

Working Paper 01

Millets as a Policy Response to the Food and Nutrition Crisis: A Case Study of Odisha Millets Mission

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Table of Contents

INTRODUCTION	3
FOOD SECURITY IN INDIA	3
RELATIONSHIP BETWEEN FOOD INSECURITY AND NUTRITION OUTCOMES	5
POTENTIAL IMPACTS OF CLIMATE CHANGE ON FOOD SECURITY	7
TRENDS OF MILLETS CONSUMPTION AND PRODUCTION IN INDIA	9
ODISHA MILLETS MISSION	12
BACKGROUND	12
PROGRAMME FRAMEWORK AND STRUCTURE	13
OBSERVATIONS FROM FIELDWORK	15
CONCLUSION	19

Introduction

Ending hunger, achieving food security, and improving nutrition are at the heart of the Sustainable Development Goals. For India, ending food insecurity remains high on the list of development priorities because the country's high economic growth has not always translated into reduced hunger and improved nutrition. India is a signatory to the Millennium Development Goals (MDGs) by, adopted at the United Nations General Assembly in September 2000, and has consistently reaffirmed its commitment to the eight development goals. The first target of the MDGs is the eradication of extreme hunger and poverty. Accordingly, the country has been moderately successful in reducing poverty. According to UNDP findings, in 1990, the all-India Poverty Headcount Ratio (PHCR) was estimated at 47.8%. To meet the 2015 target, the PHCR level had to be 23.9%. In 2011-12, the PHCR was 21.9%. The country achieved success in reducing poverty due to economic growth (the GDP grew from 5.53% (1990) to 8.15% (2015) and an increase in social spending through public programmes such as MGNREGA, but the country has made uneven progress in addressing hunger. India is home to the second-highest population of undernourished people in the world (FAO 2015). As per the latest Global Hunger Index¹ (2019), India ranks 102nd out of 117 countries. In fact, India's neighbouring countries, including Sri Lanka (66th), Nepal (73rd), Bangladesh (88th), and Pakistan (94th) have better GHI² ranks and scores.

It is difficult to identify the causes of India's growing food insecurity, since the country is the second-largest producer of fruits, vegetables, and food grains. The challenge of food insecurity is expected to grow in future due to climate change. Against this background, the paper intends to critically examine the status of food security concerns in India and describe the potential of millets as a probable solution. The paper is organised broadly as follows. Section 1 discusses the issue of food insecurity and its adverse impact on India's nutritional status. It also describes how climate change and poor natural resource management further aggravate food insecurity. Section 2 highlights the potential of millets as a key policy response to present nutritional and agricultural concerns through a case study analysis of the Odisha Millets Mission (OMM). The paper seeks to unpack the implementation process and experience of the much-appreciated and widely discussed initiative of the Government of Odisha. The final section then summarises the findings that may have important policy implications for states looking to adopt similar initiatives.

Food Security in India

According to the Food and Agriculture Organisation's (FAO) 'The State of Food Security and Nutrition in the World, 2019' Report, 194.6 million people in India are undernourished,

¹ The Global Hunger Index 2019 ranking is based on three leading indicators -- prevalence of wasting and stunting in children under 5 years, under 5 child mortality rates, and the proportion of undernourished in the population. To read more, please check: indiafoodbanking.org/hunger

² GHI ranks are based on 4 key indicators -- undernourishment, child mortality, child wasting and child stunting. Read more at: [at://economictimes.indiatimes.com/articleshow/66226877.cms?from=mdr&utm_source=contentofinterest&utm_medium=te xt&utm_campaign=cppst](http://economictimes.indiatimes.com/articleshow/66226877.cms?from=mdr&utm_source=contentofinterest&utm_medium=te xt&utm_campaign=cppst)

constituting 14.5% of the population. Any discussion of food insecurity should go beyond hunger and aim to ensure access to sufficient, nutritious food for all (FAO website).

When the constitution was framed in post-independent India, it did not explicitly recognise the right to food. But starvation deaths in Odisha (Kalahandi, Bolangir and Koraput districts) during the early 2000s prompted the National Human Rights Commission to consider the Right to Food as a part of the Fundamental Rights (Article 21). Xaxa (2014) would argue that the constitutional provisions relating to the right to food require reading Article 21 alongside two other articles to understand the obligation of the Indian state with regard to food security.

The government made programmatic provision for distributing food grains and essential commodities following critical shortages during the 1960s. The Revamped Public Distribution System (RPDS) was launched in 1992 to strengthen and streamline the PDS and improve its reach in remote and inaccessible areas where the majority of socio-economically marginalised sections of society live.³ In 1997, the central government launched the Targeted Public Distribution System (TPDS) with the focus on the poor. The central sponsored scheme was expected to benefit 60 million poor households, for whom 720,000 tonnes of food grains (such as wheat, rice, and sugar) were earmarked annually.⁴ The People's Union for Civil Liberties (PUCI) filed a writ petition in the Supreme Court, asserting that the "Right to Food" is essential to the "Right to Life" (Article 21). During the ongoing litigation, the Supreme Court issued several interim orders for the implementation of eight central schemes as legal entitlements.⁵ These include the PDS, Antyodaya Anna Yojana (AAY), the Mid-Day Meal Scheme, and Integrated Child Development Services (ICDS).⁶ In 2008, the Court ordered that the Below Poverty Line (BPL) households shall be entitled to 35 kilos of food grains per month at subsidised prices (Department of Food and Public Distribution).

By 2000, the country became a signatory to the MDGs and was expected to eradicate extreme poverty and hunger (Goal 1). While it experienced moderate success in reducing poverty, it had failed to reduce the proportion of people suffering from hunger by 50% between 1990 and 2015 (MDG Goal 1, Target 2). To address the threats of food insecurity and meet the target of MDG, Government of India enacted National Food Security Act (NFSA)⁷ in July 2013 which gave legal entitlement to 67% of the population (75% in rural areas and 50% in urban areas) to

³ Retrieved on November 8, 2019 from <https://dfpd.gov.in/index.htm>

⁴ Retrieved on November 8, 2019 from <https://dfpd.gov.in/index.htm>

⁵ Interim order dated November 28, 2001 PUCI vs. Union of India and Ors., Supreme Court Writ Petition [Civil] No. 196 of 2001.

⁶ To read more on the functioning of the Public Distribution System, please check: <https://www.prsindia.org/administrator/uploads/general/1388728622~TPDS%20Thematic%20Note.pdf>

⁷ Under the NFSA, they are: (1) Right to food: i.e. two-third of the population become legally entitled to receive highly subsidized food grains; (2) each entitled person will receive 5 kg of food grains per month (i.e. rice, wheat or coarse grains at Rs.3, Rs.2 and Re. 1 per kg. respectively); (3) the poorest of the poor who have been getting 35 kg of food grains, will continue to get 35 kg food grains per household per month under AAY. (4) with the aim of giving special focus to women and children, the Ordinance will ensure that the eldest woman of the household above 18 years will be considered the head of the household for the purpose of issue of ration cards; (5) pregnant women and lactating mother will get maternity benefit of Rs. 6000/-, and (6) pregnant women and children below 14 years of age will get nutritious meals, with higher nutritional norms for malnourished children. To read more, please check: <https://pib.gov.in/newsite/PrintRelease.aspx?relid=98108>

receive food grains at a highly subsidised prices (Ministry of Consumer Affairs, Food and Public Distribution, July 2, 2019).

It is worth noting that the various government interventions following the passage of the NFSA have struggled to end food and nutritional insecurity. Corruption led to beneficiaries receiving only a portion of the allocated PDS provisions, and of poor quality (The Telegraph, November 15, 2018). Studies revealed that the problem of poor food and nutritional security became acute during the mid-1960s. This prompted the government-led Green Revolution, which led to a reimagining of India's dietary preferences, prioritising reliance on wheat and rice as the primary food grains. Coarse grains, including different varieties of millets, maize, barley, and rye, which constituted the staple food for a large section of the population, saw consumption and production decline by 21% in rural areas and 11% in urban areas (Scroll, October 17, 2018). Devinder Sharma⁸ observed that “as a result of policies that orphaned coarse grains, while favouring fine grains and cash crops such as soybeans and cotton, is now painfully evident as widespread micronutrient deficiencies.” Ruth DeFries⁹ noted that the predominance of low-nutrient rice in PDS is associated with reduced iron intake (Scroll, October 17, 2018). A study by Rao et. al. (2018)¹⁰ found that 500 million people, or more than two-thirds of the population, are affected by iron (90%), Vitamin A (85%) and protein (50%) deficiencies. The poorer households are disproportionately affected by nutritional insecurity due to limited flexibility to diversify their diets, following changes in national food policy (subsidies favouring rice and wheat over coarse grains).

To understand the extent of food insecurity at the state level, we must rely on the India State Hunger Index (ISHI), released a decade ago, which highlighted states' poor performance in addressing food insecurity. All 17 states (constituting 95% of the national population) revealed an overall severity of the hunger problem. The ISHI scores of the best-performing states, such as Punjab, Kerala, Andhra Pradesh and Assam, indicated a “serious” hunger problem. The majority (71%) of the states experienced “alarming” hunger problems. In Central India, seven out of nine states experienced “alarming” hunger problems that were comparable to some of the poorest countries of sub-Saharan Africa. Madhya Pradesh faced an “extremely alarming” hunger problem that was comparable to Liberia and Sierra Leone.

Relationship between Food insecurity and Nutrition Outcomes

Child malnutrition is considered a very sensitive indicator of the overall levels of food security and hunger. Undernutrition manifests in three ways: stunting, when height is below the average for that age; wasting, when weight is low for a given height; and underweight, when weight is low for the given age. Stunting is associated with cognitive impairments, including delayed

⁸ Devinder Sharma is a leading agro-economist and chair of the Forum for Biotechnology and Food Security, a New Delhi-based collective of agriculture scientists, economists, biotechnologists, farmers and environmentalists.

⁹ Ruth DeFries, professor of ecology, evolution, and environmental biology at Columbia University and the Earth Institute's Center for Environmental Research and Conservation.

¹⁰ Rao, D.N. et. al. (2018) **Healthy, affordable and climate-friendly diets in India**. Global Environmental Change. Vol.49 (March 2018), 154-165.

motor development, impaired brain function, and poor school performance (NFHS -4, p. 292). Wasting is a measure of “acute undernutrition” and a result of “inadequate food intake” or illness causing weight loss (Ibid, p.292). While Weight-for-age (underweight) is a composite index of “acute and chronic undernutrition (Ibid, p.292).

India is home to 104 million tribal people, accounting for 8.6% of the country’s population. Policy safeguards¹¹ notwithstanding, nearly seven decades after independence, tribal people suffer from extreme inequity in health outcomes arising from growing food insecurity. Here, food security refers to the sufficient availability of food for direct consumption, as well as the purchasing power to buy food and access to food that meets nutritional requirements for maintaining proper health (Xaxa 2014, p. 1).

The anthropometric data on height and weight collected in the NHFS help to evaluate the nutritional status of young children in the country. During NHFS-1, stunting and underweight affected the SCs more than the STs. Wasting posed a greater challenge for the STs than for the SCs. According to the NHFS-2, rising food insecurity contributed to increasing malnutrition among Adivasi children. As stunting and underweight posed a greater challenge for the STs than for the SCs (a complete reversal from NHFS-1). Wasting was predominant among the STs compared to all the other groups. In NHFS-3, stunting posed similar challenges for the SCs and STs and increased compared with NHFS-2. Wasting continued to rise for all social groups. But posed the biggest threat to the STs, even more than to SCs or other social groups. There was a marginal drop in children suffering from underweight. There were more ST children who were underweight than all the other groups, including the SCs. The latest NHFS-4 revealed an overall improvement in the nutritional status of children under 5 across all social groups. But the nutritional status of ST children was worse than that of SC and other social groups. ST children suffered from undernutrition as evinced from wasting, stunting and underweight, more than SC and all social groups.

Percentage Figures for Malnourishment Social Category-wise			
NHFS-1			
Category	Stunted	Wasted	Underweight
Scheduled Tribe	53	22	57
Scheduled Caste	58	19	58
Other Backward Class	NA	NA	NA
Other (General)	51	17	52
NHFS-3			
Category	Stunted	Wasted	Underweight
Scheduled Tribe	54	28	55
Scheduled Caste	54	21	48
Other Backward Class	49	20	43
Other (General)	41	16	34

¹¹ The Government of India laid down three landmark policy expressions for safeguarding the interests of the tribal population-the Constitution of India, the Panchsheel Principles and the PESA Act. For more details, please check:
https://mohfw.gov.in/sites/default/files/Tribal%20Health%20Expert%20Committee%20Report_Executive%20Summary.pdf

NHFS-4			
Category	Stunted	Wasted	Underweight
Scheduled Tribe	44	27	45
Scheduled Caste	43	21	39
Other Backward Class	39	21	36
Other (General)	31	19	29

Source: NHFS

Fig 1

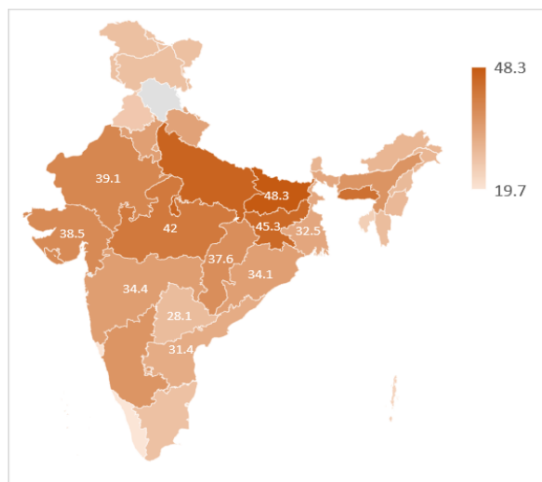


Fig 3

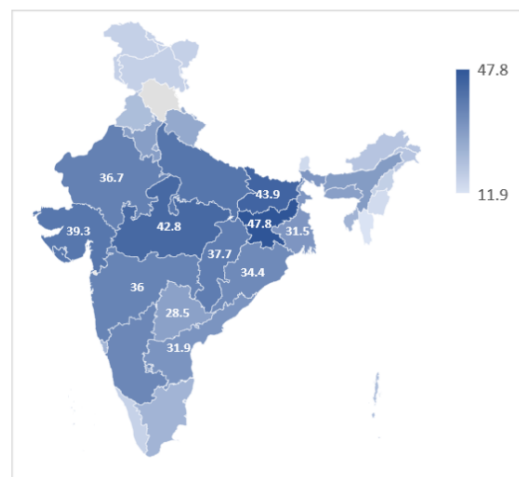
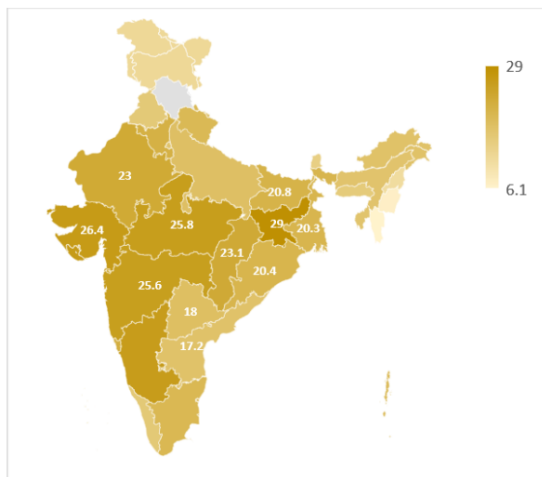


Fig 2



The three figures show the intensity of malnourishment across India. As evident, the central Indian states are some of the worst affected.

Fig 1: Percentage of children under 5 who are wasted

Fig 2: Percentage of children under 5 who are underweight

Fig 3: Percentage of children under who are stunted

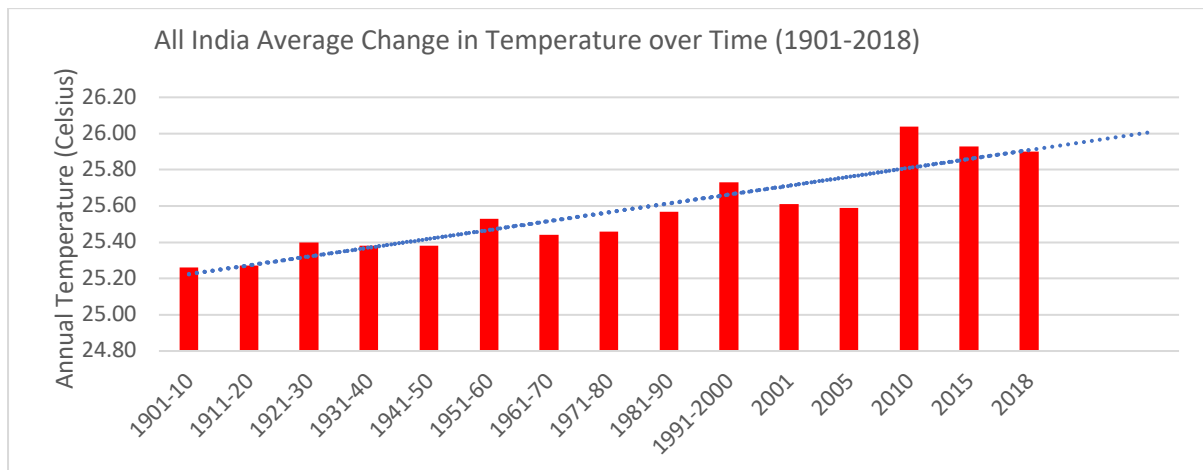
Note: Data for Himachal Pradesh not available

Source: NFHS – 4 (2015-16)

Potential Impacts of Climate Change on Food Security

Global climate change has affected food security, underscoring the challenge of ending hunger and malnutrition (FAO 2016, p. 1). The effects of climate change are emerging gradually, but urgent action is required to allow enough time to build resilience into agricultural production systems (Ibid, p.1). In fact, the projected change in global average temperature is likely to be 0.3-0.7 °C for the period (2016-2035) relative to the reference period (1986-2005) (Kirtman et al. 2013, p. 11). It is more likely that the global mean surface air temperature for the period

(2016-2035) will be more than 1°C above the mean for 1850-1900 (Ibid, p.11). It is very likely that the anthropogenic warming of surface air temperature will proceed more rapidly over land areas than over the oceans (Ibid., p. 11). In terms of average precipitation, it will very likely increase in parts of mid-latitudes, as the contrast in precipitation between wet and dry regions and between wet and dry seasons will increase (FAO 2016, p.5). Short-duration precipitation events will shift toward more intense individual storms, and fewer weaker storms are likely as temperatures increase (Ibid, p. 5).



Source: IMD

In India, according to data from the Meteorological Department (IMD), the average temperature across the country continues to rise. As per the seasonal scale, warming trends were observed during the winter and monsoon seasons, and a significant influence of El Niño Southern Oscillation events on temperature anomalies during certain seasons across India was observed.¹² The World Bank estimates that if climate change continues unhindered, the average temperature in the country could reach as high as 29.1°C by the end of the century (up from 25.8°C between 2001 and 2018) (Mint, July 21, 2019). Moreover, as the effects of climate change become more palpable across the country, some parts will be more affected than others.

CITB is one of the most vulnerable agricultural regions due to climate change and climatic variability. On average, the region experienced a 10% deficit in summer monsoon rainfall (June-September) between 1950 and 2015 (Roxy et al., 2017). The same article reported that this region has also witnessed a threefold rise in the frequency and intensity of extreme rainfall (more than 150 mm per day) covering an area of 200-250 m.

Given the dominance of rainfed farming in CITB, the impacts on agriculture could be disastrous. With the increasing inter-and intra-annual (seasonal) variability, vulnerability of the poor, especially the Adivasis, will increase due to their dependence on natural resources for their lives and livelihoods. In agriculture, climate variability could accentuate the risk of pest attacks and heighten the water crises. The current dietary practices and their impact on the

¹² To know more about assessing climate change (extreme temperature events and variability of Indian summer monsoon rainfall), please check: <http://www.indiaenvironmentportal.org.in/files/fin-rpt-incca.pdf>

environment, especially the dependence on wheat and rice as the primary food-grains, has also emerged as a cause of concern. Rice-Wheat cropping system is extremely resource intensive and fundamentally unsustainable in the long run (Bhatt, Kukal, Busari, Arora, & Yadav, 2016). Misuse of water resources has led to a sharp fall in groundwater levels as well as waterlogging in agricultural land leading to higher agricultural costs and lowered productivity. The dual challenge of malnutrition and environmentally unsustainable agricultural practices requires a critical re-examination of wheat and rice as the mainstay of the Indian food system (Davis, et al., 2018). There are numerous central schemes running in CITB for watershed development, command area development, drought prone areas programme, crop diversification, expansion of irrigation and integrated water management, flood control and mitigation, MGNREGA and other poverty alleviations programmes.¹³ Yet, there is need to revisit the central interventions considering the ground realities, and modify the programme design and implementation to adapt to the challenges of climate change and resulting food insecurities in the region.

Trends of Millets Consumption and Production in India

Millets are a climate-compliant crop (compared with other grains such as wheat and rice) in terms of marginal growing conditions and nutritional value (Kumar et al., 2018). In India, dryland agriculture constitutes 68% of the cultivated area and supports 40% of the human and 60% of the livestock population, while producing 44% of food requirements, thus has and will continue to play a critical role in addressing India's hunger (Singh, H.P. et al. 2004).

In the early 2000s, “*Kodo kutki hatao soyabean lagao*” was a popular slogan in the erstwhile unified Madhya Pradesh, encouraging cultivators to adopt oilseed crops (The Hindu, March 26, 2018). More than a decade later, the central and state governments have returned to a mission-mode approach to promote traditional coarse cereals, including millets. In 2018, the Government also decided to declare 2018 as “National Year of Millets.” (Ministry of Agriculture and Farmers Welfare, March 22, 2018). From mid-2018, the Department of Agriculture and the NITI Aayog took several steps to bring millets under the National Food Security Mission (NFSM) and other programs.¹⁴

¹³ To know more about climate change adaptation activities in India, please check:

https://www.undp.org/content/dam/india/docs/climate_change_adaptation_activities_in_india_part_i.pdf

¹⁴ Guru, D. (September 12, 2019) Millet revolution: Important to debate implementation. Deccan Herald. Read more at: <https://www.deccanherald.com/opinion/millet-revolution-important-to-debate-implementation-760906.html>

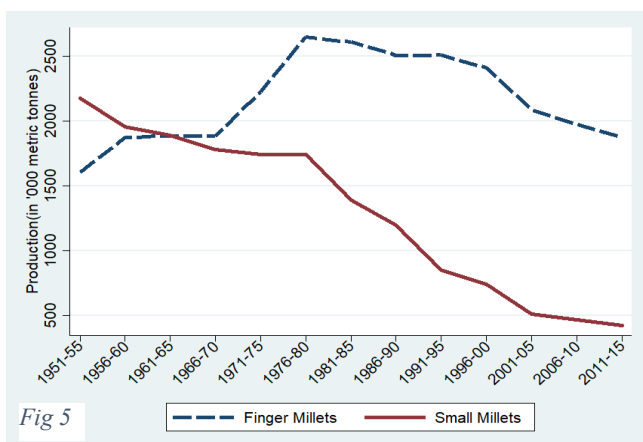
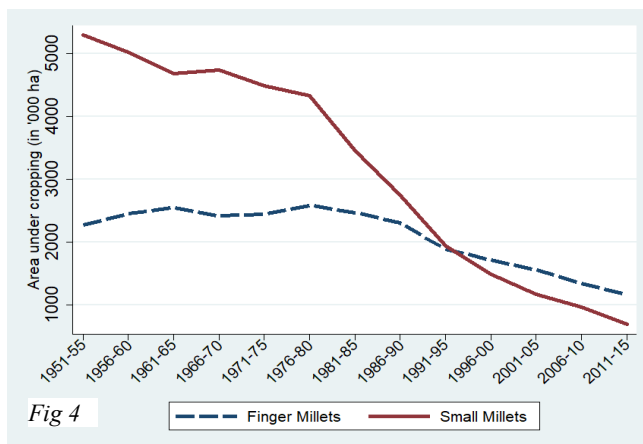


Fig 4: Quinquennial trends for country level area under finger millets and small millets (except finger millets) cropping (in '000 ha)

Fig 5: Quinquennial trends for production of finger millets and small millets (except finger millets) at the national level (in '000 metric tonnes)

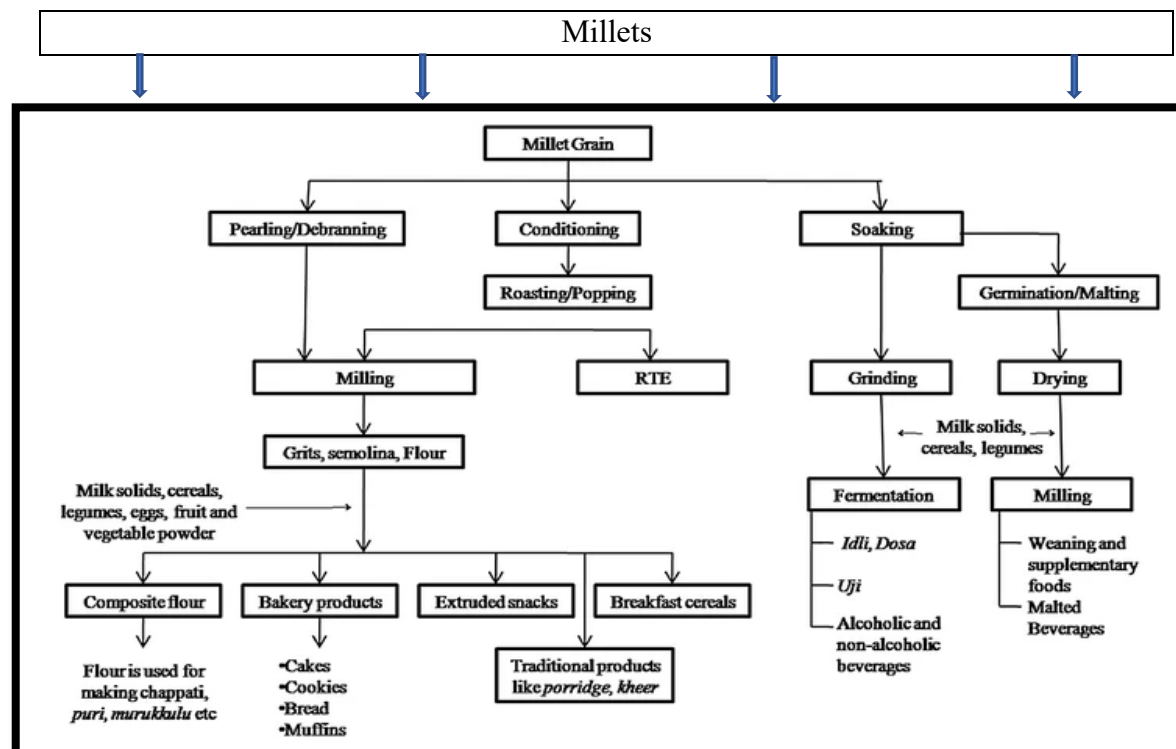
Source: Computed by authors based on data from Ministry of Agriculture and Farmers Welfare, Govt. of India

during 1951-55 to 1.86 m ha during 2011-15, with a drastic decline in the area of small millets other than finger millet from 5.29 to 0.69 m ha. The production of finger millet fluctuated between 1.61 mt in 1951-55 and 1.87 mt in 2011-15, with a high of 2.65 mt during 1976-80, despite a huge reduction in area. This was due to a doubling in finger millet productivity from 704 kg/ha to 1601 kg/ha and the widespread cultivation of high-yielding, blast-tolerant varieties. The latest (2015-16) estimates show that the total area under millet cultivation was 1.79 m. Ha with a production of 2.21 m. tons. The small millets comprising six species, finger millet (*Eleusine coracana*), little millet (*Panicum sumatrense*), Italian or foxtail millet (*Setaria italica*), barnyard millet (*Echinochloa crusgalli*), proso millet (*Panicum miliaceum*) and kodo millet (*Paspalum scrobiculatum*) (IFAD Report 2010, p.ix). Among these, finger millet is the most important and occupies about 60% of the area and contributes 70% of small millet production. In 2015-16, the finger millet alone occupied 1.14 m ha with a productivity of 1.82 m. tons and productivity of 1601 kg/ha.

The long history of the Indian subcontinent's association with the growing and consumption of millets is well researched (Krishnaswamy, 1938). Anbukkani et al. (2017) provide a good discussion of millet production and consumption at the state level, based on an analysis of household-level data from the 68th National Sample Survey. While they find a similar decline in millet production over the years, their analysis of consumption shows that it varies widely across states. Finger millets, for instance, see a high of over 18kg/household/month in Assam and Bihar, to less than 1kg/household/month for West Bengal. For most other states, the figure is below 5/kg/household/month. Small millets exhibit a nearly similar pattern.

Existing literature also shows that moving away from rice and wheat cultivation to crops like millets can substantially reduce water demand as well as improve the production of nutrients like iron, zinc and protein (Davis, et al., 2018). Five-yearly analysis of data indicates a steady decline in the area from 7.56 m ha

Millets are one of the oldest foods known to humans. Most of the millets are highly nutritious, non-glutinous, non-acid forming and easily digestible foods (PIB, July 17, 2014). Finger millets form the staple food of millions in the arid and semi-arid topics of the world. In southern part of India (Karnataka, Tamil Nadu and Andhra Pradesh) and hilly regions of the country, it continues to serve as the staple food. It serves as the fodder for livestock across the country. Millets are also being used in designing the modern foods like multigrain and gluten-free products.¹⁵



Food Security - Sustainable food sources in changing global climate - Resistant to climatic stress, pests and diseases	Nutritional Security Rich in micronutrients protein and amino acid	Safety from diseases - Gluten free a substitute for wheat in celiac diseases - Combat cardiovascular diseases, diabetes, anaemia, and calcium deficiency	Economic Security - Climate resilient crop - Sustainable income for farmers - Low investment - Value addition leading to economic gains
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Source: Adapted from Kumar et al. (2018)

¹⁵ Millets are rich in polyphenols and other biological active compounds, they are also considered to impart role in lowering rate of fat absorption, slow release of sugars (low glycaemic index) and thus reducing risk of heart disease, diabetes and high blood pressure. To know more, check: Kumar, A. et.al. (2018) *Millets: a solution to agrarian and nutritional challenges*. Agriculture & Food Security. Volume 7, Article number: 31 (2018). Retrieved on August 8, 2019 from <https://agricultureandfoodsecurity.biomedcentral.com/articles/10.1186/s40066-018-0183-3>

Millet cultivation is highly resource-efficient, as it grows on shallow, low-fertility soils with a pH ranging from acidic 4.5 to basic 8.0.¹⁶ In the pre-Green Revolution era, in 1965-66, millets were cultivated in 36.90 million ha. In 2016-17, the area under millet cultivation declined to 14.72 million ha. (a decline of over 60%); due to changes in consumption patterns, dietary habits, unavailability of millets, low yield, less demand and conversion of irrigated area for cultivation of rice and wheat (Ministry of Agriculture and Farmers Welfare, March 22, 2018).

The national millet mission was launched by the central government in 2018; adopting and implementing the mission would be at the states' prerogative. The government decided to declare the Year 2018 as "National Year of Millets." (Ministry of Agriculture and Farmers Welfare, March 22, 2018). The mission is likely to fall under the umbrella of the National Nutrition Mission (POSHAN Abhiyaan), which focuses on intensive monitoring and the convergence of initiatives to improve nutrition outcomes. However, there are no clear guidelines on how to strategise and adopt a 'Millet Mission' at the state level. On the launch of the National Millet Mission, state governments were encouraged to learn from the model formulated by OMM (Government of Odisha, 2018). The much-appreciated and talked-about OMM can offer critical lessons not only on the ultimate impact on the state's nutritional profile but also on programme and administrative processes that can serve as a model for other states.

Odisha Millets Mission

Background

Odisha, a state in eastern India bordered by West Bengal and Jharkhand to the north, Chhattisgarh to the west, Telangana and Andhra Pradesh to the south, and a long coastline along the Bay of Bengal to the east, continues to experience some of the highest levels of malnutrition in the country. Data from NFHS-4 shows that Odisha ranks in the top 10 of the most affected states of under-five child malnutrition on all three indicators of wasting, stunting and underweight. In terms of deprivations and marginalisation, the state also has one of the highest proportions of tribals in the country.

SECC (2011) data show Odisha has a tribal population of roughly 24%, and among all major states, it trails only its bordering states of Jharkhand and Chhattisgarh. Hence, barring the northeastern region, the states in central and eastern India have the highest proportion of the tribal population in the country. NFHS-4 also provides an opportunity to analyse district-level malnutrition in Odisha and helps us understand whether a higher tribal population correlates with increased incidence of malnutrition in the state. Our analysis of district-level malnutrition shows that there does exist a correlation between a higher proportion of the tribal population and higher malnutrition levels, with the relationship strongest for underweight children.

¹⁶ Gangaiah, B. (n.d.) Agronomy-Kharif Crops. Retrieved on August 9, 2019 from [http://nsdl.niscair.res.in/jspui/bitstream/123456789/527/1/Millets%20\(Sorghum%2c%20Pearl%20Millet%2c%20Finger%20Millet\)%20-%20%20Formatted.pdf](http://nsdl.niscair.res.in/jspui/bitstream/123456789/527/1/Millets%20(Sorghum%2c%20Pearl%20Millet%2c%20Finger%20Millet)%20-%20%20Formatted.pdf)

Fig 7

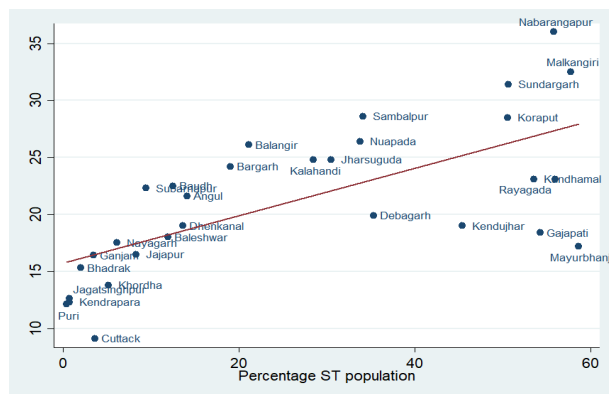


Fig 8

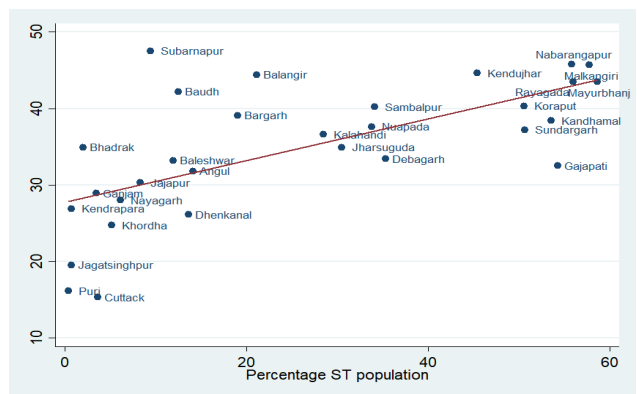


Fig 9

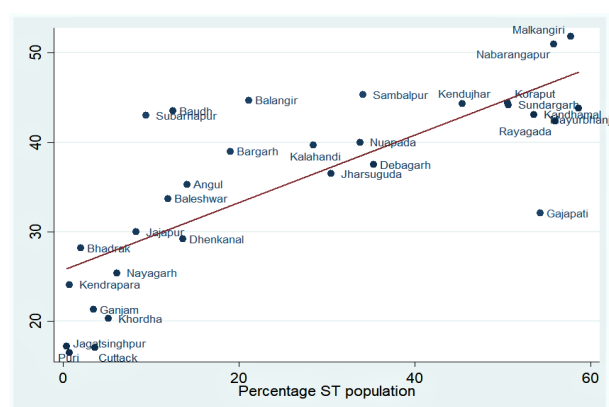


Fig 7: Percentage tribal vs percentage of under 5 children underweight
Fig 8: Percentage tribal vs percentage of under 5 children stunted
Fig 9: Percentage tribal vs percentage of under 5 children wasted
Source: NFHS – 4

The state government of Odisha was one of the first movers in reviving millet cultivation and consumption by launching the “Special Programme for Promotion of Millets in Tribal Areas”, popularly known as the Odisha Millet Mission (OMM). Launched in 2016 to address the growing concerns of agricultural uncertainty and nutrition insecurity, OMM is a five-year project (2016-2021), which already in its third year and is nearing the end of its intense implementation phase and is expected to consolidate and formalise its programme operations (Government of Odisha, 2016). In its initial phase, the programme targeted seven of Odisha’s districts with the highest tribal populations – Koraput, Malkangiri, Raigada, Gajapati, Kandhamal, Kalahandi and Nuapada – that also have a history of growing and consuming millets. This Special Program for Millets targets tribal areas of the state, was then expanded, and currently covers 14 districts and 72 blocks across 12,257 Ha., involving 31,099 farmers. The project was implemented across three phases.

Programme Framework and Structure

The Odisha Millets Mission envisages addressing both the supply side and demand side aspects of millet use. The scheme focuses on improving millet farming practices, reviving household consumption of millets for improving food and nutritional security, setting up millet enterprise and farmer-producer organisation, and ensuring the integration of millets into existing food and nutrition programs such as Integrated Child Development Services (ICDS) and Public Distribution System(PDS). The initiative is unique in the sense that it leverages a range of

actors in the farm and tribal development space, including community-based organisations, grassroots NGOs and technical advisors.

A key component of the programme is also the incentive structure implemented through the direct benefit transfer model, in which farmers who follow the recommended practice receive a conditional cash transfer. The standard process of the transfer is shown below in Fig 10.

S.No.	Stakeholders	Level	Responsibilities
1	Mission on Millets Committee	State	A State level Committee for policy related decisions such as inclusion of millets in PDS.
2	Directorate of Agriculture and Food Production	State	Nodal Agency for the Program. Appoints a Nodal person to work with Program Secretariat. Periodically monitors the Program.
3	Program Secretariat (WASSAN) and Research Secretariat (NCDS)	State	Program Management, Monitoring, Development and maintenance of web-based MIS, Coordination with State Departments and District Administration, Capacity Building, Convergence and Research.
4	District ATMA Governing Board	District	Facilitates disbursement of funds to CBOs and Facilitating Agencies (FA) against six monthly action plans. Regularly monitors the program on a monthly basis. Administrative head of the Project at the District Level.
5	Program Secretariat (WASSAN)	District	Program Secretariat support District ATMA Governing Board in Monitoring of implementation of the program. It will verify financial and process documentation of CBO.
6	Facilitating Agencies (NGOs at Block Level)	District	Monitors work of CBOs and CRPs for timely implementation of the project. Build capacities of CBOs, CRPs. FA will be responsible for relevant financial and process documentation of CBOs.
7	Community Based Organizations	Block	Responsible for implementing of the program with support from Community Resource Persons (CRPs), Facilitating Agencies and Program Secretariat. FA is responsible for project implementation by the CBOs and all relevant documentation by CBOs.

Table 1: Stakeholder matrix for OMM

*WASSAN- Watershed Support Services and Activities Network

*NCDS-Nabakrushna Choudhury Centre for Development Studies

*ATMA- Agricultural Technology Management Agency

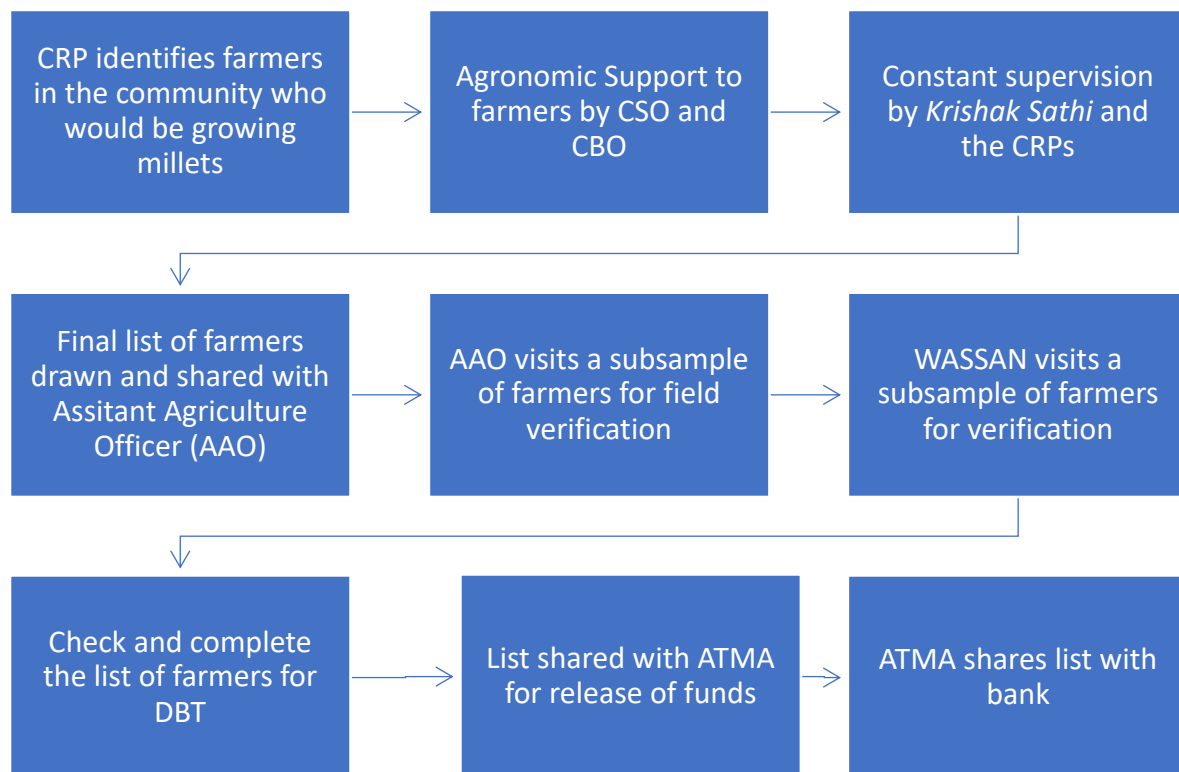


Fig 6. DBT process under OMM
 Source: Based on authors' discussions

Observations from Fieldwork

Koraput district was incorporated in Phase 3 of the OMM. Koraput has historically been a millet-producing district with a tribal population of 48%. This section summarises the reflections and observations from the fieldwork in the blocks of Lamtaput, Boipariguda, Laxmipur and Borigumma in the district of Koraput. The data reported in the document is based primarily on in-depth personal and focus group interviews with community members, *block-level* bureaucrats of the agriculture department, and staff of the facilitating CSOs, including the Centre for Youth and Social Development (CYSD), Professional Assistance For Development Action (PRADAN), and Harsha Trust.

In July 2018, the Khajuriput village of Goudoguda Gram Panchayat in Laxmipur Block of Koraput District was selected for implementation of the OMM. A tribal village of 168 households. It is entirely represented by the *Khondh* tribe. The *Khondh* are adept land-dwellers, exhibiting greater adaptability to the forest environment.¹⁷ They continue to practice the *Podu* system of shifting cultivation, using *slash-and-burn methods* on the hilly slopes where they grow various millets, rice, lentils, or vegetables.¹⁸ However, in 2002, Khajuriput was declared

¹⁷ Retrieved on November 11, 2019 from <http://www.antrocom.net/upload/sub/antrocom/070211/10-Antrocom.pdf>

¹⁸ Retrieved on November 11, 2019 from [http://gbpihedenviis.nic.in/ENVIS%20Bulletin/ENVIS%20Bulletin%20\(Vol.%2024,%202016\)/Study_shifting_cultivation_NV_Kumari.pdf](http://gbpihedenviis.nic.in/ENVIS%20Bulletin/ENVIS%20Bulletin%20(Vol.%2024,%202016)/Study_shifting_cultivation_NV_Kumari.pdf)

a “model village” by the Odisha Government, and since then, it has gained access to electricity, roads, and schools. Today, the *Podu* cultivation system has largely ceased, and the forests in the area have been revived. In 2013, tribal families from this village applied for the Individual Forest Rights (IFR) under the Forest Rights Act, but had yet to receive IFR titles. Each household (with the exception of 5 families that were landless) owns some land in the village and depends on rainfed farming-30 households own half an acre, 50-60 households own one acre, and the remaining own over an acre to two acres of land. They grow millets, maize, sunflower, mustard and rajma. For vegetables, each household depends on its respective kitchen garden.

CYSD was selected as the implementation partner for the OMM flagship program in the Koraput district. In July 2018, the CYSD team began motivating tribal households to increase millet production, productivity, value addition, and market linkages in Khajuriput. They held demonstrations to promote “agronomic practices” (e.g., System of Millets Intensification (SMI) and line transplanting) for finger millet (*Mandia/Ragi*), little millet (*Suan*), and foxtail millet.

The area which has witnessed millet cultivation for the last two hundred years was reluctant to adopt the “agronomic practices” over the broadcast sowing method. Two of 163 households adopted the new techniques, and they immediately saw their little millet production increase from 2 quintals to 7-8 quintals per ha. In the second year, 35 out of 163 households adopted “agronomic practices” in millet cultivation. For adopting line sowing and transplanting, farmers received an input incentive of INR 1,000 per acre, and for adopting SMI under the OMM, an input incentive of INR 2,000 per acre. Under the OMM, funds are disbursed by the Agricultural Technology Management Agency (ATMA). Khajuriput has received two power weeders. In millet cultivation involving seed broadcasting, manual weeding had to be conducted, a tedious and laborious process. As tribal households are unable to afford labour, women in the family are entrusted with sowing, weeding, adding manure, and harvesting. Consequently, the decisions over whether to adopt “agronomic practices,” rests with women due to their extensive involvement in the cultivation process.

After the introduction of line sowing, transplanting and SMI, cycle weeding is encouraged, which saves time and manual drudgery on weeding. A CHC has been setup that provides agricultural equipment to farmers on a very nominal rent and is managed by the CBO. However, the equipment is in fairly limited numbers. As a result, it would be important to perhaps augment the number of machineries and equipment as well as to encourage farmers to share these equipments since there did seem to be cases where once farmers used the equipment, they often kept it to themselves for extended periods of time.

Discussions with the community also revealed that more farmers were likely to adopt line transplanting and SMI methods in the coming years. When we asked what prevented the community from taking up “agronomic practices,” it was reluctance to adopt new practices and the additional task of line transplanting, which prevented the community from making the

switch to a more productive method. Through the mobilisation efforts of CYSD, more households are convinced about the significance of adopting new practices. A progressive farmer, who adopted “agronomic practices” in millet cultivation, talked about saving an additional quintal of millet after the first year that he sold in the local market. Today, he trains other community members in line transplantation and SMI practices. Tribal communities receive farm loans from Large Area Multi-purpose Cooperative Societies (LAMPS) and Banks. Under the Remunerative Approach for Agriculture and Allied Sector Rejuvenation, formerly known as Rashtriya Krishi Vikas Yojana (RKVY), farmers have received certified seeds at subsidised prices. They receive pricing subsidies on seeds through LAMPS.

For the tribal households of Khajuriput, millet was traditionally grown for consumption. But OMM provided the communities with an opportunity to grow millets for consumption and sell the additional produce at markets. The farmers would sell millets for INR 29 per kilo at the government-run Mandis, which is usually higher than the price they got from middlemen by a non-trivial amount of INR 6 -9 per kilogram. But maintaining quality and moisture balance is critical for securing the Minimum Support Price at the Mandis. As part of OMM, 6 CRPs have been mobilised to collect and market millets. In the current financial year, the mobilisation efforts undertaken by CYSD through the 6 CRPs helped to procure 200 quintals of millets. For the next financial year, there is a plan to procure 400 quintals from farmers and sell them through government-run Mandis.

In recent years, some household members have begun cultivating rice, but millets have remained the community's major staple food. When the community members were asked about the popularity of millets among the younger generations, the response was overwhelmingly negative. In the past few years, this area has seen the establishment of three or four residential schools funded by the central and state governments through the Tribal Departments. As children begin attending these schools, they are served rice for lunch and dinner and start to lose their appetite for millet-based meals. In an effort to revive millets among children, CYSD has been working closely with the Anganwadi and the community to organise Millet Food Festivals. During our visit to Goudoguda Anganwadi, a Millet Food Festival had been organised for pregnant and lactating mothers and children. Led by the Block Anganwadi Head and the Anganwadi staff from Goudoguda, the Food festival showcased various Ragi products and recipes. In Lamptaput Block, which has been receiving various interventions under the OMM, similar Millet Food Festivals were organised. At these Food Festivals, Anganwadi women were trained in Vizianagaram, Andhra Pradesh, to prepare various Ragi recipes that could be served as part of Mid-day meals and Anganwadi meals. At present, Anganwadis and Schools receive Ragi Ladoos on Mondays and Fridays during lunch. Under the OMM, the local PDS shops were providing millets for INR 1 per kilo. In an attempt to promote millets, Harsha Trust organised a Food Festival in collaboration with women farmers from one of its Community-Based Organisations (CBOs). With the support of external trainers, a few women were trained to prepare millet-based soup. The Food Festival also held demonstrations of various millet recipes to showcase value-added millet products. As part of an ongoing

Breastfeeding Campaign in Borigumma Block, Harsha Trust has also been discussing the significance of millet consumption for pregnant and lactating mothers.

Before OMM officially began, Pradan had been working with small and marginal tribal farmers of the region since about 2012. One consistent observation was that while farmers were growing millets, two things changed simultaneously. One, the push for paddy cultivation and consumption, particularly promoted by the state through the PDS and the promotion of high-yielding paddy varieties. Secondly, the increasingly erratic nature of rainfall and lowering soil quality made agriculture a risky affair. These two reasons in tandem made food security a major concern in the region. Historically, rice production has been augmented through methods like System Rice Intensification (SRI). However, increased rice production did not lead to substantially better nutritional outcomes, as evidenced by widespread malnutrition in Koraput. Pradan, in collaboration with the Agriculture Department, had been working to improve millet farming systems but found it difficult to gain traction among farmers. Millets had traditionally been grown by farmers using the broadcast seeding method. Given the nature of the millet crop, this low-effort technique usually still yielded enough for the farming family's self-sustenance. The resilient nature of the millet crop also meant most farmers traditionally did not follow crop management practices such as weeding. However, increased rice consumption, a growing population, and increasingly fragmented landholdings led to a decline in millet cultivation, resulting in deteriorating nutritional levels. The primary approach to improve millet production has been to improve the package of practices for millet cultivation. Encouraging and training farmers to move away from broadcast sowing, Pradan staff focus on ensuring the farmers in the block follow either of the three recommended seeding practices. There has been a consistent effort to support farmers in adopting improved management practices, such as weeding, rolling, crop cutting, and promoting non-pesticide pest management (NPM). These have mostly been carried out through traditional agricultural extension models, such as field demonstrations and training.

Pradan has been implementing the programme along with the CBO, *Nari Shakti Mahila Mahajan*. The CBO is a women-led common interest group that was promoted by Pradan well before the launch of the millets mission. The role of the CBO in the coming years is expected to be pivotal to maintaining the programme's momentum. Especially as the role of CSOs gradually recedes, CBOs are expected to take the lead in assuming these responsibilities. Current programme operations are jointly run by Pradan and the CBO, with Pradan taking the active lead and providing considerable handholding to the CBO. A cluster hiring centre has been set up by the CBO, where farmers can rent machinery, such as cycle weeders and other equipment, for crop management. The equipment is rented out to farmers at minimal prices. The grant for setting up the CHC is covered by OMM resources.

In an effort to promote market linkages for millets, Pradan has been engaging the services of Agricultural Entrepreneurs (AEs), who are involved in door-to-door collection of produce from communities. Pradan is encouraging communities to continue sowing and harvesting simultaneously to maximise their income. Furthermore, the CSO continues to inform farmers

about the Minimum Support Prices (MSP) for millets in Jagdalpur, Vizianagaram, and some neighbouring markets.

Unlike the Lamptaput and Laxmipur Blocks, which were more successful with achieving the key objectives of the OMM, the Borigumma Block in the same district was not. As per the OMM mandate, each block is assigned 1,000 ha for millet cultivation over five years. For this block, the target of growing millets in 600 ha. over three years has been met by Harsha Trust, the CSO operating as the facilitating agency for the OMM. In the first year, Harsha Trust managed to introduce millet cultivation in 123 out of 200 Ha. In the second year, Harsha Trust managed to introduce millet cultivation in 242 Ha. against the targeted 200 Ha. In Borigumma Block, rice cultivation takes precedence over millet cultivation. Millets were cultivated as a subsistence crop, sold below the MSP (INR 12-14/kilo). Following the revival of millets under the OMM and the setting up of the government Mandi, millets were sold at the MSP (INR 28.93). Today, the farming community is becoming interested in introducing new “agronomic practices” under the OMM to increase production and sell millets at MSP through the Government Mandis. At present, there are 4 government Mandis for the Borigumma Block. Two additional Mandis were set up through the District Collector’s Emergency District Fund, in coordination with the officials from LAMP and Tribal Development Co-operative. Corporation of Odisha (TDCC). These two new Mandis have come up through the advocacy efforts of Harsha Trust with the District Collectors’ Office.

In Bandiguda village of Bandiguda Gram Panchayat of Borigumma Block in Koraput District, the community has long been engaged in rice production. According to Adivasi women (mainly from the Gadwa and Paraja communities), there is little interest in millet production due to their extensive engagement in rice cultivation through manual transplanting. Additionally, people prefer consuming rice over millets. Millet cultivation, for them, requires additional time since the broadcasting method is used. Through the mobilisation efforts of Harsha Trust, 26% of households adopted line transplanting methods, as popularised by the OMM, and are already reaping the benefits of increased production and additional income from selling millets in the Mandi. 50% of households continue to engage in millet cultivation using broadcasting methods and manual weeding.

Conclusion

The state government of Odisha is one of the first movers in reviving millet cultivation and consumption by launching the “Special Programme for Promotion of Millets in Tribal Areas.” The scheme focused on improving millet farming practices and developing the supply chain, as well as generating demand for millets through existing government schemes and better marketing through institutions such as co-operatives and farmer-producer organisations. The initiative is unique in the sense that it leverages a range of actors in the farm and tribal development space, including CBOs, grassroots CSOs and technical advisors such as WASSAN and NCDS, for effective roll-out and documentation of the programme learnings.

While the programme has been successful in establishing collaborations between the CSOs and the communities, the agriculture department and other line departments at the block and GP levels are fundamental to the programme's smooth functioning. The programme's mission mode and the involvement of CSOs as facilitators have made OMM a high-priority project. The urgency must translate into shared priorities across the agriculture department and other line departments at the block and GP levels.

ATMA, which serves as the nodal agency at the district level, has been particularly slow in releasing programme funds to the CSOs and the CBOs. The current policy is that 70% of the first tranche must be exhausted before the next tranche is released. While there's state pressure on the ATMA, the delay has been persistent at the district level. For instance, in 2019-20, Pradan utilised resources that arrived as a delayed payment for 2018-19 in January 2019. Hence, once the delayed funds for 2019-20 come through, they would require exhausting at least 70% of the payment that came for 2018-19, as well as 2019-20, to receive the payment for 2020-21.

Presently, the government Mandis procure millets at INR 29 per kilo, intermediaries procure at slightly lower prices of around INR 23-25 per kilo. Before the establishment of the government Mandi, prices offered by intermediaries were as low as INR 12-15 per kilo. While government Mandis are strict about certain quality-based characteristics of the produce, intermediaries are often willing to procure even when the moisture content or de-husking quality is suboptimal. As a result, their role in the millet market remains fairly significant. Moreover, with increased production, there is now a considerable surplus for farmers to sell, but the restriction on the quantity Mandis will purchase keeps farmers reliant on intermediaries. In the long run, as the adoption of improved practices spreads, millet production in villages is likely to rise further. Consequently, significant investment needs to be made in setting up government Mandis to cut transportation costs, reduce the role of intermediaries, and increase household incomes from the sale of millets.

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