.16	162.64	15.37	1.06	272.22
Haryana	63.62	165.17	2.79	0.22	231.8
Himachal Pradesh	130.63	154.24	2.18	1.01	288.06
Jharkhand	175.14	139.43	0.2	0.21	314.99
Karnataka	177.35	67.44	44.04	1.57	290.39

STATES	RICE	WHEAT	COARSE CEREALS	: OTHER CEREALS	TOTAL CEREALS
Kerala	183.48	37.41	1.41	0.62	222.92
Madhya Pradesh	58.54	158.03	0.53	1.06	218.16
Maharashtra	126.04	133.55	17.11	1.2	277.9
Manipur	390.98	5.63	0.09	0.32	397.01
Meghalaya	258.96	21.42	0	-	280.39
Mizoram	165.7	2.39	-	0.05	168.15
Nagaland	278.94	9.92	1.17	2.76	292.79
Odisha	222.61	82.16	0.38	0.31	305.46
Punjab	55.14	155.22	0.71	0.52	211.59
Rajasthan	37.7	217.28	5.93	0.65	261.56
Sikkim	315.76	57.68	6.74	1.72	381.91
Tamil	237.64	34.69	4.43	0.63	277.4
Telangana	280.75	48.77	8.86	0.99	339.37
Tripura	261.49	15.66	-	0.06	277.21
Uttar Pradesh	63.53	134.15	0.29	0.46	198.44
Uttarakhand	132.76	155.66	0.29	0.37	289.08
West Bengal	221.09	70.03	0.01	0.02	291.15

Source: NSO

Annex Table 3: State-Wise Procurement of Nutri-Cereals (000 Tonnes)

State	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	Total 2007 to 2013	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	Total 2014 to 2023
Karnataka	14	712	316	40	1	0	729	1812	143	211	0	0	96	203	555	509	531	0	2248
Madhya Pradesh	1	60	0	9	17	8	87	182	303	28	238	4	0	6	225	38	0	0	600
Haryana	124	310	77	74	17	0	0	602	0	5	6	31	99	100	150	0	81	231	573
Uttar Pradesh	0	0	0	0	0	0	0	0	0	0	0	0	5	0	106	3	43	373	530
Maharashtra	2	107	6	3	Neg	64	96	278	7	17	16	50	18	124	136	41	17	0	426
Gujarat	0	0	0	0	0	0	0	0	0	0	0	0	1	0	16	8	58	33	116
Odisha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	32	0	0	32
Andhra Pradesh	61	177	7	0	0	0	28	273	5	0	0	0	0	0	0	0	4	1	10
Telangana	0	0	0	0	0	0	289	289	6	0	0	0	0	0	0	0	0	0	6
Uttarakhand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3
Tamil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Chhattisgarh	2	9	1	3	1	0	3	19	0	0	0	0	0	0	0	0	0	0	0
Punjab	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rajasthan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bihar	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
Total	**204**	**1375**	**407**	**128**	**36**	**72**	**1231**	3453	**465**	**260**	**260**	**86**	**218**	**432**	**1208**	**630**	**737**	**641**	4937

Source: GOI, Agricultural Statistics at A Glance-2023.

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Authors

Dr Murali Kallummal is Head of Administration at CRIT and a Professor at the Centre for WTO Studies. He has been associated with the Centre since 2003. He specialises in market access issues both under the WTO and Regional Trade Agreements and has extensively worked on tariffs and non-tariff measures (NTMs). He has published papers in peer-reviewed journals and has been a reviewer for several international and Indian journals. He has also been consulted by several bodies/international organisations for conducting training programmes.

Prof Kallummal played a central role in the intellectual drafting of the *Indian National Strategy for Standardisation (INSS)*, the only national policy document on standards and quality in India. He was the lead academic expert from the Centre for WTO Studies (IIFT), guiding the integration of trade, regulatory, and quality infrastructure perspectives into the policy. It is India's first and only comprehensive national policy document on standards and quality, covering domestic infrastructure, regulatory frameworks, and international trade implications.

His pioneering work has involved conceiving and executing India's first web-based portal on SPS and TBT measures. The database provides trade links for all WTO-notified SPS and TBT measures since 1995.

Email: muralik@iift.edu

Dr Akanksha Pratik Sonker is an Associate (Economics) at the Centre for WTO Studies. She holds a PhD in Economics from CESP, JNU. Her areas of specialisation include agriculture, rural economy and development economics. At the Centre, her research lies at the intersection of agriculture, trade, sustainability, and other relevant WTO issues.

Email: akankshas_cws@iift.edu

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5th to 8th Floor, NAFED House, Siddhartha Enclave, Ashram Chowk

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