

Millets as a Policy Response to the Food and Nutrition Crisis – Special Reference to the Odisha Millets Mission

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Introduction

End hunger, achieve food security, and improve nutrition is at the heart of the Sustainable Development goals. For India, ending food insecurity continues to be high in the list of development priorities because the country's high economic growth has not always translated to reducing hunger and addressing malnutrition. India is a signatory to the Millennium Declaration (MDGs) adopted at the United Nations General Assembly in September 2000 and has consistently reaffirmed its commitment towards the eight development goals. The first target of the MDGs is eradication of extreme hunger and poverty. Accordingly, the country has been moderately successful in reducing poverty. As per the UNDP findings, in 1990, the all India Poverty Head Count Ratio (PHCR) was estimated to be 47.8%. In order 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 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 (88nd) and Pakistan (94th) have better GHI² ranks and scores.

It is difficult to identify the causality 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 the nutrition status of India. It also describes the threat of climate change and poor natural resource management in further aggravating food insecurity. Section 2 highlights the potential of millets as a key policy response to the present nutritional and agriculture concerns through a case study analysis of the Odisha Millets Mission(OMM). The paper tries to unpack the implementation process and experience of the much appreciated and talked about initiative of the Government of Odisha.

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: http://economictimes.indiatimes.com/article/show/66226877.cms?from=mdr&utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst

The final section then summarises the findings that may have important policy implications for states looking to adopt similar initiatives.

1. Food Security in India

According to 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, constituting 14.5% of the population. Any discussion of food insecurity should look beyond the question of hunger and aim at ensuring access to nutritious and sufficient food for all (FAO website).

When the constitution was framed in post-independent India, it did not explicitly recognize the right to food. But starvation deaths in Odisha (Kalahandi, Bolangir and Koraput districts) during early 2000s, prompted the National Human Rights Commission to consider 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 requires the reading of Article 21 along with two other articles³ to understand the obligation of the Indian state with regard to the right to food security.

The government made programmatic provision for distributing food grains and essential commodities following critical shortages during 1960s. The Revamped Public Distribution System (RPDS) was launched in 1992, with a view to strengthen and streamline the PDS and improve its reach in remote and inaccessible areas where majority of socio-economically marginalized sections of society live.⁴ In 1997, the central government launched the Targeted Public Distribution System (TPDS) with the focus on poor. The central sponsored scheme was expected to benefit 60 million poor households for whom 720,000 tonnes of food grains (for instance, wheat, rice and sugar) were earmarked annually.⁵ The People's Union for Civil Liberties (PUCL) 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 implementation of eight central schemes as legal entitlements.⁶ These include the PDS, Antyodaya Anna Yojana (AAY), the Mid-Day Meal Scheme, and Integrated Child Development Services (ICDS).⁷ 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).

³ Article 39 of the constitution, enshrined as one of the Directive Principles, is fundamental in the governance of the country, requiring the State to direct its policy towards securing that the citizens, men and women equally have the right to an adequate means to livelihood. On the other hand, Article 47 of the constitution, considered it to be the duty of the state to raise the level of nutrition and the standard of living and to improve public health.

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

⁵ Retrieved on November 8, 2019 from <https://dfpd.gov.in/index.htm>

⁶ Interim order dated November 28, 2001 PUCL vs. Union of India and Ors., Supreme Court Writ Petition [Civil] No. 196 of 2001.

⁷ 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>

By 2000, the country became a signatory to the MDG 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)⁸ in July 2013 which gave legal entitlement to 67% of the population (75% in rural areas and 50% in urban areas) to 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 failed to put an end to food and nutritional insecurities. Corruption contributed to beneficiaries receiving only a part of the allocated quantity of the PDS provisions, and that too 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 the reimagining of India's dietary preferences, as it prioritised the dependence 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 large section of the population, witnessed decline in consumption and production by 21% in rural areas and 11% in urban areas (Scroll, October 17, 2018). Devinder Sharma⁹ 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 DeFries¹⁰ noted that the predominance of low nutrient rice in PDS is associated with the reduction in iron intake (Scroll, October 17, 2018). A study by Rao et. al. (2018)¹¹ found that 500 million people, or more than two-third of the population are affected by iron (90%), Vitamin A (85%) and protein (50%) deficiencies. The poorer households are disproportionately affected by nutritional insecurities due to less flexibility to diversify the diets, following the 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 back, which drew attention to the poor performance of states 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

⁸ 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>

⁹ 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.

¹⁰ Ruth DeFries, professor of ecology, evolution, and environmental biology at Columbia University and the Earth Institute's Center for Environmental Research and Conservation.

¹¹ Rao, D.N. et. al. (2018) **Healthy, affordable and climate-friendly diets in India**. Global Environmental Change. Vol.49 (March 2018), 154-165.

states such as Punjab, Kerala, Andhra Pradesh and Assam, posed “serious” hunger problem. Majority (71%) of the states experienced “alarming” hunger problem. In Central India, seven out of nine states experienced “alarming” hunger problem that was 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 itself in usually three ways; stunting – when height is below the average height for that age, wasting – when weight is low for a given height and underweight – when weight is low for the given age. Stunting is a sign of “chronic undernutrition” associated with cognitive impairments such as delayed motor development, impaired brain function and poor school performance (NHFS-4, p.292). Wasting is a measure of “acute undernutrition” and result of “inadequate food intake” or illness causing weight loss time (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 safeguards¹² 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 sufficient availability of food for direct consumption, but also the purchasing power to buy food and access to food that meet the food and nutritional requirements for keeping the body in proper health (Xaxa 2014, p.1).

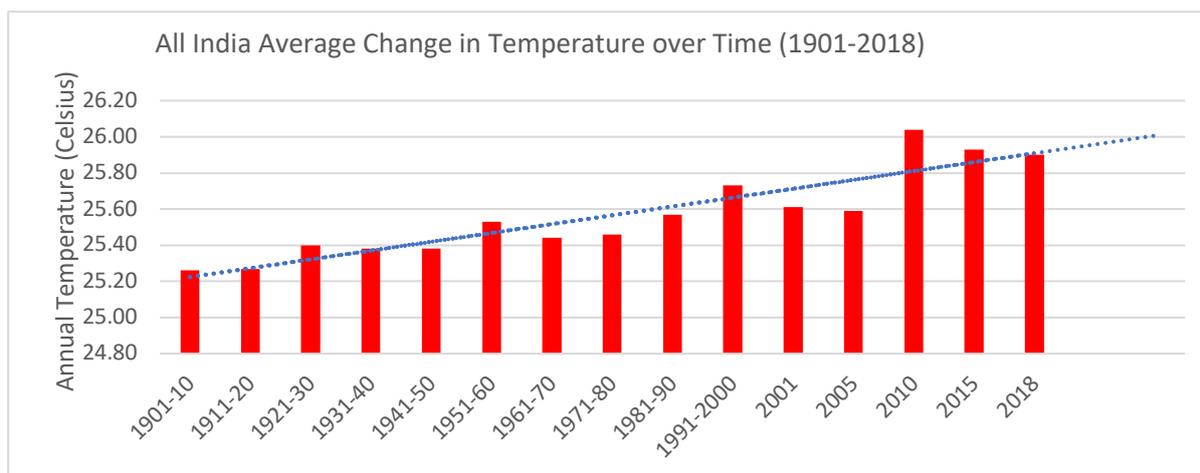
The anthropometric data on height and weight collected in the NHFS help to evaluate the nutritional status of young children in the country. During NHFS-1, stunting and underweight affected the SCs more than STs. Wasting posed a bigger challenge for the STs than SCs. As per the NHFS-2, increasing food security contributed to growing malnutrition for the Adivasi children. As stunting and underweight posed a bigger challenge for the STs than the SCs (complete reversal from NHFS-1). Wasting was predominant among the STs than all the other groups. In NHFS-3, stunting posed similar challenges for the SCs and STs, and increased from the previous NHFS-2. Wasting continued to rise for all social groups. But posed the biggest threat to the STs, even more than SCs or all the other social groups. There was 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 that there was an overall improvement in nutritional status of under-5 children across all social groups. But the nutritional status of ST children were worse off than SC and other social groups. ST children

¹² 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

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(1992-93)			
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
NFHS-2(1998-99)			
Category	Stunted	Wasted	Underweight
Scheduled Tribe	53	22	56
Scheduled Caste	52	16	54
Other Backward Class	45	17	47
Other (General)	41	13	41
NHFS-3(2005-06)			
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
NHFS-4(2015-16)			
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



Source: IMD

In India, according to the Meteorological Department (IMD) data, average temperature across the country continue 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.¹³ The World Bank estimates that if the climate change continues unhindered, then 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 2001-2018) (Mint, July 21, 2019). Moreover, as effect of climate change across the country become palpable, some parts of the country will be more affected than the rest.

CITB is one of the most vulnerable agricultural regions due to climate change and climatic variability. On an average, the region experienced 10% rainfall 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 three-fold rise in frequency and intensity of extreme rainfall (more than 150 mm per day covering an area of 200-250 m.

Considering the dominance of rainfed farming in CITB, the impacts on agriculture are potentially 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 its impact on the 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

¹³ 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>

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.¹⁴ 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 is a climate compliant crop (as compared to other grains such as wheat and rice) both 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).

Fig 4

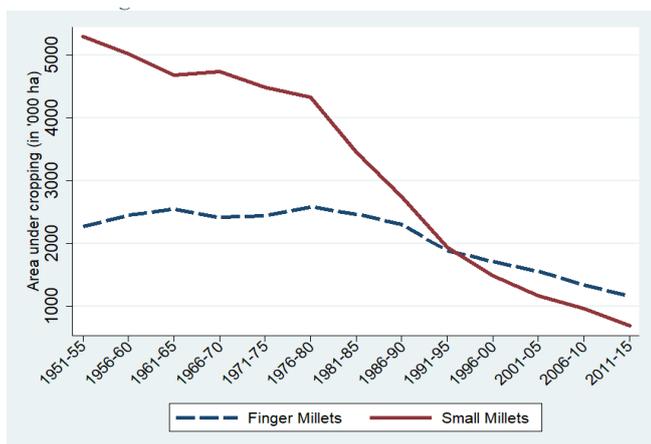


Fig 5

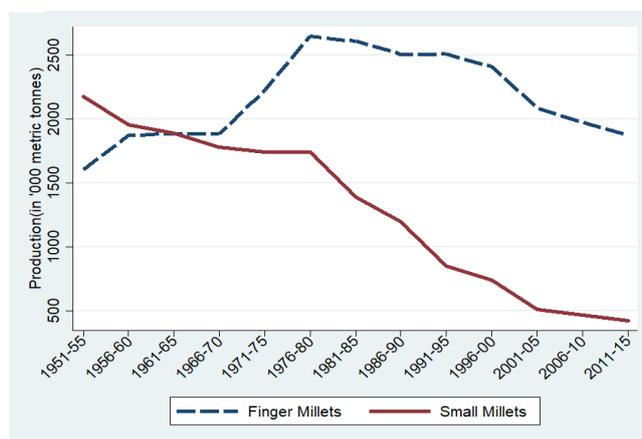


Fig 4: Quinquennial trends for country level area under finger millets and small millets (except finger millets) cropping (in '000 ha)

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

In early 2000s, “*Kodo kutki hatao soyabean lagao*” was a popular slogan in the erstwhile unifies Madhya Pradesh, encouraging cultivators to go in for oilseeds crop (The Hindu, March 26, 2018). More than a decade later, the central and state governments has gone back to adopting a mission-mode approach for promote the traditional coarse cereals, including millets. In

2018, the Government has 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 within the folds of the National Food Security Mission (NFSM) and other program.¹⁵

¹⁴ 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

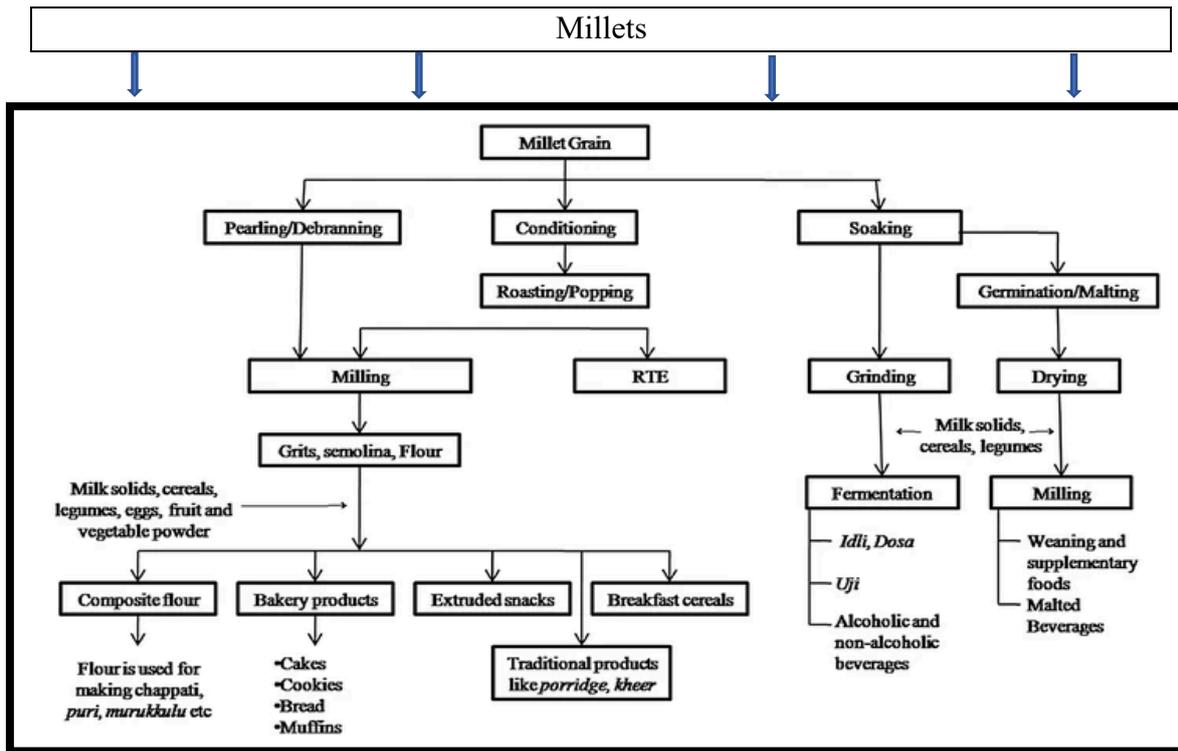
¹⁵ Guru, D. (September 12, 2019) Millet revolution: Important to debate implementation. Deccan Herald. Read more at: <https://www.deccanherald.com/opinion/millet-revolution-important-to-debate-implementation-760906.html>

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 millets production and consumption at the state level based on an analysis of household level data from the 68th National Sample Survey. While they find similar fall in the production of millets over the years, their analysis of consumption show that it ranges widely between 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 near 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 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 high of 2.65 mt during 1976-80 despite huge reduction in area. This was due to doubling of productivity of finger millet from 704 kg/ha to 1601 kg/ha and widespread cultivation of high yielding blast tolerant varieties. The latest (2015-16) estimates, the total area under millets 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.

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.¹⁶

¹⁶ 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>



<p>Food Security</p> <ul style="list-style-type: none"> • Sustainable food sources in changing global climate • Resistant to climatic stress, pests and diseases 	<p>Nutritional Security</p> <ul style="list-style-type: none"> • Rich in micronutrients protein and amino acid 	<p>Safety from diseases</p> <ul style="list-style-type: none"> • Gluten free a substitute for wheat in celiac diseases • Combat cardiovascular diseases, diabetes, anaemia, and calcium deficiency 	<p>Economic Security</p> <ul style="list-style-type: none"> • 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)

Millet cultivation is highly resource efficient considering it grows on shallow, low fertile soils with a pH of soil ranging from acidic 4.5 to basic soils with pH 8.0.¹⁷ 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 change in consumption pattern, 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 prerogative of the states. 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 be under the overarching umbrella of the

¹⁷ 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)

National Nutrition Mission (POSHAN Abhiyaan) that focuses on intense monitoring and convergence of initiatives focused on improved nutrition through different state line departments. However, there does not exist clear guidelines on how one should go about strategizing and adopting 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 have critical learnings not only in terms of ultimate impact on the nutritional profile of the state but also in terms of programme and administrative processes that can be developed as a model for other states.

Odisha Millets Mission

Background

Fig 7

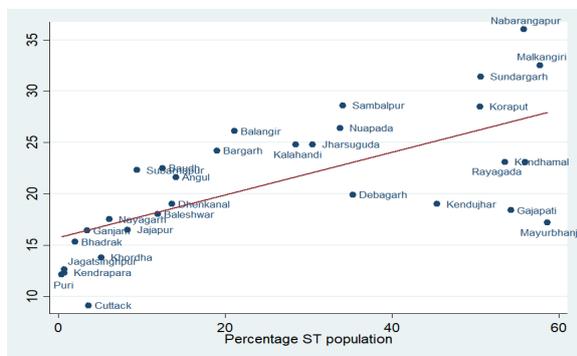


Fig 8

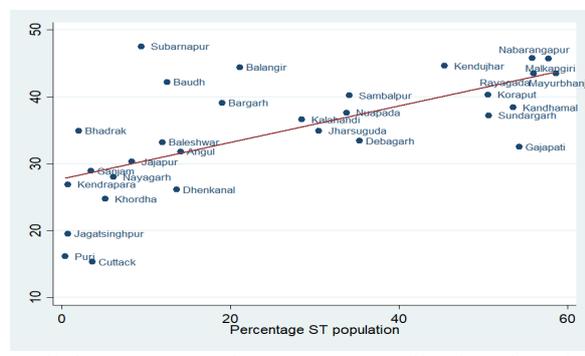


Fig 9

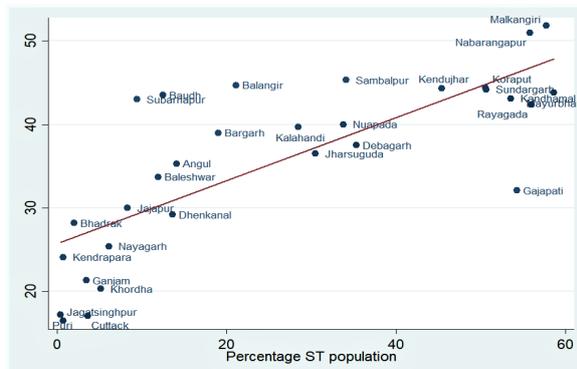


Fig 7: Percentage tribal vs percentage of under 5 children stunted

Fig 8: Percentage tribal vs percentage of under 5 children wasted

Fig 9: Percentage tribal vs percentage of under 5 children underweight

Source: NFHS – 4

Odisha, a state in eastern India bordered by West Bengal and Jharkhand on the north, Chhattisgarh on the west, Telangana and Andhra Pradesh on the south and a long coast line along the Bay of Bengal on the east continues to experience some of the highest malnutrition levels 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 the three indicators of wasting, stunting and underweight. In terms of deprivations and marginalisation, the state also has some of the highest proportion of tribals in the country.

SECC (2011) data shows Odisha has a tribal population of roughly 24% and among all major states, only trails it's bordering states of Jharkhand and Chhattisgarh. Hence, barring the north eastern region, the states in central and east India have the highest proportion of tribal population in the country. NFHS-4 also provides an opportunity to analyse the district level malnutrition of Odisha and helps us understand trends of whether a higher tribal population

correlates with that of 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 tribal population and higher malnutrition levels with the relationship strongest for underweight children.

The state government of Odisha was one of the first movers in reviving the farming and consumption of millets 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 highest tribal population – Koraput, Malkangiri, Rauagada, Gajapati, Kandhamal, Kalahndi and Nuapada – that also have a history of growing and consuming millets.

This Special Program for Millets target tribal areas of the state was then expanded and currently covers 14 districts, 72 blocks across 12,257 Ha. and involving 31,099 farmers. The project was implemented across three phases.

Programme Framework and Structure

The Odisha Millets Mission envisages to address both 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 organization, and ensure the integration of millets into exiting 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 on a range of actors in the farm and tribal development space including community-based organisations, grassroot NGOs and technical advisors.

A key component of the programme is also the incentive structure put in place using the direct benefit transfer model where farmers who follow the recommended practice are provided a conditional cash transfer. The standard process of the transfer is shown as 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

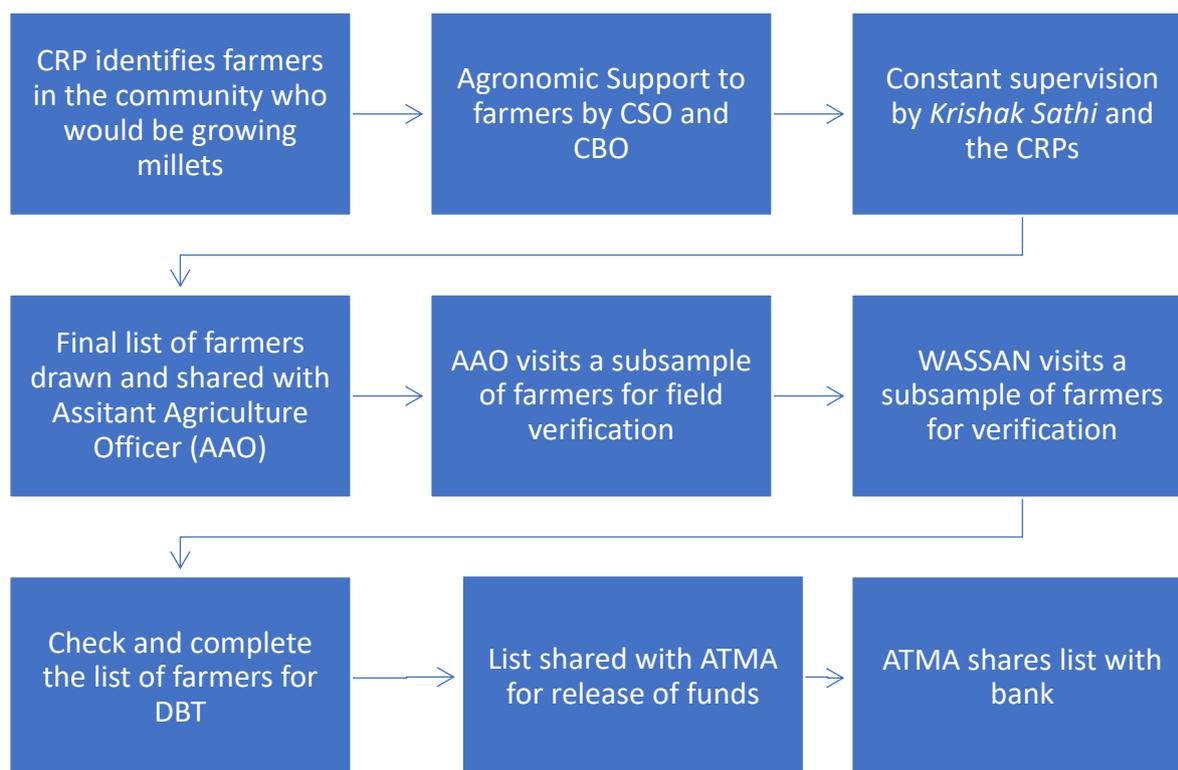


Fig 6. DBT process under OMM
Source: Based on authors' discussions

Observations from Fieldwork

Koraput district was incorporated in the Phase 3 of the OMM. Koraput has historically been a millet producing district with a tribal population of 48%. This paper summarises the reflections and observations from the fieldwork in 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 the community members, *block level* bureaucrats of the agriculture department and staff of the facilitating CSOs which includes 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.¹⁸ They continue to practice *Podu* system of shifting cultivation using *slash-and-burn methods* on the hilly slopes where they grow different varieties of millets, rice, lentils or vegetables.¹⁹ However in 2002,

¹⁸ Retrieved on November 11, 2019 from <http://www.antrocom.net/upload/sub/antrocom/070211/10-Antrocom.pdf>

¹⁹ Retrieved on November 11, 2019 from

[http://gbpihedensis.nic.in/ENVIS%20Bullitin/ENVIS%20Bulletin%20\(Vol.%2024,%202016\)/Study_shifting_cultivation_N_V_Kumari.pdf](http://gbpihedensis.nic.in/ENVIS%20Bullitin/ENVIS%20Bulletin%20(Vol.%2024,%202016)/Study_shifting_cultivation_N_V_Kumari.pdf)

Khajuriput was declared a “model village” by the Odisha Government, and since then received access to electricity, roads and schools. Today, *Podu* system of cultivation has mostly stopped 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 were yet to receive IFR titles. Each household (with the exception of 5 families that were landless) own some land in the village and depend on rainfed farming-30 households owns half an acre, 50-60 households owned 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 depend on their respective kitchen garden.

CYSD was selected as the implementation partner for the OMM flagship program in Koraput district. On July 2018, CYSD team started motivating the tribal households to increase production, productivity, value additions and market linkages of the millets in Khajuriput. They held demonstrations for promoting “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 last two hundred years, were reluctant to adopt the “agronomic practices” over the broadcast sowing method. Two households out of 163 households, adopted the new techniques, which immediately witnessed an increase in production from 2 quintals to 7-8 quintals in one ha. of little millet. In the second year, 35 out of 163 households adopted “agronomic practices” in millet cultivation. For adopting line sowing and transplanting, the farmers received input incentive of INR 1,000 per acre and input incentive of INR 2,000 per acre for adopting SMI under the OMM. Under the OMM, funds are disbursed by Agricultural Technology Management Agency (ATMA), Khajuriput has received two power weeders. In millet cultivation involving broadcasting of seeds, manual weeding had to be conducted, which is both a tedious and expensive laborious process. As tribal households are unable to afford labour, women in the family are entrusted with the task of 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 held with the community also revealed that more farmers were likely to take up line transplanting and SMI methods in 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 more productive method. Through the mobilization 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 the other members of the community about how to practice 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, previously 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 for collection and marketing of millets. In the current financial year, the mobilization efforts undertaken by CYSD through the 6 CRPs, helped to procure 200 quintals of millets. For the next financial year, there is plan to procure 400 quintals from the farmers and selling them in the Government run Mandis.

In recent years, some members of the household have started cultivating rice but millets have remained the major staple food for the community. When the community members were asked about the popularity of millets among the younger generations, the response was overwhelmingly negative. In past few years, this area has witnessed the growth of three or four residential schools set up through central and state funding from the Tribal Departments. As children start staying in these schools, they are served rice for lunch and dinner, and they 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 organizing Millet Food Festivals. During our visit to Goudoguda Anganwadi, one such Millet Food Festival had been organized for pregnant, lactating mothers and children. Led by Block Anganwadi Head and the Anganwadi staff from Goudoguda, the Food festival showcased various Ragi products and recipes. In Lamptaput Block, which have been receiving various interventions under the OMM, similar Millet Food Festivals were organized. In these Food Festivals, Anganwadi women were trained in Vizianagaram, Andhra Pradesh on preparing various Ragi recipes, which could be prepared as part of Mid-day meals and Anganwadi meals. At present, Anganwadis and Schools were receiving Ragi Ladoos on Mondays and Fridays during lunches. Under the OMM, the local PDS shops were providing millets for INR 1 per kilo. In an attempt to promote millets, a Food Festival was organized by Harsha Trust in collaboration with women farmers from one of their Community Based Organization (CBO). With the support of external trainers, few women were trained to prepare millet-based soup. The Food Festival also held demonstrations for various millet recipes in order to showcase the value added products from millets. As part of an ongoing Breast-Feeding 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. Something that was consistently observed was that while farmers were growing millets, two things had simultaneously changed. One, the push for paddy cultivation and consumption, particularly promoted by the state through the PDS and the promotion of high yielding seeds of the paddy crop. 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, increase in the production of rice did not lead to substantially better nutrition outcomes as evidenced by the widespread malnutrition in Koraput. Pradan in collaboration with the Agriculture Department had been working to improve the systems for millets farming but found it difficult to get reception among farmers. Millets traditionally had been grown by farmers in 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 consumption of rice, rising population, increasingly fragmented land holdings meant that the cultivation of millets dropped resulting in deteriorating nutrition levels. The primary approach to improve millet production has been on improving the package of practices for millet cultivation. Encouraging and training farmers to move away from broadcast sowing, Pradan staff focuses on ensuring the farmers in the block follow either of the three recommended seeding practices. There has been consistent effort in supporting farmers to adopt improved management practices such as weeding, rolling, crop cutting and promotion of non-pesticide pest management (NPM). These have been mostly been carried out through traditional agricultural extension models using field demonstrations and trainings.

Pradan has been implementing the programme along with the CBO, *Nari Shakti Mahila Mahajan*. The CBO is a woman based common interest group that has been promoted by Pradan much prior to the launch of the millets mission. The role of the CBO in the coming years is expected to be pivotal in ensuring the momentum of the programme. Especially once the role of CSOs gradually recede, the CBOs are expected to take the lead in taking up the 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 setup by the CBO where farmers can rent machineries such as cycle weeders and other equipments from crop management. The equipment is rented out to farmers at minimal prices. The grant for setting up the CHC is covered by resources under OMM.

In an effort to promote market linkages for millets, Pradan has been engaging the services of the Agricultural Entrepreneur (AE), who are involved in door-to-door collection of the produce from the communities. Pradan is encouraging the communities to continue sowing and harvesting at the same time so that they could maximise on their income. Furthermore, the

CSO continue to the farmers about the Minimum Support Prices (MSP) for millets from Jagdalpur, Vizianagaram and some of the neighbouring markets.

Unlike the Lamptaput and Laxmipur Blocks, which were more successful with achieving the key objectives of the OMM, Borigumma Block in the same district. As per the OMM mandate, each block is assigned 1,000 ha. for millet cultivation over a span of five years. For this block, the target of growing millets in 600 ha. over three years, have 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 government Mandi, millets were sold at the MSP (INR 28.93). Today, 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 set up through the District Collector’s Emergency District Fund and 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 been long engaged in rice production. According to the Adivasi women (mainly from Gadwa and Paraja) of the community, there is little interest in millet production due to their extensive engagement in rice cultivation through manual transplantations. Additionally, people prefer consuming rice over millets. Millet cultivation, for them, require additional time since the broadcasting method. Through the mobilization efforts of Harsha Trust, 26% households followed line transplanting methods, as popularised by the OMM, and already reaping the benefits of growth in production and additional income by selling millets in the Mandi. 50% households continue to engage in millet cultivation through the broadcasting methods and manual weeding.

Conclusion

The state government of Odisha is one of the first movers in reviving the farming and consumption of millets 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 work on generating a 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 on a range of actors in the farm and tribal development space including CBOs, grassroot 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 setting up successful collaborations between the CSOs and the communities, the agriculture department and other line departments at the block and GP levels are fundamental to the smooth functioning of the programme. The mission mode of the programme and involvement of CSOs as facilitators has made OMM a high-priority project. It is critical that the urgency is translated into similar priorities among the agriculture department and other line departments at the block and GP levels.

ATMA serve 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 one tranche needs to be exhausted before the next tranche is released. While there's pressure from the state to the ATMA at the district level, the delay has been consistent. For instance, for the year of 2019-20, Pradan has been utilising resources that came as a delayed payment for the previous year of 2018-19 in January 2019. Hence, once the delayed funds for 2019-20 comes through, they would be requiring exhausting at least 70% of the payment that came for 2018-19 as well as 2019-20 to receive the payment for 2020-21. Considering 70% mandate can be difficult, ATMA should lower the mandate to better expedite the release of fund.

Presently, the government Mandis procure millets at INR 29 per kilo, middlemen procure at slightly lower prices of around INR 23-25 per kilo. Prior to the setting up of government Mandi, prices offered by middlemen were as low as INR 12-15 per kilo. While government Mandis are strict about certain quality-based characteristics of the produce, middle-men are often willing to procure even in cases when the moisture content or the quality of de-husking is suboptimal. As a result, their role in the market for millets remain fairly significant. Moreover, with the increased production, there now exists considerable surplus with farmer for sale but the restriction of quantity that Mandis would purchase makes the farmer continue to rely on middlemen. In the long run, as the adoption of improved practices spread, it is likely that production of millets within villages would rise even further. Consequently, significant investment need to be made in setting up government Mandis to cut both transportation costs, role of middlemen and increase household incomes from sale of millets.

