



# Millets and SDGs



Department of Agriculture & Farmers' Empowerment  
Government of Odisha

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## Abbreviations

A&FE	Agriculture and Farmers' Empowerment	CDP	Crop Diversification Programme
AICRP	All India Coordinated Research Projects	CFTRI	Central Food Technological Research Institute
AE	Actual Expenditure	CH <sub>4</sub>	Methane
AFOLU	Agriculture, Forestry and Other Land Use	CHC	Custom Hiring Centre
AIIMS	All India Institute of Medical Sciences	CMSCs	Community Managed Seed Centres
APAARI	Asia-Pacific Association of Agricultural Research Institutions	CMSS	Community Managed Seed System
APEDA	Agricultural and Processed Food Products Export Development Authority	CO <sub>2</sub>	Carbon Dioxide
APL	Above Poverty Line	COVID	Coronavirus disease
ATMA	Agricultural Technology Management Agency	CRP	Community Resource Person
AWCs	Anganwadi Centres	CSC	Community Seed Centre
BASUDHA	Buxi Jagabandhu Assured Water Supply to Habitations	CVDs	Cardiovascular Diseases
BDA	Bhubaneswar Development Authority	DBT	Direct Benefit Transfer
BMC	Bhubaneswar Municipal Corporation	DI	Decilitre
BMI	Body Mass Index	DMF	District Mineral Foundation
BPL	Below Poverty Line	FAO	Food and Agriculture Organization
CBO	Community Based Organisation	FAOSTAT	Food and Agriculture Organization Corporate Statistical Database
CCC	Climate Change Cell	FICCI	Federation of Indian Chambers of Commerce and Industry
CCIA	Climate Change Impact Assessment	FPC	Farmer Producer Company

FPO	Farmer Producer Organisation	IFAD	International Fund for Agricultural Development
FRA	Forest Rights Act	IFS	Integrated Farming System
FS&CW	Food Supply and Consumer Welfare	IIMR	Indian Institute of Millets Research
GCF	Green Climate Fund	IIP	Indian Institute of Packaging
GDP	Gross Domestic Product	IPCC	Intergovernmental Panel on Climate Change
GHG	Green House Gas	ISB	Indian School of Business
GHI	Global Hunger Index	ITK	Indigenous Technical Knowledge
GI	Glycemic Index	IWMI	International Water Management Institute
GoI	Government of India	IYoM	International Year of Millets
Govt.	Government	Kg	Kilogram
GPs	Gram Panchayats	LFPR	Labour Force Participation Rate
GSDP	Gross State Domestic Product	LAMPCS	Large Sized Adivasi Multipurpose Cooperative Society
GtCO <sub>2</sub> e	Giga tonnes of Carbon dioxide	LDL	Low-density lipoprotein
GVA	Gross Value Added	LPG	Liquified Petroleum Gas
Ha.	Hectare	LS	Line Sowing
Hb	Haemoglobin	LT	Line Transplanting
HDPE	High Density Polyethylene	m <sup>2</sup>	Metres square
HHs	Households	MDM	Mid-day meal
H&FW	Health and Family Welfare	MFP	Minor Forest Produce
ICAR	Indian Council of Agricultural Research	M-PAS	Millet Procurement Automation System
ICDS	Integrated Child Development Services	MPI	Multidimensional Poverty Index
IEC	Information, Education & Communication	MSME	Micro, Small and Medium Enterprises
Mg.	Milligrams	PDS	Public Distribution System

MSP	Minimum Support Price	PM POSHAN	Pradhan Mantri Poshan Shakti Nirman
KUY	Mukhyamantri Krushi Udyog Yojana	PIB	Press Information Bureau
Mm	Millimetre	PoPs	Package of Practices
MT	Metric tonnes	PR&DW	Panchayati Raj & Drinking Water
N <sub>2</sub> O	Nitrous Oxide	PVC	Polyvinyl Chloride
NAPCC	National Action Plan for Climate Change	PVTs	Participatory Varietal Trials
NASC	National Agriculture Science Complex	Qtl.	Quintal
NCDS	Nabakrushna Choudhury Centre for Development Studies	RAO	Restaurant Association of Odisha
NCDs	Non-communicable Diseases	RBD	Randomised Block Design
NGO	Non-Governmental Organisation	RRAN	Revitalising Rainfed Agriculture Network
NFHS	National Family Health Survey	R&D	Research & Development
NFSA	National Food Security Act	RMC	Regulated Market Committees
NITI Aayog	National Institution for Transforming India	Rs.	Rupees
NIN	National Institute of Nutrition	SACAL	Social Action for Community Alternative Learning
OMM	Odisha Millets Mission	SAPCC	State Action Plan for Climate Change
OSG	Other Social Groups	SAS	Situation Assessment Survey
OUAT	Odisha University of Agriculture and Technology	SC	Scheduled Castes
PACS	Primary Agriculture Credit Society	SCSTRTI	Scheduled Castes and Scheduled Tribes Research and Training Institute
PCPD	Per Capita Per Day Consumption	SDGs	Sustainable Development Goals
SOP	Standard Operating Procedure		
SFSS	State Food Security Scheme		

SHC	Soil Health Card
SHGs	Self Help Groups
SSLR	Seed System Land Races
SMI	System of Millet Intensification
SOFI	State of Food Security and Nutrition in the World
SSPII	Site-Specific Protective Irrigation Infrastructure
SSTL	State Seed Testing Laboratory
ST	Scheduled Tribes
TDCCOL	Tribal Development Cooperative Corporation Limited
THR	Take Home Ration
UAE	United Arab Emirates
UN	United Nations
UNEP	United Nations Environment Programme
UNICEF	The United Nation Children's Fund
UNWFP	United National World Food Programme
WASSAN	Watershed Support Services and Activities Network
WFP	World Food Programme
WHO	World Health Organisation
W&CD	Women and Child Development
WSHGs	Women Self Help Groups

# MESSAGE BY HON'BLE MINISTER AGRICULTURE & FARMERS' EMPOWEMENT DEPARTMENT



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## **Message**

In an age defined by global interconnectedness and shared responsibilities, the pursuit of sustainable development has become an imperative for nations around the world. As we navigate the complexities of the 21<sup>st</sup> century, it is evident that our choices today will profoundly impact the well-being of future generations. It is with this foresight and commitment to a sustainable future that I proudly introduce this report, which explores the dynamic interplay between Sustainable Development Goals (SDGs) and the remarkable world of millets.

Odisha – the land of rich cultural heritage and vibrant traditions, has always been at the forefront of progressive policies and sustainable practices. In our pursuit of holistic development, we have recognized the transformative potential of millets in the State. Millets, often referred to as the "smart crops" or "miracle grains", hold tremendous potential to address multiple SDGs simultaneously. These resilient and nutritious grains have been a staple in our diets for centuries, sustaining generations with their nutritional value and adaptability to challenging climatic conditions.

The alignment of millets with the United Nations' Sustainable Development Goals (SDG) is a testament to the wisdom of our ancestors and the innovative spirit of our times. Herewith, you will explore the innovative approaches taken by Government of Odisha, particularly through the Odisha Millets Mission (OMM) to integrate millets into our agricultural practices, nutrition programs and livelihood strategies through decent financial incentives to millet farmers for cultivation and assured procurement of their produce. This report will unveil the interrelationship between millets and the SDGs, showcasing potentiality of these humble grains for positive change in our communities and beyond.

I extend my best wishes to all those who have contributed to this important publication, as well as to the countless individuals and organizations committed to advancing the cause of millets and the SDGs. Together, we can foster a future where our people thrive, our planet flourishes, and our shared aspirations for a sustainable world are realized.

**(Ranendra Pratap Swain)**

# FOREWORD

It is matter of immense pleasure and pride that 'SDGs and Millets' report is being released during the International Convention on Millets 2023. This publication is a testament to the state's dedication to the United Nation's Sustainable Development Goals (SDGs) and the innovative efforts undertaken by the Odisha Millets Mission (OMM) to promote the cultivation and consumption of millets in the state. The report explores the symbiotic relationship between the SDGs and millets and how this synergy can lead to improved food security, better nutrition, and a more climate-resilient agricultural landscape in Odisha.

As the world shifts its focus to millets as an exceptional cereal crop, it becomes crucial to recognize the versatility of millets in concurrently addressing multiple development objectives. Recognizing the Sustainable Development Goals (SDGs) as universally accepted benchmarks for assessing diverse development indicators, the Department of Agriculture & Farmers' Empowerment in collaboration with the Planning & Convergence Department has undertaken the process of mapping the SDGs with millets to evaluate the achievements and interventions comprehensively.

With 2023 being declared as the International Year of Millets (IYOM), there has been a growing interest in understanding the contrition of millets to the achievement of SDGs. As a leading state in the promotion of millets, I am very happy that the Department of Agriculture and Farmers' Empowerment has come up with this important publication.

I strongly believe this report will serve as a valuable resource, throwing light on the state's achievements, challenges, and the roadmap for further progress in aligning the cultivation and consumption of millets with the SDGs. It will undoubtedly inspire others, both within and beyond the state, to adopt similar strategies for sustainable development. I greatly acknowledge support of Prof. Sonal Choudhary, University of York, Dr. Raymond Obayi, University of Manchester and Prof. Manoj Dora, Anglia Ruskin University, United Kingdom for their valuable inputs on the draft.

I would like to express sincere gratitude to the Hon'ble Chief Minister for his leadership and guidance in the journey of OMM. I thank Hon'ble Minister, Agriculture and Farmers' Empowerment; Chief Advisor to Hon'ble CM; Chief Secretary and Development Commissioner for their constant encouragement.

I place on record my sincere appreciation for the support and cooperation extended by the Planning & Convergence Department and the OMM team led by Director, Agriculture and Food Production for undertaking the background research and documentation required for this publication.

Dr. Arabinda Kumar Padhee, IAS  
Principal Secretary  
Department of Agriculture & Farmers' Empowerment  
Government of Odisha



# Introduction

## 1.1: Background

The term 'Millet' encompasses a variety of small-seeded cereals that hold significant historical relevance. These crops have been traditionally grown and consumed in low and middle-income countries across Asia and Africa for centuries, particularly in regions characterized by semi-arid climate. Millets thrive in high-temperature environments, boast short maturation periods and exhibit high productivity. In recent times, there has been a growing global interest in millets, extending to high-income countries, driven by their recognized nutritional values and sustainable farming practices. Some of the most commonly cultivated millets include:

Table 1.1: Millets and their botanical and common names<sup>1</sup>

Types	Local Name/Odia	Generic Name	Botanical Name
Finger Millet	Mandia/ Ragi	Finger Millet	<i>Eleusine coracana</i>
Little Millet	Suan/Koshla/Kuiri/ Gurji	Little Millet	<i>Panicum sumatrense</i>
Foxtail Millet	Kangu/ Kang/ Gondli	Foxtail Millet	<i>Setaria italica</i>
Sorghum	Janha/Khedjana/ Gangei/ Janjarla	Jowar	<i>Sorghum bicolor</i>
Ditch Millet	Kodo	Kodo Millet	<i>Paspalum scrobiculatum</i>
Pearl Millet	Bajra/ Gathia/ Katenga/ Katreng	Bajra	<i>Pennisetum glaucum</i>
Barnyard Millet	Bila suan/ Kheera	Barnyard Millet	<i>Echinochloa spp.</i>

Millets held a fundamental place in the traditional Indian diet. However, between 1962 and 2010, India witnessed a stark decline in per capita millet consumption, plummeting from 39.2 kg to a mere 4.2 kg. In stark contrast, the per capita wheat consumption doubled during the same period, surging from 27 kg to 52 kg.<sup>2</sup> These shifts in dietary preferences are largely attributed to the Green Revolution, which actively promoted the widespread cultivation of wheat and paddy, marginalizing the consumption of millets. Furthermore, millets have faced a certain social stigma over time, often being regarded as 'poor man's food.'

Nonetheless, the tide is decidedly turning, driven by several compelling factors. Millets, with their remarkable characteristics, are expected to play a vital role in our efforts to combat climate change and alleviate poverty. They offer security in terms of food, nutrition, fodder and livelihoods. These hardy crops demonstrate resilience in the face of extreme temperatures, floods and droughts. The fibrous roots of millet plants contribute to soil enhancement, prevention of soil erosion, regulation of water run-off and aid in the restoration of natural ecosystems.

Notably, the United Nations General Assembly declared the year 2023 as the International Year of Millets (IYoM 2023) during its 75th session in March 2021 with the objective to raise awareness of and direct policy attention to the nutritional and health benefits of millets and their suitability for cultivation under adverse and changing climatic conditions and to promote sustainable production of millets, while highlighting their potential to provide new sustainable market opportunities for producers and consumers.<sup>3</sup>

<sup>1</sup> <https://milletsodisha.com/millets-benefits-and-nutritional-information>

<sup>2</sup> NITI Aayog (2023)

<sup>3</sup> <https://www.fao.org/millets-2023/home/en>

The Food and Agriculture Organization (FAO) serves as the lead agency for celebrating this significant year, working in collaboration with other relevant stakeholders.

## 1.2. Millets and SDGs: The Widening Frontiers

The Sustainable Development Goals (SDGs) are the new overarching Goals for humankind which integrate economic, social and environmental dimensions of development. The SDGs with the comprehensive compass of 17 Goals and 169 associated targets offer a blueprint for balanced development as opposed to lopsided interventions that prioritize specific outcomes at the cost of overall sustainability. For instance, concentrating solely on increasing agricultural productivity and incomes for farmers may prove counterproductive in the long term, if it results in the degradation of essential natural resources like soil, water and biodiversity.

The cultivation and consumption of millets are integral to achieving several Sustainable Development Goals (SDGs). Millets are exceptionally robust, requiring minimal irrigation, chemical fertilizers, and pesticides<sup>4</sup> making them a cornerstone of sustainable agriculture, particularly in water-scarce regions. Their resilience plays a significant role in providing income stability to the farmers in the evolving landscape of climate change, thus, contributing to SDG 1, 'No Poverty'.

Furthermore, millets have the potential to meet the current and burgeoning nutritional needs of the global population. Their ability to withstand drought, thrive in higher temperatures and have a short growth cycle positions them as an ideal choice for food security initiatives, directly contributing to SDG 2, 'Zero Hunger'. The increasing recommendation of millet-based foods to address health issues and lifestyle related diseases has led to a surge in global consumer preference for millets and millet-based foods, consequently promoting SDG 3, 'Good Health & Wellbeing'.

Women are at the forefront of the Odisha Millets Mission (OMM). They actively participate in all aspects of the millet value chain, emerging as 'Millet Entrepreneurs' and promoting SDG 5, 'Gender Equality'. The expansion of value-added processing of millets has created substantial income-generating opportunities for both men and women in rural areas, contributing to the realization of SDG 8, 'Decent Work and Economic Growth'. By virtue of their unique characteristics as mentioned above, millets are recognized for their pivotal role in sustainable food systems worldwide and for addressing the objectives of SDG 12, 'Responsible Consumption and Production'. Millets also have a minimal ecological impact, foster biodiversity, boast a near-zero carbon footprint and exhibit climate resilience, making a significant contribution to SDG 13, 'Climate Action'. Brimming with potential, millets can act as a vital cog in the country's sustainable development wheel when backed by appropriate policy and implementation thrust.

*"Millets have the potential to address major challenges humanity is facing at present such as climate change, nutritional insecurity and environmental degradation.*

*In a way, millets are our great hope for building a sustainable and vibrant future.*

*Reviving millets also revives our food culture and honours the traditional wisdom of our communities.*

*Let's pledge to diversify our diets with these traditional grains."*

**- Hon'ble Chief Minister of Odisha**






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<sup>4</sup> Devkota et al, 2016; Goron & Raizada, 2015; Gupta et al, 2017

### 1.3. Odisha Millets Mission (OMM)

Odisha stands out as a pioneering state that initiated a special program for the promotion of millets in tribal areas, known as the Odisha Millets Mission (OMM). Launched in 2017, the OMM aims to increase household consumption of millets by about 25 percent, enhance household nutrition security and create demand for millets, with special focus on women and children. Additionally, the program seeks to promote millet processing enterprises at the Gram Panchayat (GP) and Block levels. This initiative aims to ensure that households have convenient access to millet processing and value-added millet products. The OMM also strives to enhance millet productivity, improve profitability from millet cultivation and develop millet-based enterprises with market-oriented value chains. Furthermore, it actively promotes women entrepreneurs in millet-based activities. A significant aspect of the OMM involves the integration of millets into state nutrition programs such as the Public Distribution System (PDS), Integrated Child Development Services (ICDS) and Mid-Day Meal (MDM). These interventions collectively form the cornerstone of OMM's comprehensive approach to harnessing the potential of millets in Odisha.

#### Objectives of Odisha Millets Mission:<sup>5</sup>

-  Promoting household-level consumption
-  Setting up decentralised processing facilities
-  Improving productivity of millet crops
-  Promoting Farmer collectives and marketing
-  Inclusion of millets in state nutrition programmes

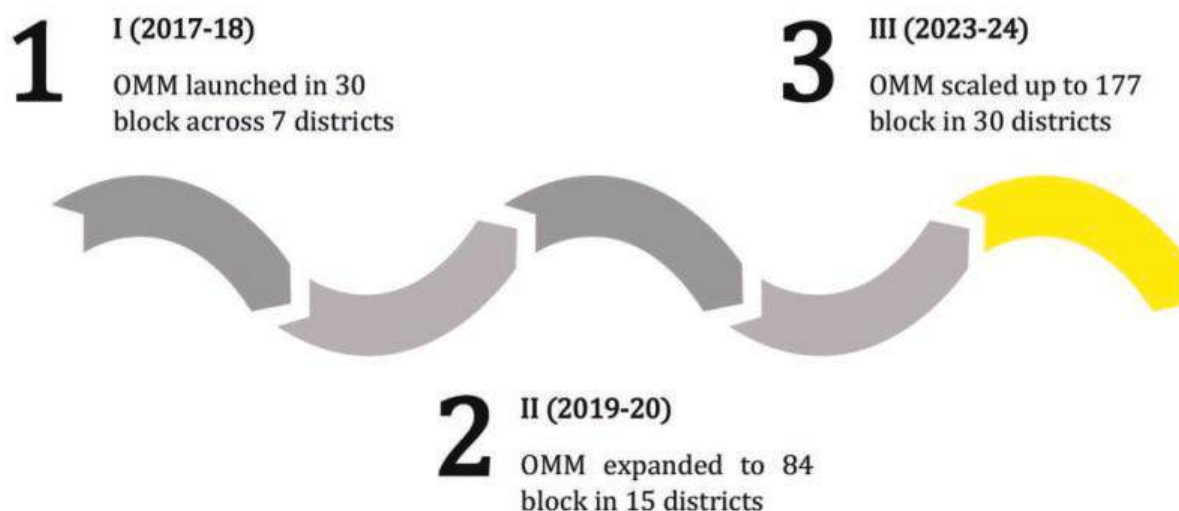
Furthermore, OMM is committed to revive millets in terms of both agricultural practices and diets. It lays particular emphasis on empowering women. The programme seeks to encourage the development of processing and entrepreneurial ventures, alongside enhancing productivity through the adoption of improved farming techniques.

Image 1.1: Millet Farm in OMM district



<sup>5</sup> GoO (2022-23b)

Figure 1.1: Coverage under OMM



OMM's expansion to include new blocks and districts is an ongoing effort, with additional blocks and districts being integrated into the program each year. Figure 1.1. provides a general overview of significant milestones achieved in terms of block and district coverage under OMM.

#### 1.4. Rational of the Report

Given that agriculture is a major contributor to global warming due to methane emissions from rice cultivation and the extensive use of chemical inputs, it is crucial to recognize millets as a sustainable alternative. Millets inherently require fewer chemical inputs and naturally produce fewer emissions. As the world, including the state of Odisha, focuses on millets as a remarkable cereal crop and launches comprehensive promotional campaigns, it becomes important to appreciate millets' contribution in achieving multiple development objectives simultaneously.

The significance of millets on a global scale is set to increase, with the International Year of Millets (IYoM) and the promotion of millets through G20 initiatives. The Odisha Millets Mission has garnered national and international recognition for its innovative implementation methods, participatory processes and multi-stakeholder approach.

Recognizing the Sustainable Development Goals (SDGs) as globally accepted metrics for measuring various indicators worldwide, the Department of Agriculture & Farmers' Empowerment, in collaboration with the Planning & Convergence Department, has initiated the process of aligning the SDGs with millets to assess its interventions and achievements.

In specific terms, the objectives of this report are as follows:

- i. Identify and discuss how cultivation of millets can contribute to the achievement of SDGs.
- ii. Analyse the significance of initiatives pertaining to millets in the context of SDGs in Odisha.
- iii. Examine the importance of millet-related strategies and interventions in Odisha within the framework of SDGs and to explore the capacity to adapt these interventions to further the attainment of SDGs.

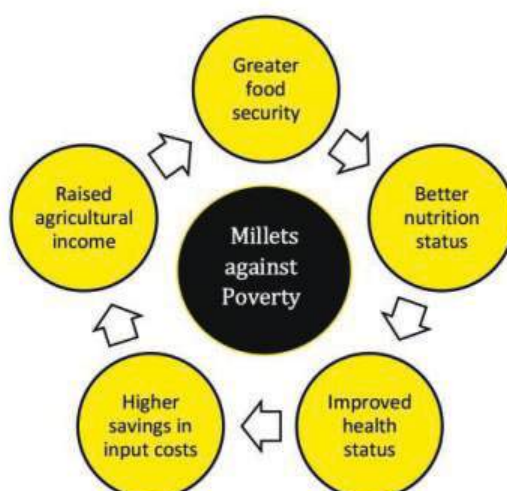


# SDG 1: No Poverty

A significant portion of the population in Odisha is dependent on agriculture and the allied sector as their primary source of income. About 46.8 percent of the workers in Odisha are employed in the agriculture and the allied sector. The agricultural sector constitutes about 22.5 percent of Gross State Value Added (GSVA) (AE) in FY 2022-23 and is estimated to grow at 6 percent in real terms.<sup>6</sup> The potential of agriculture in contributing to SDG 1, 'No Poverty' is immense. Farmers encounter numerous challenges in ensuring a steady income and these challenges have multiplied with the vulnerabilities posed by climate change. Millets have the potential to offer income security to the farmers while addressing the concerns of climate change.

A growing awareness of the advantages of incorporating millets into one's diet has resulted in a noticeable surge in demand of millets. Millets have earned recognition as a 'superfood' due to their associated health benefits, leading to a steady increase in regular consumption. Packaged millet products are becoming more prevalent in both supermarkets and local markets, with demand rising in rural and urban areas alike. Consequently, millet cultivation, among other factors, has the potential to positively impact the economic well-being of the agricultural households that prioritize millets as their primary crop.

Figure 2.1: Role of Millets in Fighting Poverty (SDG 1)



## 2.1. Socio-Economic Status of Millet Farmers

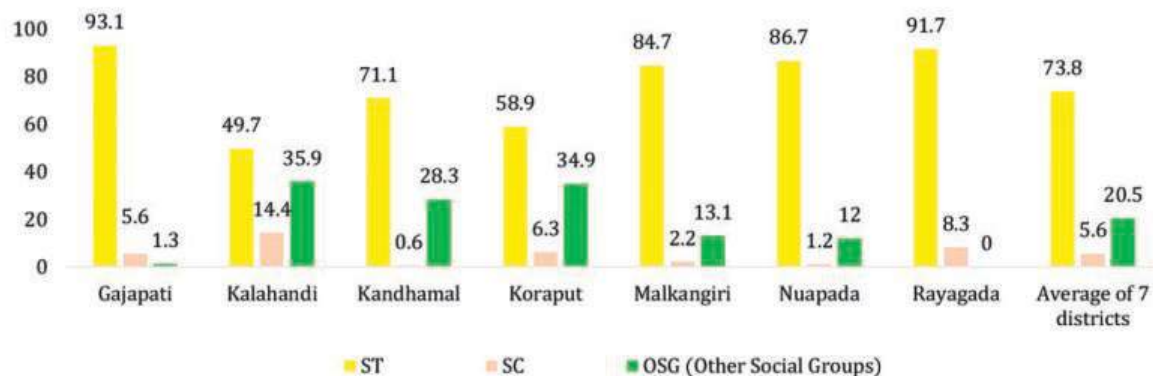
Odisha's per capita income in FY 2022-23 was Rs. 1,50,676 in current prices (Odisha Economic Survey, 2022-23). As per the Situation Assessment Survey (SAS) (Jan-Dec 2019), average monthly income per agricultural household in Odisha was Rs. 5,112.

Among the millet farmers in Odisha, the highest proportion belong to the tribal communities. The districts of Gajapati (93.1 percent) followed by Rayagada (91.7 percent) has the highest proportion of millet farmers belonging to tribal communities, while others belong to Scheduled Castes and other social groups.

<sup>6</sup> GoO (2022-23a)

Among the 7 districts, Kalahandi has the lowest proportion of tribal farmers (49.7 percent) but the highest proportion of farmers belonging to Scheduled Castes (14.4 percent) and other social groups (35.9 percent).<sup>7</sup>

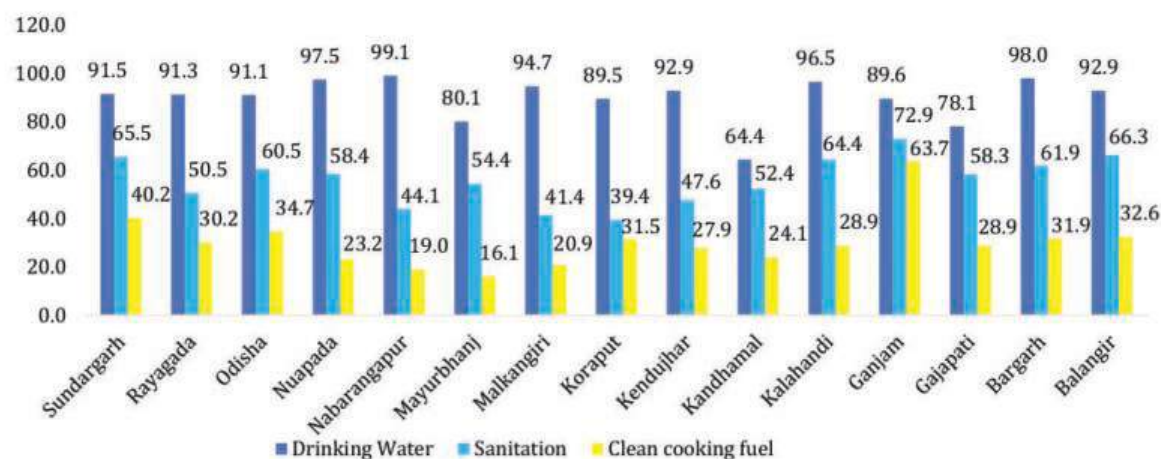
Chart 2.1: Distribution of Millet Farmers in Social Groups (%)



Source: NCDS, 2021

## 2.1.1 Access to Basic Services

Chart 2.2: Access to Basic Services (%)



Source: NFHS, 2019-21

The extent of access to basic services is a key aspect of poverty. As NFHS 5 (2019-21) data reveals, the major millet-producing districts in Odisha exhibited low rates of access to essential amenities like clean drinking water, sanitation and clean cooking fuel. Among these districts, Kandhamal (64.4 percent) and Gajapati (78.1 percent) reported the lowest percentages of people with access to clean drinking water. Access to clean cooking fuel was notably lacking across all 14 districts, with none of them surpassing a 50 percent access rate. Koraput (39.4 percent) and Malkangiri (41.4 percent) ranked the lowest in terms of sanitation access.

<sup>7</sup> NCDS (2021)

## 2.1.2 Incidence of Multidimensional Poverty

Poverty is typically associated with various manifestations such as poor health, unemployment, and low educational outcomes, which both contribute to and result from poverty. Poverty has detrimental effects on individuals' well-being, impacting social harmony and economic development. Therefore, while poverty is commonly assessed based on income, it is rather a multidimensional phenomenon. The concept of multidimensional poverty captures multiple deprivations experienced by people in their daily lives, encompassing aspects related to health, education and standard of living.<sup>8</sup>

Chart 2.3: Incidence of Multidimensional Poverty (%)

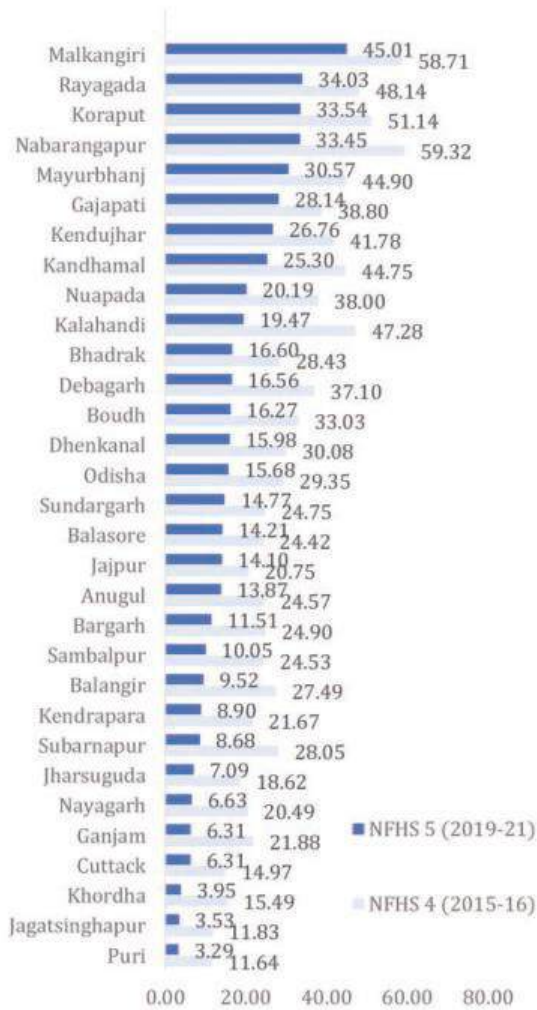


Chart 2.4: % point change in MPI between 2015-16 to 19-21



Source: NITI Aayog, 2023

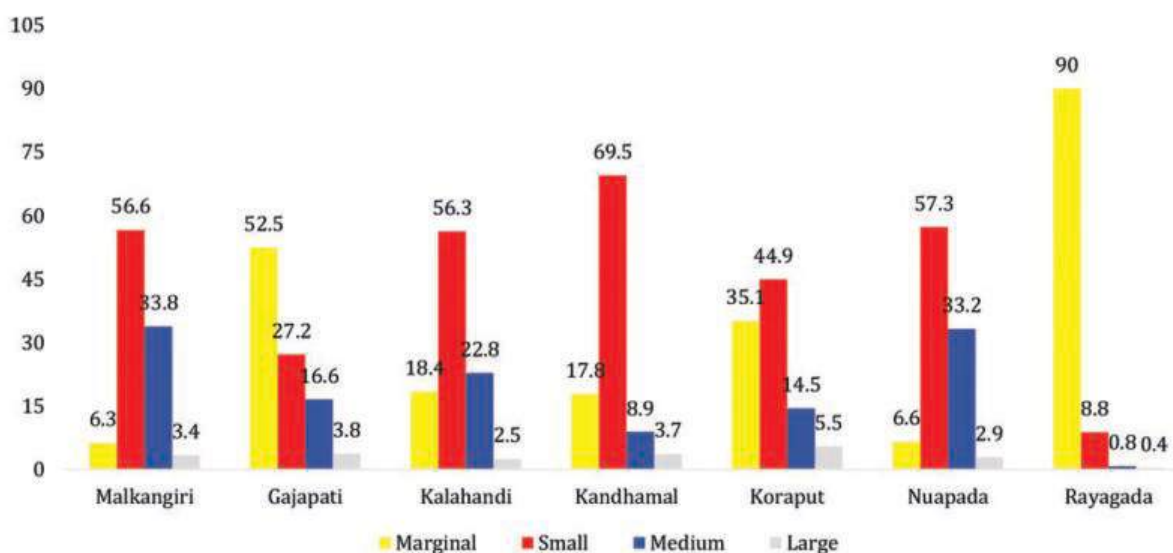
The priority districts under OMM are also the bottom ten districts with maximum incidence of multidimensional poverty as per the National Multidimensional Poverty Index Report 2023 published by NITI Aayog, Government of India. With respect to reduction in multidimensional poverty between 2015-16 to 2019-21, ten of the priority OMM districts performed better than the state average. Top performers among them are Kalahandi, Nabarangapur, Kandhamal and Balangir.

<sup>8</sup> NITI Aayog (2023)

### 2.1.3 Land Ownership

Most of the millet farmers in Odisha belong to the marginal (<1.0 ha.), small (1-2 ha.) and medium (2-4 ha.) farmers' category. The district of Rayagada (98.8 percent) has the highest proportion of millet farmers in the marginal and small land holding category. Few millet farmers have medium or large landholdings.

Chart 2.5: Operational land holding among millet farmers (%)



Source: NCDS, 2021





## 2.2 OMM's Flight Against Poverty

OMM has adopted a multi-pronged strategy to address poverty among the millet farmers.

Table 2.1: OMM's Support that Impacts Poverty<sup>9</sup>

	<p><b>Monetary Incentives:</b> Farmers cultivating millets are eligible for monetary incentives on undertaking the following package of practices:</p> <ul style="list-style-type: none"> <li>• Improved agronomic practices like System of Millet Intensification (SMI), Line Transplanting (LT) and Line Sowing (LS).</li> <li>• Application of adequate quantity of farmyard manure and compost, etc.</li> <li>• Seed treatment for protection from diseases and pests and to enhance purity and yield.</li> <li>• Use of organic inputs for disease and pest management.</li> </ul>
	<p><b>Guaranteed Procurement:</b></p> <ul style="list-style-type: none"> <li>• Tribal Development Co-operative Corporation of Odisha Limited (TDCCOL) is assigned as the state procurement agency.</li> <li>• Millet Procurement Automation System (M-PAS) is developed on the lines of paddy procurement to ease farmer registration and operations.</li> <li>• Procurement and distribution of finger millet to W&amp;CD and FS&amp;CW departments for PDS and AWCs.</li> </ul>

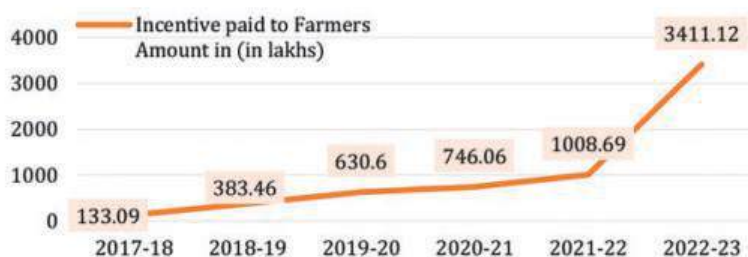
<sup>9</sup> UNWFP (2021)

	<p><b>Seed Input Supply:</b></p> <ul style="list-style-type: none"> <li>• Seed provision to farmers.</li> <li>• Cost of seeds factored in the incentives.</li> <li>• Establishment of decentralized seed centres managed by farmers organizations for demand-sensitive quality seed supply.</li> </ul>
	<p><b>Custom Hiring Centre (CHC):</b></p> <ul style="list-style-type: none"> <li>• Unit comprising set of farm machinery, equipment and implements.</li> <li>• Small, marginal and poor farmers access farm implement at subsidized rates.</li> </ul>
	<p><b>Millet Processing and Value Addition:</b></p> <ul style="list-style-type: none"> <li>• Millet Processing Units for processing millets into flour for consumption and income generation purposes.</li> <li>• Value addition activities of creating millet cookies, cupcakes etc. are carried out under OMM to support entrepreneurship and income generation.</li> </ul>
	<p><b>Millets Consumption:</b></p> <ul style="list-style-type: none"> <li>• 25 percent of millet produce is not procured from the farmers and left for self-consumption.</li> <li>• Support activities to increase millet consumption that increases market share of millets and ensure a steady supply of income for the farmers.</li> <li>• Improved nutrition from increase millet consumption decreases health burden.</li> </ul>

## 2.2.1 Monetary Support to Farmers

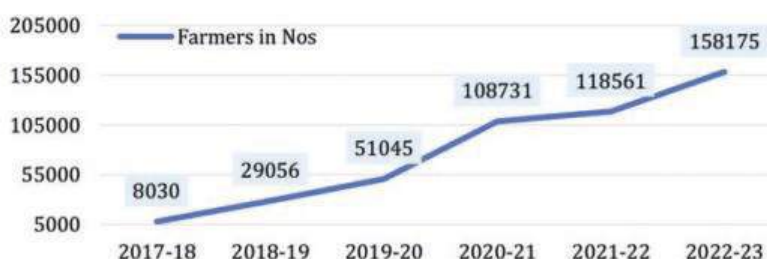
In order to boost farmers' participation, the OMM offers monetary incentives amounting to Rs. 26,500 per hectare, annually, for up to two hectares. This incentive is granted for a maximum duration of five years. Upon successful implementation of improved agronomic practices, the specified amount is transferred directly to the farmers' accounts through Direct Benefit Transfer (DBT) mechanism. A total of Rs. 6,313.02 lakhs have been disbursed to farmers through DBT since the commencement of the program in 2017-18.

**Chart 2.6: Incentives Amount Paid to Farmers under OMM**



Further, incentives amounting to Rs. 3411.12 lakhs have been provided to 1,58,175 farmers who participated in millet demonstration under OMM during the Kharif season of 2022-23.

**Chart 2.7: Number of Farmers provided Incentives under OMM**



Outreach to farmers and incentives provided under OMM have continued to rise over the years, as shown in chart 2.7.

Source: OMM Data

**Table 2.2: Monetary Incentives to farmers for improved agronomic practices**

Method	1 <sup>st</sup> year	2 <sup>nd</sup> year	3 <sup>rd</sup> year	4 <sup>th</sup> year	5 <sup>th</sup> year
Ragi-SMI	Rs. 10,000/ha	Rs. 7,500/ha	Rs. 5,000/ha	Rs. 2,000/ha	Rs. 2,000/ha
Ragi - LT/LS	Rs. 7,500/ha	Rs. 5,000/ha	Rs. 3,000/ha	Rs. 2,000/ha	Rs. 2,000/ha
Non-Ragi	Rs. 10,000/ha	Rs. 7,500/ha	Rs. 5,000/ha	Rs. 2,000/ha	Rs. 2,000/ha

Source: GoO (2022-23b)

## 2.2.2 Procurement of Millets:

**Image 2.1: Glimpses of Finger Millet Procurement under OMM**

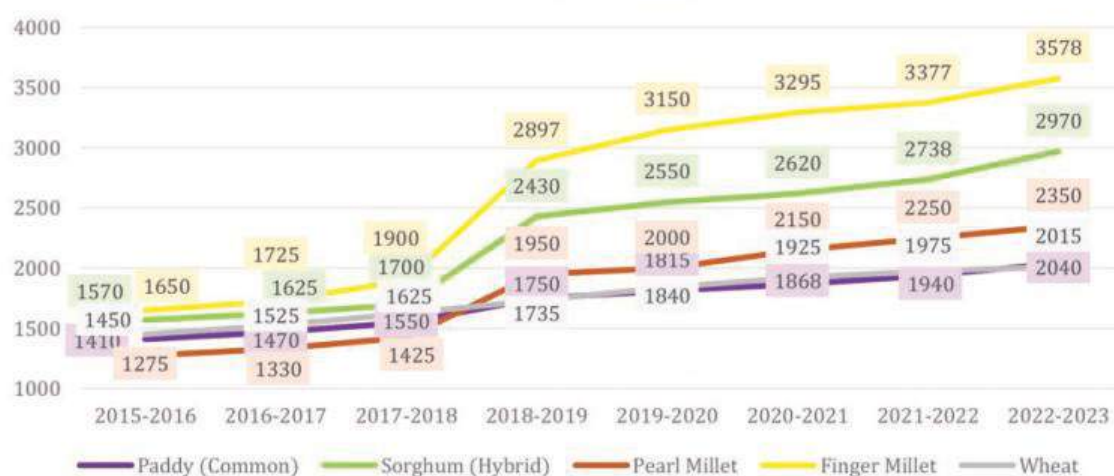


Before the launch of OMM, farmers were compelled to sell their produce through informal channels such as local middlemen, money lenders, input suppliers or even engage in the traditional system of barter with fellow farmers. Selling of produce through informal channels exposed farmers to the risks of usury, exploitation, and underselling.

However, since the implementation of OMM, farmers have shifted to selling their produce directly through government procurement channels. This not only assures them of a fair and remunerative price for their harvest but also safeguards them against deception and exploitation.

Minimum Support Price (MSP) rates for all major cereals and finger millet have increased from 2015-16 to 2022-23. Change in MSP is highest for Finger Millet between 2015-16 to 2022-23.

**Chart 2.8: MSP Trend (Rs./ Qtl.)**



Source: Ministry of Agriculture, Govt. of India

Out of the five types of millets typically cultivated in Odisha (finger millet, small millet, foxtail millet, sorghum, kodo and pearl millet), only finger millet is procured by the government. An impressive 81 percent of the finger millet produced is procured by the government<sup>10</sup>, effectively safeguarding finger millet cultivators from vulnerabilities and ensuring that they receive their rightful dues.

Chart 2.9: Farmers covered under procurement



Source: TDCCOL, 2022-23

Chart 2.10: Produce (Qtl.) procured from farmers



Source: GoO, 2022-23b

Since the inception of OMM, farmers have been selling their produce directly to government procurement channels. TDCCOL, the assigned state procurement agency, has covered a total of 59,621 households through procurement of millets in 2022-23.

### 2.3 Millets and Increasing Farmers' Income

Prior to the commencement of OMM, millet farmers faced restricted income levels resulting from limited sales and low market prices, attributable to the following factors:<sup>11</sup>

- Lack of market demand and price support system during the pre-OMM period resulted in net negative sales proceeds.
- Traditional farming practices adversely affected the production of millets.

Following OMM interventions, the average total sale proceeds per acre of finger millet jumped nearly 17 times, from Rs. 1,148 to Rs. 17,692, across the seven districts. The transformation becomes even more remarkable when considering net sales proceeds after factoring in production costs. In the pre-OMM period, there was an average loss of Rs. 945 per acre, which transitioned into a net income of Rs. 13,042 per acre during the post-OMM period. This remarkable improvement in sales proceeds occurred despite a considerable rise in production costs, attributed to increased labour expenses, higher costs for other inputs and an expansion in production scale, ultimately resulting in higher marginal cost per acre of cultivation.

<sup>10</sup> NCDS (2021)

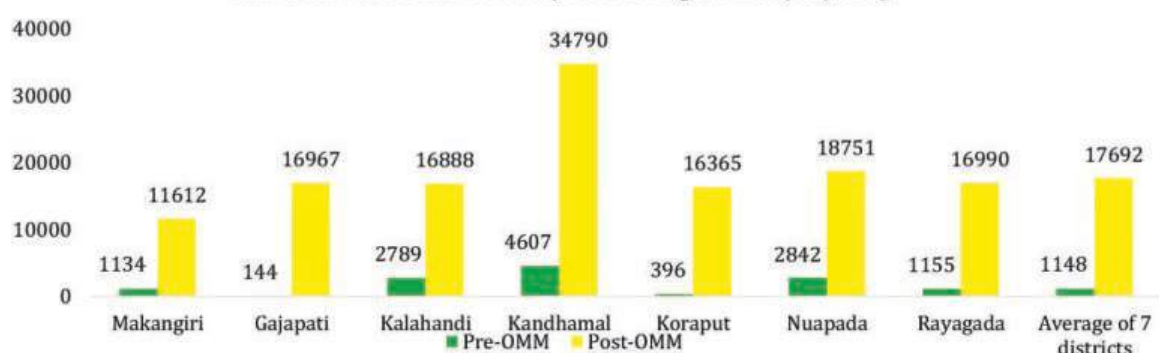
<sup>11</sup> Inputs provided by the research team of NCDS, Research Secretariat of OMM

The significant change in sales proceeds happened on account of the following:<sup>12</sup>

- Increased finger millet production driven by the use of improved seed varieties supported by the program.
- Farmers' adoption of good agronomic practices recommended under the program.
- Higher price of finger millet due to MSP fixation.
- Improved marketing facilitated by strengthening of supply and value chains.
- Rising demand for millets during the project period.
- Government initiatives to promote and popularize millet consumption across customer categories stimulated the market demand.

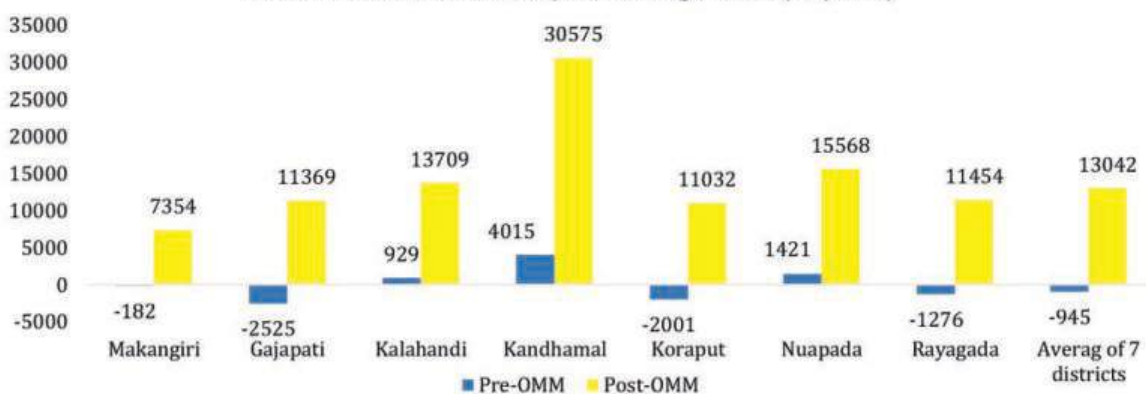
Though the enhancement was particularly pronounced for finger millets, similar improvements were observed for other millet varieties too. Sales proceeds per acre have increased for all millets when compared to the pre-OMM period.

**Chart 2.11: Total Sales Proceeds/ Acre of Finger Millet (Rs. /Acre)**



Source: NCDS, 2021

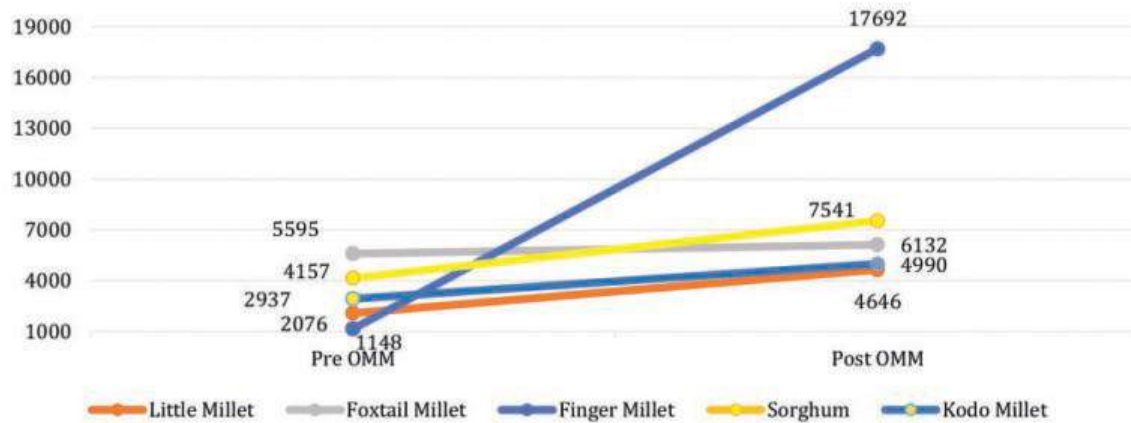
**Chart 2.12: Net Sales Proceeds/ Acre of Finger Millet (Rs. / Acre)**



Source: NCDS, 2021

<sup>12</sup> Inputs provided by the research team of NCDS, Research Secretariat of OMM

2:14: Change in Sale Proceeds per Acre (Rs.)



Source: NCDS, 2021

Image 2.2: Pearl Millet Field in Balangir



Source: OMM

### Success Story: How pearl millets increased income and food security of farmers in Balangir district?<sup>13</sup>

Arjun Prasad Gupta, a small-scale farmer hailing from Malpada village in Khaprakhhol block, Balangir district, relies heavily on agriculture as his primary source of income. Traditionally, he cultivated paddy and cotton, allocating one and two acres of his land to each crop, respectively. However, this conventional approach often resulted in financial setbacks, as his

crops frequently fell victim to damage caused by unpredictable rainfall patterns and recurrent dry spells.

In a significant turnaround during the 2021-22 season, Arjun Prasad Gupta decided to replace cotton with pearl millets on a 2-acre plot of his land. With the valuable support of the Odisha Millets Mission (OMM), he successfully harvested an impressive 14 quintals of pearl millet grains, which were valued at Rs. 31,500, all while incurring an input cost of just Rs. 8,000. Of the total yield, Arjun sold 10 quintals in the market, securing a valuable source of income.

Recognizing the significance of self-sufficiency and sustainability, Arjun Prasad Gupta retained 4 quintals of the pearl millet harvest for his personal consumption and future seeding purposes. In acknowledgment of his commitment to adopting millets as a valuable crop, Arjun received an additional incentive of Rs. 2,000 from OMM.

Arjun's journey from traditional cotton farming to prosperous pearl millet cultivation, with the guidance of the OMM, demonstrates the potential for economic growth and stability that millets offer to small-scale farmers of Odisha.

<sup>13</sup> GoO (2023a)

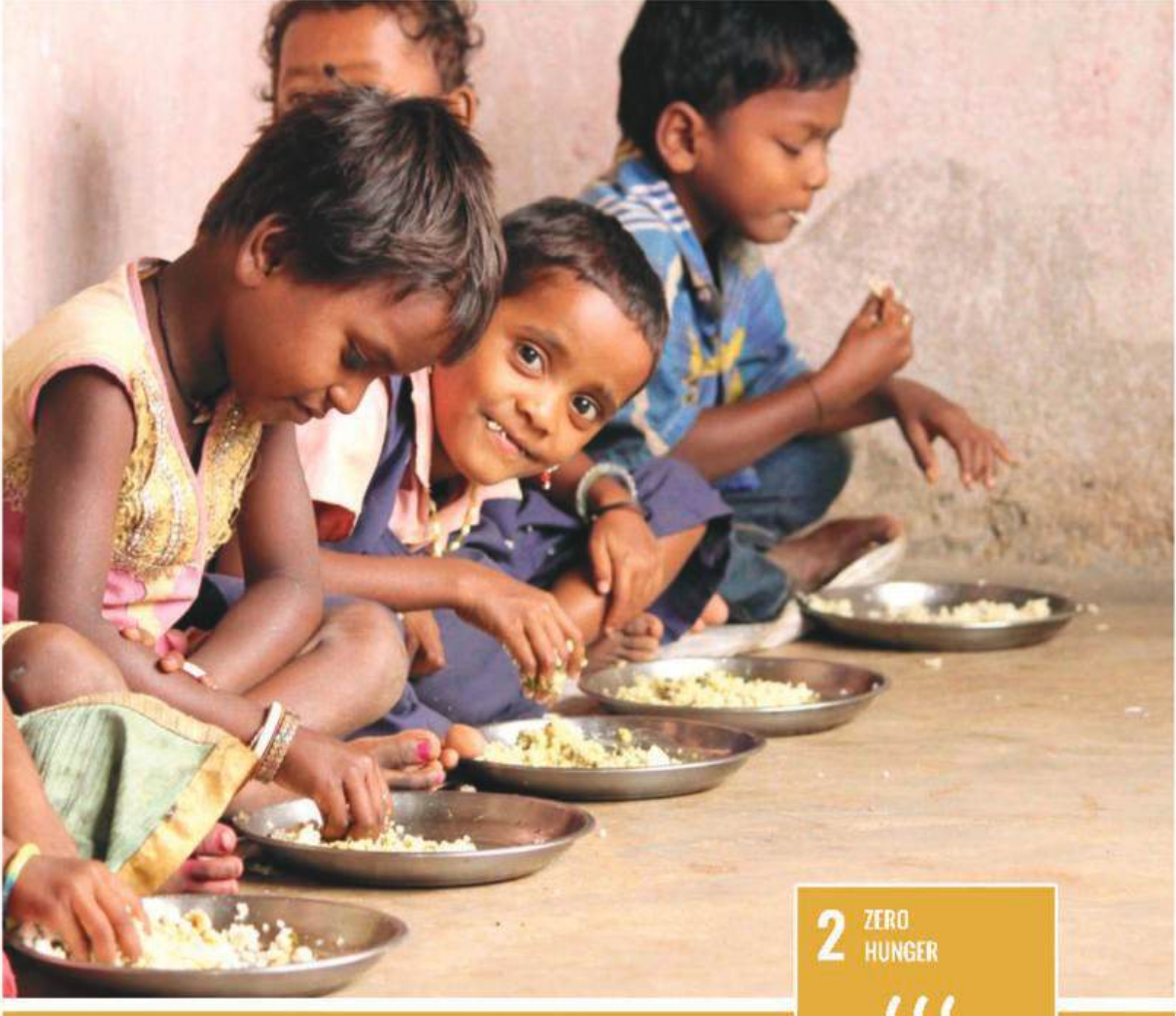
## 2.4 Conclusion

The Sustainable Development Goal 1, 'No Poverty' is dedicated to the formidable task of eradicating poverty in all its forms. SDG 1 along with its seven targets, takes a comprehensive approach that encompasses various dimensions of poverty. This includes access to essential services, addressing issues related to land and other economic resources, providing targeted welfare support and mitigating the impacts of social, economic crises, as well as natural disasters.

Odisha Millets Mission perfectly aligns with the objectives of SDG 1. Given that a substantial proportion of Odisha's workforce is engaged in agricultural activities, OMM presents a sustainable opportunity to economically empower the farming community. Several OMM interventions support the small and marginal farmers, guaranteeing them with income security. A total of 1,58,175 farmers have been provided with monetary incentives to bolster the production of millets. Furthermore, the government's commitment to millet procurement under Minimum Support Price (MSP) has resulted in the direct procurement of 6,03,304 quintals of millets from farmers.

OMM's strategic interventions aimed at increasing millet consumption have not only driven up demand but have also unlocked employment opportunities beyond the realm of farming, particularly benefiting women. The mission has successfully created income-generating avenues spanning the entire millet value chain, from the production of millet agricultural inputs such as seeds and bio-input production units to millet processing and the development of entrepreneurs running cafés, outlets and tiffin centers, etc.

The impressive transformation witnessed in the production and sale proceeds of millets following OMM's interventions holds the promise of substantially improving the socio-economic conditions of millet farmers. It is essential to recognize that an increase in income resonates directly with other dimensions of poverty, including health, education and access to essential services. Therefore, OMM's intervention becomes a driving force that directly contributes to the realization of SDG 1, 'No Poverty,' effectively forming an integral part of a robust and inclusive poverty-alleviation policy.



# SDG 2: Zero Hunger

Millets hold immense potential in addressing the pressing issues of food, nutrition and environmental security. In recent times, there has been a concerted effort by international institutions, national and state governments to revive the prominence of millets. This initiative aims to reduce dependence on water-intensive crops and promote dietary diversity, ultimately ensuring both nutrition and food security. The revitalization of millet production and consumption emerges as a significant driver towards achieving the Sustainable Development Goals (SDGs), with a particular emphasis on SDG 2, 'Zero Hunger.'

Table 3.1: Role of Millets in Addressing Hunger (SDG 2)

 <p><b>Food Security:</b> Millets are smart crops:</p> <ul style="list-style-type: none"> <li>▪ Are resilient to climate change</li> <li>▪ Grow in harsh conditions</li> <li>▪ Require less time to grow</li> <li>▪ Are smart choices for improving access to food amid climate crisis</li> </ul>	 <p><b>Improved Nutrition:</b> Millets are known as nutri-cereals:</p> <ul style="list-style-type: none"> <li>▪ High in protein</li> <li>▪ High in calcium, zinc, iron</li> <li>▪ Significant source of a variety of vitamins and minerals</li> <li>▪ High in dietary fibre</li> </ul>
 <p><b>Increased Farmers' Income:</b></p> <ul style="list-style-type: none"> <li>▪ Millets are cost effective as they require minimal water, fertilizers and pesticides</li> <li>▪ Are robust and less vulnerable to losses due to pests &amp; insects</li> <li>▪ Support multiple crop cycles a year</li> </ul>	 <p><b>Sustainable Agriculture:</b></p> <ul style="list-style-type: none"> <li>▪ Millets have low water footprint</li> <li>▪ Are traditionally cultivated without fertilizers/ pesticides.</li> <li>▪ Promote soil integrity through their strong root network</li> </ul>

Millets have historically been integral to Odisha's staple food and cropping systems. With the onset of Green Revolution, the focus had shifted to paddy and wheat to rapidly meet the food security needs. This transition led to decline in the production and consumption of millets.

Image 3.1: Ragi distribution through PDS



Since its advent, OMM has been diligently addressing the declining trends in millet production and consumption in the state, with the overarching goal of revitalizing millets both on farms and on plates.<sup>14</sup> This concerted effort significantly contributes to attainment of 'zero hunger' and improved nutrition levels. Notably, Odisha ranks 3<sup>rd</sup> among all the states in the

procurement of finger millets for distribution under the Public Distribution System (PDS). The increased procurement and distribution of millets under the PDS framework serve to bolster both millet production and consumption. The integration of millets into the PDS effectively combats the challenge of micro-nutrient deficiency and enhances nutrition security. Charts 3.1 and 3.2

<sup>14</sup> UNWFP (2021)

Charts 3.1 and 3.2 below provide a comprehensive overview of the coverage of millets within the public distribution system (PDS) in Odisha.

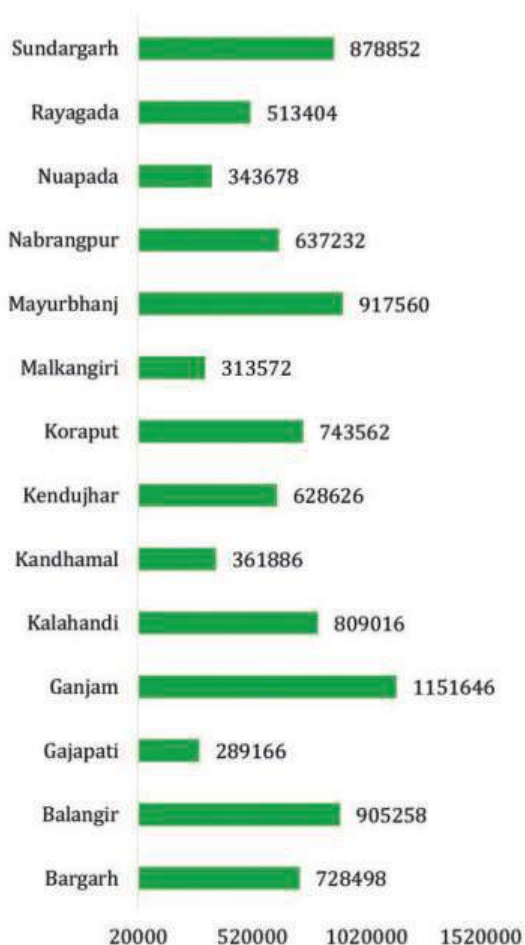


Chart 3.1: Finger Millet allocated (kgs.)

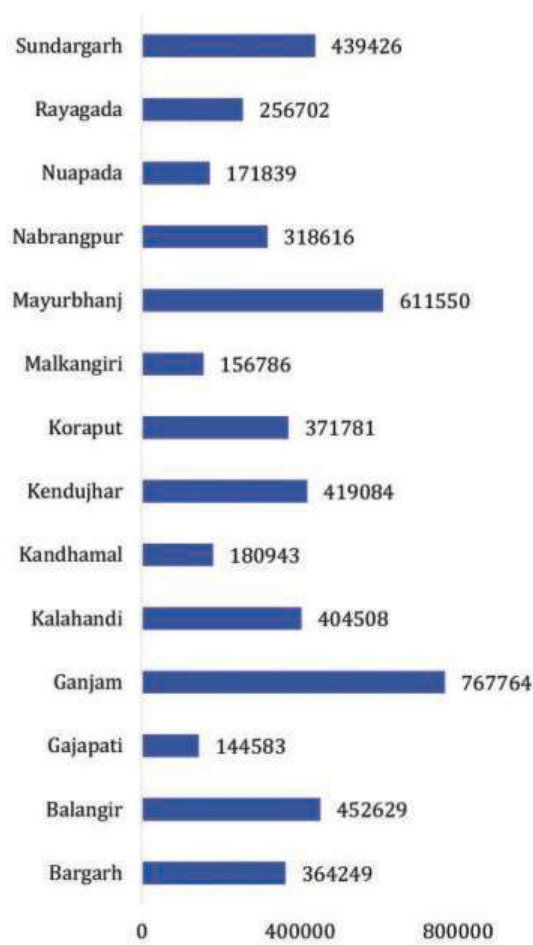


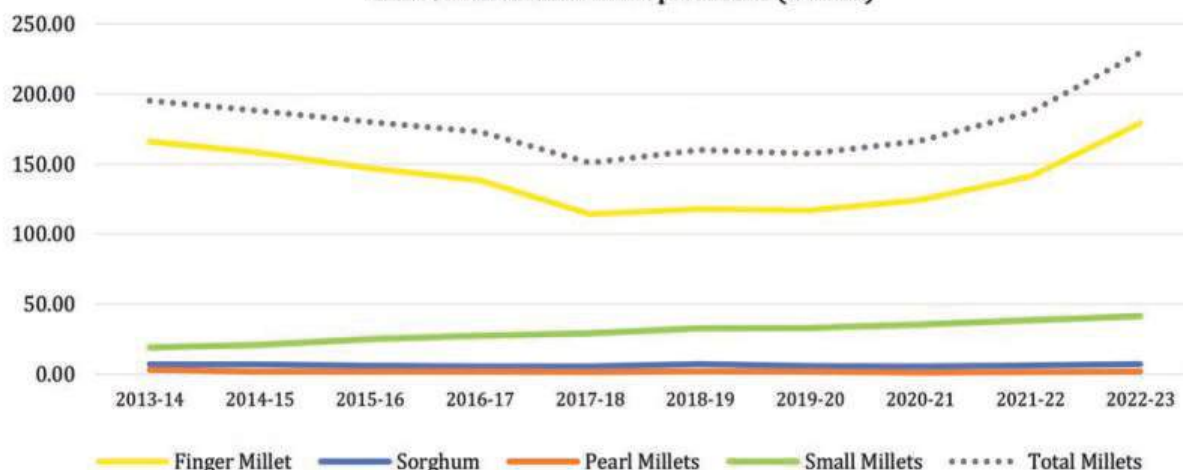
Chart 3.2: Beneficiaries covered (No.)

Source: GoO, 2020-21

### 3.1. Area under Millet Production in Odisha

Land area dedicated to millet cultivation has witnessed a remarkable increase of 78.30 percent since the launch of OMM in 2017-18. Prior to this, there has been a consistent decline in millet cultivation from 1,95,000 hectares in 2013-14 to 1,50,910 hectares in 2017-18, which was subsequently reversed. In the year 2022-23, the cultivation of millets sprawled across a substantial 2,29,210 hectares in Odisha. Finger millet emerged as the dominant millet variety, occupying an estimated cultivated area of 1,79,000 hectares during the same period, marking an impressive increase of 64.65 percent since 2017-18. Additionally, small millets covered an area of 41,310 hectares in 2022-23, followed by sorghum at 7,100 hectares, and pearl millets at 1,800 hectares.

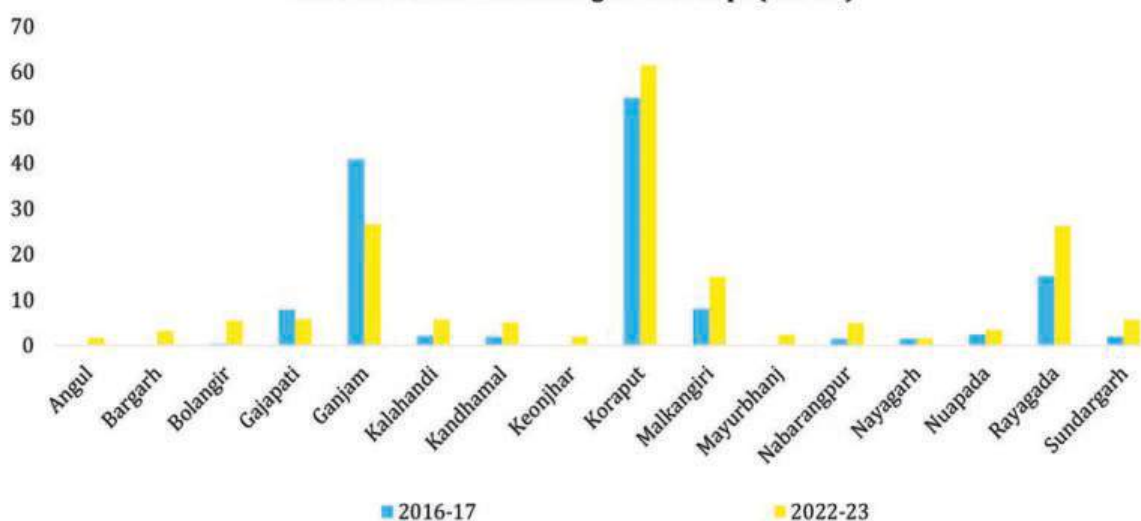
Chart 3.3: Area under millet production ('000 ha.)



Source: Directorate of Agriculture & Food Production, Govt. of Odisha

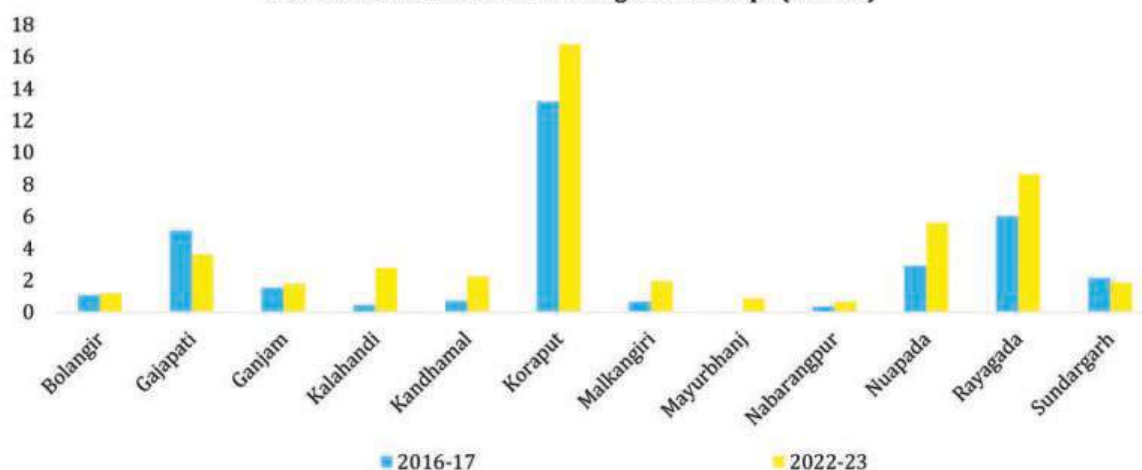
- Koraput has the largest area under cultivation of both finger millet and non-finger millet crops.
- Finger millet is cultivated in 24 districts, while non-finger millets are grown in 20 districts of the state. The remaining districts are currently being covered under OMM.
- Keonjhar has witnessed the most remarkable percentage increase in the area dedicated to finger millet cultivation from 2016-17 to 2022-23 closely followed by Angul and Balangir. In terms of the actual expansion in the area under finger millet cultivation, Rayagada leads with an increase of 11,070 hectares, followed by Koraput and Malkangiri, both displaying a growth of 7,130 hectares each.
- Mayurbhanj witnessed the most substantial percentage increase in the area allocated for non-finger millet cultivation, registering an impressive growth from 2016-17 to 2022-23 followed by Angul. It is worth noting that before the intervention of OMM in 2016-17, only 20 hectares of land in Mayurbhanj and 10 hectares in Angul were dedicated to non-finger millet cultivation.

Chart 3.4: Land area under finger millet crops ('000 ha.)



Source: Directorate of Agriculture & Food Production, Govt. of Odisha

Chart 3.5: Land area under non-finger millet crops ('000 ha.)



Source: Directorate of Agriculture & Food Production, Govt. of Odisha

Chart 3.6: Area under finger millets (% share)

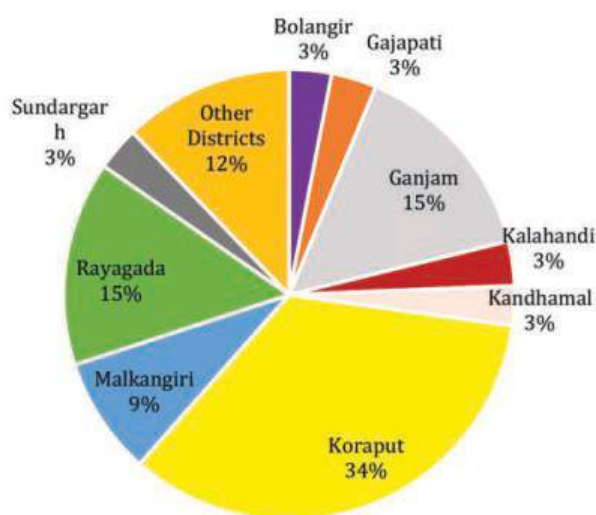
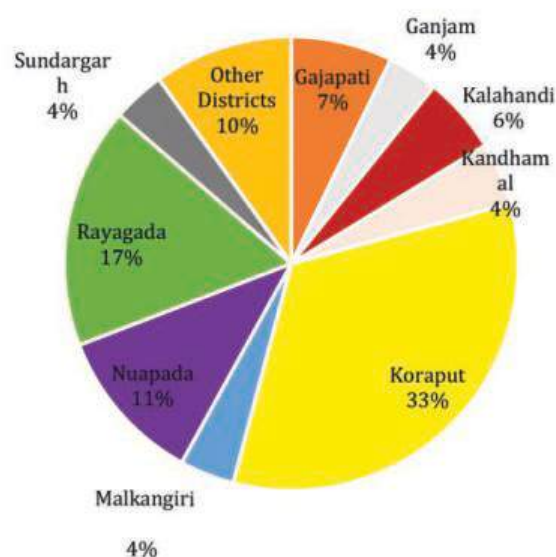


Chart 3.7: Area under non-finger millets (% share)

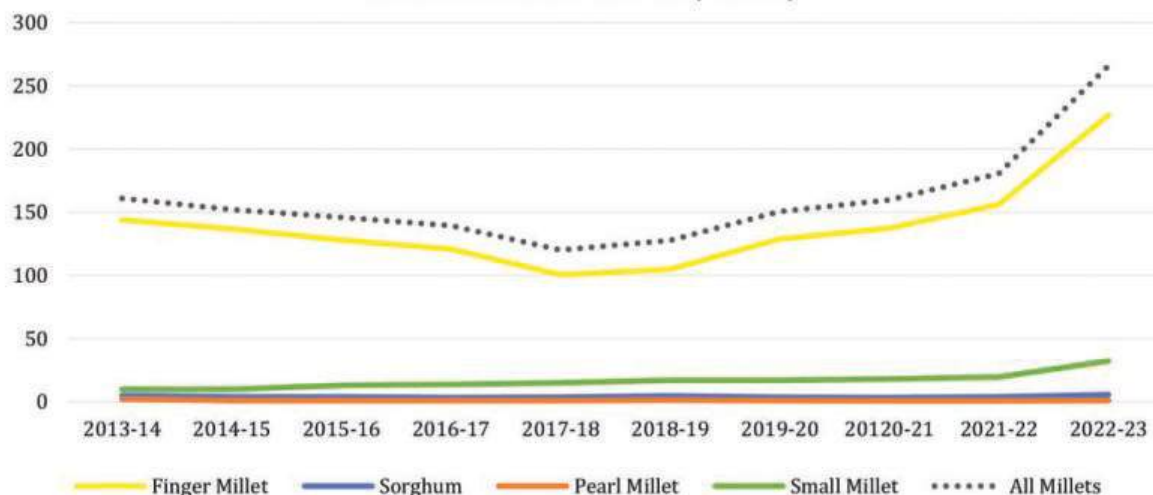


Source: Directorate of Agriculture & Food Production, Govt. of Odisha

### 3.2. Millet Production in Odisha

Since the launch of OMM in 2017-18, there has been a remarkable surge of 121.27 percent in millet production. Finger millets demonstrated the highest growth rate, with an impressive increment of 125.61 percent (from 2017-18 to 2022-23), closely followed by small millets at 115.80 percent during the same period. Prior to OMM, millet production experienced a decline from 2013-14 to 2017-18. However, post the implementation of OMM, millet production rebounded significantly, reaching 2,65,880 MT. in 2022-23. This is a substantial increase compared to 1,20,160 MT in 2017-18 and 1,61,000 MT in 2013-14. This represents a decade-long surge of 65.14 percent in millet production, with small millets and finger millets showing increments of 22.40 percent and 57.58 percent, respectively. The data underscores the highly positive impact of OMM, launched in 2017-2018, on the production of millets.

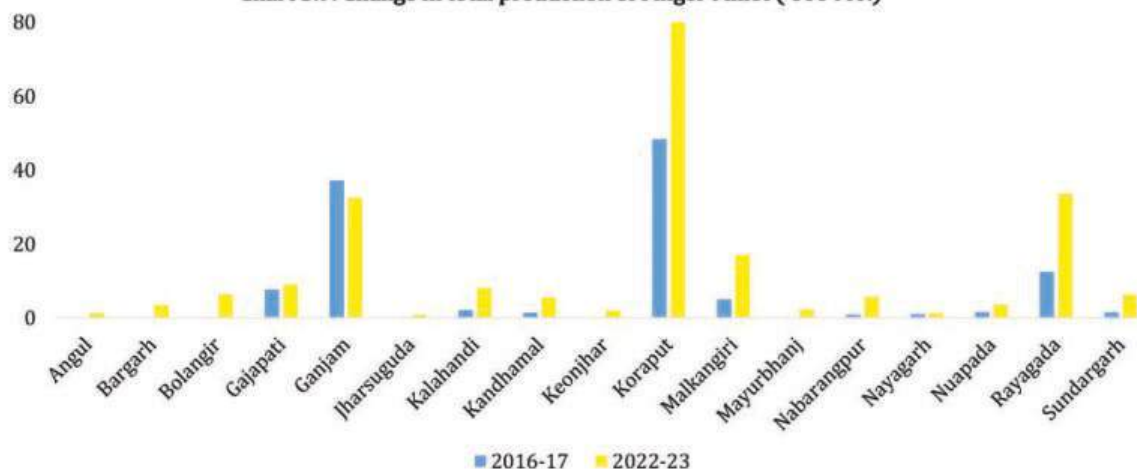
Chart 3.8: Production of Millets ('000 M.T)



Source: Directorate of Agriculture & Food Production, Govt. of Odisha

Finger millet has emerged as the predominant millet variety in nearly all of Odisha's districts. Presently, 24 districts in Odisha are actively involved in finger millet production and efforts are underway to expand cultivation to the remaining 6 districts. In terms of production quantity for the year 2022-23, Koraput district took the lead with the highest finger millet production, amassing a total of 84,920 MT. Following closely were Rayagada and Ganjam districts, making significant contributions of 33,660 MT. and 32,660 MT., respectively.

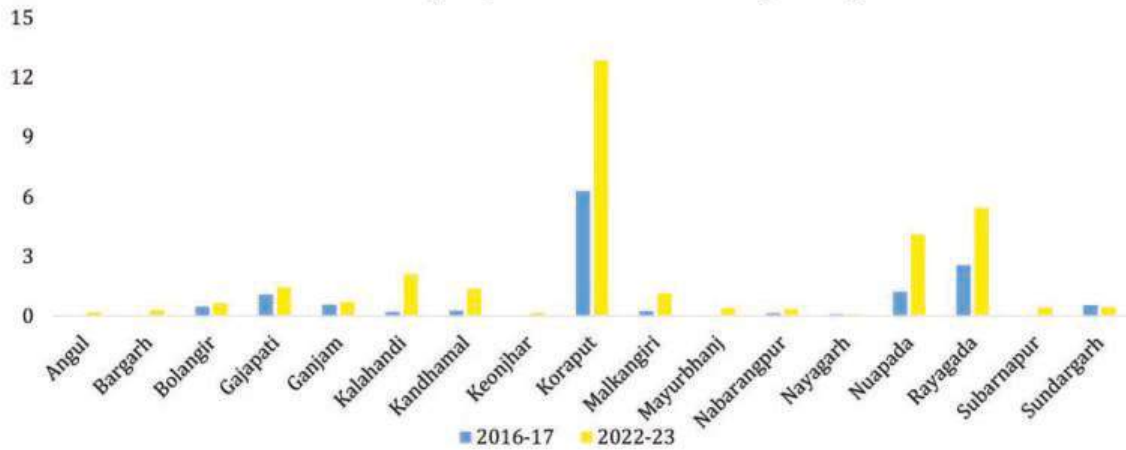
Chart 3.9: Change in total production of Finger Millet ('000 MT.)



Source: Directorate of Agriculture & Food Production, Govt. of Odisha

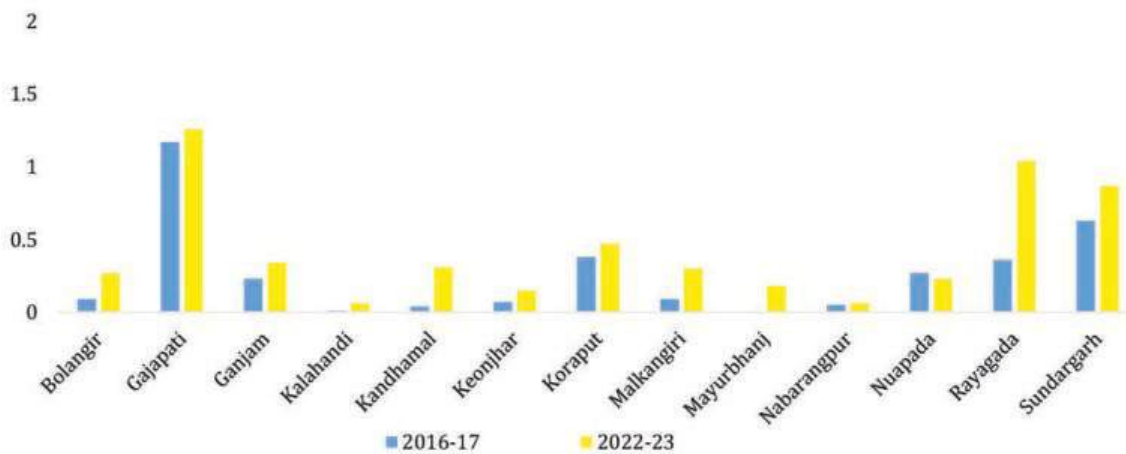
The cultivation of small millets has extended to 20 districts in Odisha and plans are afoot to cover all 30 districts in the near future. Notably, small millet production has increased by a remarkable 132.95 percent from 2016-17 to 2022-23. Among the districts, Mayurbhanj stands out with an extraordinary 4,000.00 percent increase, elevating production from 10 MT. to 410 MT. Angul closely follows with an impressive 1600.00 percent increase, taking production from 10 MT. to 170 MT. In the realm of small millet production growth, Koraput district leads the pack, achieving a substantial increase of 6,560 MT. Rayagada and Nuapada districts are not far behind, recording a production increases of 2,890 MT. and 2,880 MT., respectively over the same period.

Chart 3.10: Change in production of Small Millets ('000 MT)



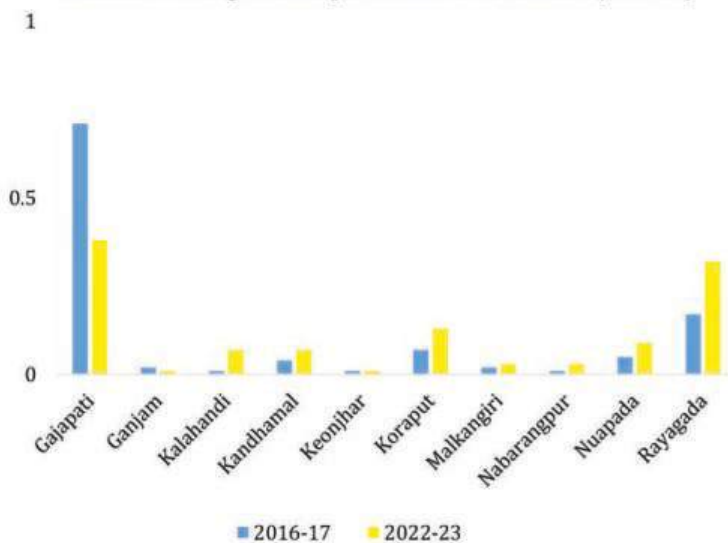
Source: Directorate of Agriculture & Food Production, Govt. of Odisha

Chart 3.11: Change in production of Sorghum ('000 MT)



Source: Directorate of Agriculture & Food Production, Govt. of Odisha

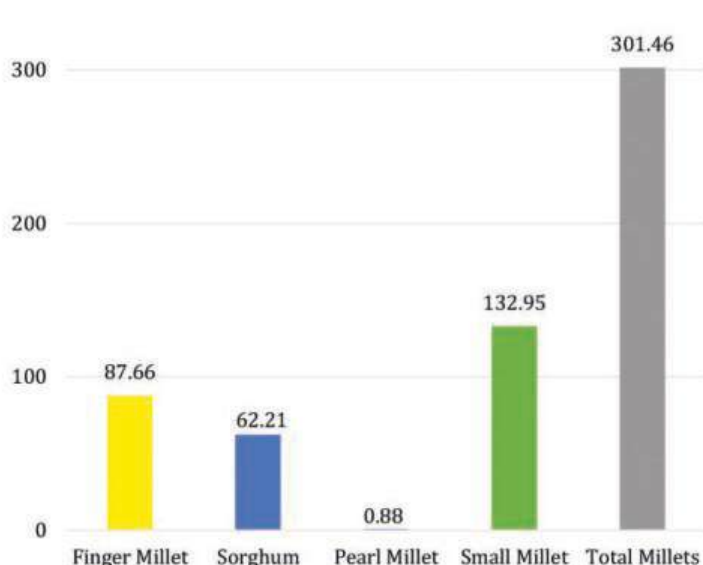
Chart 3.12: Change in total production of Pearl Millet ('000 MT)



Source: Directorate of Agriculture & Food Production, Govt. of Odisha

Sorghum cultivation is actively practiced in 16 districts, while pearl millets are grown in 10 districts. Notably, Sorghum production exhibited substantial growth, showcasing a remarkable increment of 62.21 percent from 2016-17 to 2022-23. Kandhamal and Kalahandi districts spearheaded the surge in sorghum production, achieving an impressive growth rate of 675.00 and 500.00 percent, respectively.

**Chart 3.13: Change (2016-17 to 2022-23) in Total Production (%)**



Since the initiation of OMM, there has been a notable trend of substantial growth in millet production. This growth represents a remarkable 301.46 percent increase from 2016-17 to 2022-23. Of particular significance is the outstanding performance of small millets, which have seen the highest increment of 132.95 percent during this period. This trend is a promising sign of the positive impact and progress brought about by OMM in boosting millet cultivation and production across the state.

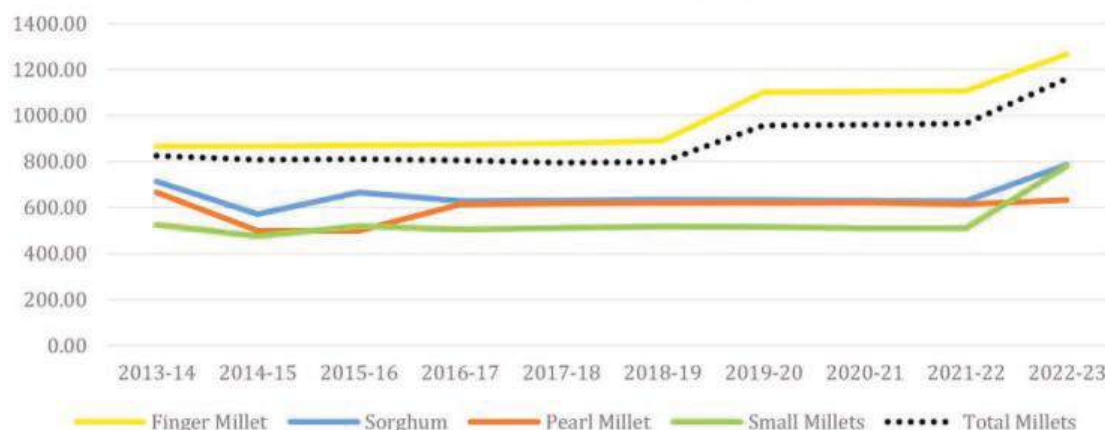
Source: Directorate of Agriculture & Food Production, Govt. of Odisha

### 3.3. Productivity of Millets in Odisha

Productivity of millets in Odisha has shown a remarkable upward trajectory since the inception of the Odisha Millets Mission. In the span of five years from 2017-18 to 2022-23, there has been a substantial increase of 45.68 percent in millet productivity, marking a notable achievement. Small and finger millets have demonstrated the highest productivity growth rates, with impressive increments of 52.43 and 44.13 percent, respectively, during the same period.

Over the course of a decade, finger millets have experienced a significant increase in productivity, with a remarkable 46.14 percent increment. Finger millet productivity has increased from 867.47 kg/ha. in 2013-14 to an impressive 1267.71 kg/ha. in 2022-23. Concurrently, the overall productivity of millets has also displayed noteworthy growth, with a 40.49 percent increment, rising from 825.64 kg/ha. in 2013-14 to a commendable 1159.98 kg/ha. in 2022-23. This increase in productivity is a testament to the success of OMM in enhancing millet cultivation and productivity across Odisha.

**Chart 3.14: Yield of millets (kg/ha.)**



Source: Directorate of Agriculture & Food Production, Govt. of Odisha

The core reason behind the remarkable increase in millet productivity in Odisha can be attributed to the OMM's unwavering commitment to enhancing yields through the promotion of improved agronomic practices and the use of organic inputs. This strategic focus has been instrumental in driving up millet production across the state.

OMM has employed a farmer-to-farmer learning and extension approach, a pivotal strategy for fostering widespread community level impact. To incentivize and encourage farmers to adopt these improved agronomic practices, the government provides financial support up to Rs. 26,500 per hectare. Originally designed as a 3-year program, this support has been extended to 5 years, offering farmers a more extended period to benefit from these sustainable techniques.

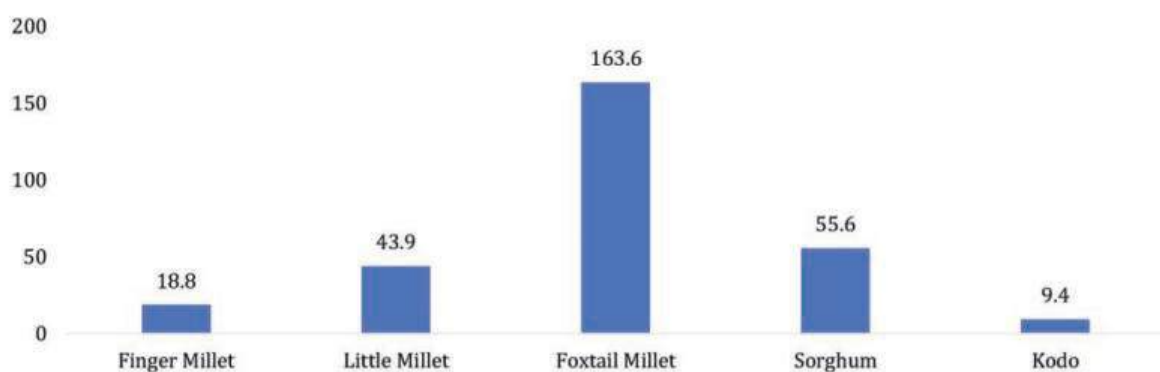
**Image 3.2: Women line transplanting millets (improved agronomic practice)**



### 3.4. Millet Farmers in Odisha

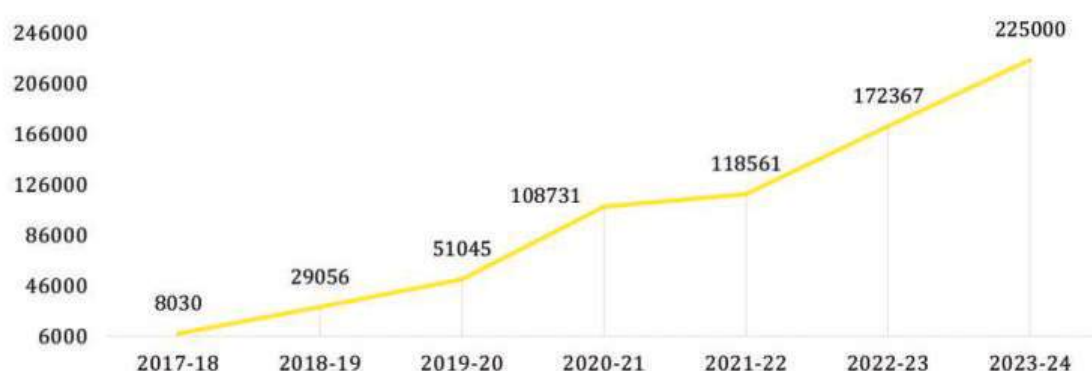
Farmer engagement in millet cultivation has also surged significantly in Odisha since the initiation of OMM. Foxtail millet witnessed the highest increase, with a remarkable 163.6 percent rise, followed by sorghum at 55.6 percent and little millet at 43.9 percent. Despite these gains, finger millet remains the most widely cultivated millet variety in the state. Overall, the number of farmers actively participating in millet cultivation and related activities has shown extraordinary growth. As of Kharif 2023-24, a total of 2.25 lakh small and marginal farmers were involved in OMM and about 1.35 lakh hectares of land were brought under millet crops.

Chart 3.15: Farmers cultivating millets (% increase)



Source: NCDS, 2021

Chart 3.16: Farmers covered under OMM (improved PoP demonstration)



Source: OMM Data

### 3.5. Role of Millets in Combating Malnutrition

Millets, rich in essential nutrients such as protein, carbohydrates, micronutrients and phytochemicals, play a pivotal role in combating malnutrition. Their regular inclusion in diets can significantly enhance the nutritional wellbeing of both children and women. Millets exhibit remarkable effectiveness in mitigating iron deficiency and elevating haemoglobin levels among children, adolescents and expectant mothers. Furthermore, they contribute to alleviating "hidden hunger," a form of chronic micronutrient malnutrition that afflicts over 80 percent of Indian adolescents.<sup>15</sup>

Table 3.2: Proximate Composition and Dietary Fibre of Millets (Per 100 g)

Millets	Carbohydrate (g)	Protein (g)	Fat (g)	Ash (g)	Total Fibre (g)
Pearl millet	61.78 ± 0.85	10.96 ± 0.26	5.43 ± 0.64	1.37 ± 0.17	11.49 ± 0.62
Finger millet	66.82 ± 88.0	07.16 ± 0.63	1.92 ± 0.14	2.04 ± 0.34	11.18 ± 1.14
Foxtail millet*	60.09	12.30	4.30	-	-
Little millet	65.55 ± 1.29	08.92 ± 1.09	2.55 ± 0.13	1.72 ± 0.27	06.39 ± 0.60

<sup>15</sup> UNICEF (2019)

Millets	Carbohydrate (g)	Protein (g)	Fat (g)	Ash (g)	Total Fibre (g)
Kodo millet	66.19 ± 1.19	08.92 ± 1.09	2.55 ± 0.13	1.72 ± 0.27	06.39 ± 0.60
Barnyard millet*	65.55	6.20	2.20	-	-
Proso millet*	70.04	12.50	1.10	-	-

Source: NIN, 2017 and \*2007

Over the past two decades, Odisha has made substantial progress in improving the nutrition levels of its children and women. Nonetheless, according to the National Family Health Survey (NFHS – 5, 2019-21), 31.0 percent of children under the age of 5 years in Odisha were stunted, 29.7 percent were underweight, 18.1 percent were wasted and 6.1 percent were severe wasted in Odisha. These figures are in comparison to the Indian national averages of 35.5 percent for stunting, 32.1 percent for underweight, 19.3 percent for wasting and 7.7 percent for severe wasting.

Between 2015-16 and 2019-21, OMM priority (first phase) districts outperformed other districts in reducing malnutrition. Most of these districts displayed a negative incremental change, signifying a decrease in child nutrition parameters, including wasting, stunting and underweight. This negative increment surpassed the state average of 2.9 percent point reduction in stunting, 1.7 percent point reduction in wasting and 3.7 percent point reduction in underweight. Nevertheless, the prevalence of anaemia among women, adolescents and children in Odisha remain high, exceeding 50 percent in each of these categories.

The Govt. of Odisha has taken up various innovative programs and schemes to combating malnutrition in the state. OMM is one such program that encompasses various interventions, events, collaborations and awareness campaigns aimed at boosting millet consumption at the household level by fostering behavioural change. Key initiatives in this battle against malnutrition not only involves the procurement and distribution of millets under the Public Distribution System (PDS) but also the integration of millets into several social safety programs. These programs ensure the distribution of millets in the form of rations or the provision of hot-cooked meals and nutritious ladoos to children, primarily through Anganwadi centers and schools. These collective efforts underscore Odisha's dedication to combating malnutrition comprehensively and effectively.

### 3.6. OMM Interventions to increase Millet Consumption

**Image 3.3: Ragi distribution under PDS by Hon'ble MLA, Mr. Salugna Pradhan in Daringbadi, Kandhamal**



Increasing household consumption of millets by 25 percent to enhance nutrition security is a major stated objective of OMM. Towards this objective, OMM has undertaken several initiatives which are highlighted below.



### Procurement and Distribution of Millets under PDS:

The introduction of millet procurement and distribution through the Public Distribution System (PDS) aims to boost both production and consumption of millets. TDCCOL has been appointed as the state's procurement agency responsible for sourcing finger millets directly from farmer. A total of 85 Farmer Producer Organizations (FPOs) have been actively involved in millet procurement. They serve as facilitators to help farmers sell their produce, assisting with the registration and renewal of older farmers in the M-PAS system. Working in collaboration with FPOs, LAMPCS and PACS, finger millet procurement was successfully executed in 143 blocks spanning 19 districts of Odisha, during the 2022-23 period. The FPOs played a pivotal role in managing the mandis, strategically located within a 5-kilometer radius of villages to ensure convenient access to procurement services for farmers.



### Inclusion of Millets in State Programmes:

In its effort to fight malnutrition, promote food and nutrition security and diversify the plates of people in rural and underdeveloped pockets of the state, OMM has introduced millets in the ICDS and Mid-day Meal programmes on a pilot basis. This is expected to be scaled up in a phased manner, through the Mukhyamantri Sampurna Pushti Yojana and other programmes of the Departments of Women and Child Development (WCD) and School and Mass Education (S&ME).

Image 3.4: Pre-school children eating Ragi Ladoo



Image 3.5: Ragi-based THR



**Ragi Ladoo in ICDS:** In 2020, as a pilot programme, Ragi Ladoo was introduced under the ICDS in Keonjhar and Sundargarh districts of Odisha, with support from the District Mineral Foundations (DMF). This initiative encompassed 6,077 Anganwadi Centres (AWCs), benefiting 1,48,035 pre-school children in both districts. Children received Ragi Ladoos as a nutritious morning snack. Importantly, this program also generated employment opportunities for 58 Women Self-Help Groups (WSHGs) engaged in processing and value addition units dedicated to ladoo production.

**Ragi-based Take Home Ration (THR) in ICDS:** In 2022, a pilot initiative on including ragi in THR was launched in Malkangiri and Koraput districts. The initiative targets pregnant and lactating

**Image 3.6: Distribution of ragi ladoos to girls in residential schools**



Subsequently, the program expanded to 13 blocks, encompassing 340 residential schools and targeting 38,191 children.

### **Inclusion of Millets in Mid-Day Meal (MDM) Programme:**

OMM is actively working on incorporating millets into the Mid-day Meal (MDM) program, aiming to enhance the consumption of nutritious food among elementary students in schools. Originally designed to boost school enrolment, the pilot program has evolved into an effective strategy to combat malnutrition, especially among children from disadvantaged groups. Currently, OMM is collaborating with the School and Mass Education (S&ME) Department to draft a comprehensive proposal for the inclusion of millets in school meals.

women, providing them with ragi-based THR and little millet khichdi. Through the Integrated Child Development Services (ICDS), a total of 13,669 pregnant and lactating women have benefited from this program.

**Ragi Ladoo in Welfare Hostels:** In 2022, a pilot program introducing ragi ladoo was also initiated in the welfare hostels of Keonjhar district, supported by the District Mineral Foundation (DMF). Initially, it covered 3,950 children across 35 residential schools.

**Image 3.7: Millets in Mid-Day Meal**



### **Millets Café/Outlets/Tiffin Centre:**

**Image 3.8: Glimpses from inauguration of a Millet Shakti Cafe**



In collaboration with Mission Shakti Department, various millet-based enterprises have been established. These initiatives include the launch of seven Millet Shakti cafés, six outlets, 170 tiffin centers and four Millet Shakti on Wheels in various locations. These establishments not only promote millet consumption but also create employment opportunities for many Women Self-Help Groups (WSHGs). The initiative has been highly successful,

with several outlets strategically placed in prime locations such as Kalinga Stadium and the State Secretariat.



### Culinary Innovation and Introduction/Inclusion of Millet menus in Cafés and Restaurants:

In October 2022, a "Millet-Meet" was organized in collaboration with the Restaurant Association of Odisha (RAO) to further the goal of introducing millet-based dishes and menus in select cafes and restaurants across the state. This event involved tasting and hands-on training sessions on preparing millet-based dishes, with active participation from Women Self-Help Groups (WSHGs). The master trainers from WSHGs provided valuable training to chefs from various cafes and restaurants, imparting the skills needed to create a wide range of millet-based dishes and menus.

This effort has resulted in the development of numerous millet-based dishes and cuisines, including foxtail millet paniaram, sorghum salad, proso millet curd rice, proso millet vegetable biryani, bajra jalebi, and little millet upma, among others. These delectable offerings have gained significant popularity among various demographics, particularly the youth and café and restaurant visitors, contributing to the increased consumption of millets

Image 3.9: Millet food festival in Michael's Kitchen



### Awareness Campaigns:

The "Eat Millets Campaign and various promotional awareness initiatives have been organized by OMM to educate people about the nutritional and health advantages of millets. In a ground breaking move to mark the International Year of Millets (IoYM), Odisha has become the first state in India to commemorate "Mandia Dibasa" (Millet

Image 3.10: Glimses of inauguration of a 3-day millet campaign at AIIMS



Day) on November 10th. The Hon'ble Chief Minister of Odisha has sanctioned the first Thursday of the Margasira month in the Hindu Calendar as "Mandia Dibasa," which celebrates the rich tradition of millet cultivation in Odisha. This event is designed to encourage millet cultivation and wider millet consumption across the state. The awareness events and campaigns are aimed at popularizing millets, unlocking their untapped potential for health and nutrition, and offering sustainable livelihoods to tribal millet farmers. Additionally, they promote millets as a highly climate-resilient cultivation practice to address the growing challenges posed by climate change in the state.



### Milli - The Mascot:

OMM has harnessed the power of "Milli", its friendly and personified mascot, to champion and humanize the cause of millets. Milli's presence is more than just symbolic; she plays a pivotal role in promoting millets through a multifaceted approach. In various awareness campaigns, Milli serves as a relatable character to educate the public about the numerous nutritional benefits of millets. Moreover, educational materials, school programs, cultural celebrations and online/social media campaigns feature this engaging mascot. By using Milli as its mascot, OMM has been able to effectively communicate the message of millet promotion, nutrition, and agriculture in a more engaging and appealing manner. The mascot makes the campaign memorable and relatable, fostering a stronger connection between the mission and the people of Odisha.

Image 3.11: Versions of Milli



Source: OMM



### Cooking Competition:

Neighbourhood-level cooking competitions, an initiative undertaken jointly by OMM and various government departments including Women and Child Development, Mission Shakti, Health and Family Welfare, served as vibrant celebrations emphasizing the cultural significance of millets. These events, attended by an impressive turnout of 1500 enthusiastic women participants, were marked by creative culinary experiments with diverse millet-based dishes, adding a sense of festivity and cultural importance to millet utilization and consumption.



### Sports and Millets: Image 3.12: Hockey Players with the Millet Mascot, Kalinga Stadium

The hosting of the FIH Hockey World Cup in 2023 in Bhubaneswar served as a global stage for OMM to extend its outreach and propagate the benefits of millets. Recognizing the role of sports as a strategic partner in the International Year of Millets (IYoM) framework, OMM, in partnership with the Sport and Youth Service Department



and the International Hockey Federation (FIH), organized an array of events and activities. These included millet tasting sessions for the men's hockey team, the inauguration of a Millet Shakti outlet at Kalinga Stadium, distribution of millet-based gifts to all participating teams and delegates, the creation of promotional videos, a trophy tour, and Milli, adorned in the official jersey of the Indian hockey team. This engagement with the world of hockey significantly contributed to enhancing awareness and promoting millet consumption both locally and on the international stage.



### Other Promotional Activities and Events:

OMM has employed several multifaceted campaigns to promote millet consumption among the public. Some of the key activities include awareness campaigns, promotional events, millet-based food festivals, fairs, seminars, tasting events, and celebrity engagements. OMM also actively uses social media as a communication channel to reach a wider audience. They leverage platforms like Facebook, Twitter, and Instagram to share information about millets, recipes, and success stories.

### 3.7. Millet Landraces

Crop landraces have unique local agroecological and societal functions and offer important genetic resources for plant breeding. Recognition of the value of landrace diversity and concern about its erosion on farms have led to sustained efforts to establish ex situ collections worldwide.<sup>16</sup> Conservation and promotion of millet landraces through the seed system of landraces is one of the major objectives of OMM. Landraces are a type of domesticated plants that have developed over time through adaptation to its natural and cultural environment, and that has not been subjected to formal crop improvement or breeding.<sup>17</sup> OMM has explored the landraces of millets which are still grown in different parts of Odisha. Conservation of landraces directly contributes to SDG target 2.5, that talks about maintaining the genetic diversity of seeds conservation and emphasise on equitable benefits sharing from the utilisation of genetic resources.

In 2022, a pilot study on landraces mapping was undertaken in 17 blocks of 11 districts under OMM with an aim of documenting the current landraces being cultivated and preserved by the custodian farming communities in Odisha.

The Participatory Varietal Trials (PVTs) were conducted in collaboration with farmers at the block level. PVT helped to map and collect the landraces seeds from farmers and proved to be an effective method for identifying appropriate cultivars for resource-poor farmers. Efforts were made to ensure that farmers can access these landraces through community-managed seed centres. These varieties are kept both in community gene banks established in the Block attached to the Community Management Seed System (CMSS) programme of OMM and in the State Seed Testing Laboratory (SSTL) in Bhubaneswar under a cryogenic system.

Image 3.13: Landraces Mapping



Source: Draft Annual OMM Report, 2022-23

<sup>16</sup> <https://www.nature.com/articles/s41477-022-01144-8>

<sup>17</sup> untitled (fao.org)

As a result of the intervention under OMM, now farmers can access the conserved landraces from SSTL if there is a loss of landrace due to any natural calamities. Till now, there are 97 traditional millet varieties stored in SSTL.

#### **Participatory Variety Trial in Ragi:**

During 2022-23, OMM in collaboration with Facilitating Agencies conducted Participatory Varietal Trials (PVT) for Ragi millets directly at farmers' fields. These trials were carried out across 10 districts, namely Bargarh, Balangir, Boudh, Ganjam, Jharsuguda, Kalahandi, Mayurbhanj, Nayagarh, Nuapada, and Rayagada. The objective was to identify the preferred varieties among a collection of landraces, with a released variety serving as a reference point, within a specific agroecological region. The selection process involved both farmers and researchers, resulting in the choice of two preferred and suitable varieties for seed production in the year 2023-24, suitable to a micro-agroecological zone.

**Table 3.3: Number of PVTs conducted in Ragi from 2018 to 2021**

Season	Districts	Blocks	Farmers	Ragi landraces	Govt. Check varieties	Final selected LRs	Final Selected Govt. varieties
Kharif 2018-19	5	12	12	79	14	18	6
Rabi 2018-19	2	4	4	26	3	2	4
Kharif 2019-20	12	39	39	185	41	71	8
Kharif 2020 -21	3	12	12	104	15	23	1
Kharif 2021-22	2	12	12	107	12	23	1
<b>Total</b>	<b>24</b>	<b>79</b>	<b>79</b>	<b>501</b>	<b>85</b>	<b>137</b>	<b>20</b>

Source: PVT Reports of Odisha Millets Mission

Note: The ragi landraces and Government Check varieties were repeated in the blocks

### **Varietal Purification:**

Promising and potential Ragi landraces from the PVT were collected for purification and validation. In the year 2018-19, 14 well performed Ragi landraces were collected from PVT. These 14 Ragi landraces along with two ragi improved varieties were grown in Randomised Block Design (RBD) method in Bhubaneswar in control condition. Four Ragi landraces MAMI, KALIA, BATI and BHARATI were selected by experts as superior among all other landraces and checks. In the year 2019-20, four Ragi landraces MAMI, KALIA, BATI and BHARATI were grown ear head to row in two replications. All the Agronomic data were collected as per All India Coordinated Research Project (AICRP) format.

### **Multi-location Trials of Purified Landraces:**

After two years of varietal purification, multi-location trials of four landraces were conducted in Koraput, Malkangiri, Rayagada and Mayurbhanj districts. These trials included purified varieties, local, national, and state checks. The trial design was the RBD method with three replications in farmers' fields. Agronomic studies were carried out according to AICRP format, and experts from institutions like IIMR and OUAT provided input during crop growth. The Working Group on Seeds advised the Odisha Millets Mission (OMM) team on variety purification, trial design, and documentation.

### **Release and Notification of Landraces:**

During the sixth working group meeting on seeds of the Odisha Millets Mission, four proposed landraces (BATI, KALIA, MAMI and BHARATI) were presented for feedback from scientists and breeders. The first Landraces Varietal Release Committee (LVRC) meeting held on July 21, 2023, and chaired by the Principal Secretary of DA&FE aimed to release these landraces for general cultivation in suitable regions. This release serves as a recommendation to farmers for adoption.

The proposed ragi landraces were renamed KUNDRA BATI, LAXMIPUR KALIA, MALYABANT MAMI, and GUPTESWAR BHARATI, after important places in Koraput and Malkangiri and the custodian farmers' habitation. The LVRC unanimously approved the release of these four finger millet landraces for Koraput and Malkangiri districts with potential expansion to other districts based on community acceptance and performance.

On August 10, 2023, Odisha officially notified these four landraces for Koraput and Malkangiri, marking a historic first in India.

### **Participatory Varietal Trial in Non-Ragi:**

In the Kharif season of 2022-23, Participatory Varietal Trials were conducted for non-ragi millets in five districts viz. Gajapati, Kandhamal, Koraput, Malkangiri, and Sundargarh. These trials focused on little millet, foxtail millet, and sorghum. In these trials, direct sowing was carried out, followed by the application of organic inputs. From these trials, two preferred and suitable varieties were chosen for seed production in the Kharif season of 2023-24, specifically tailored to a particular micro-agroecological zone.

**Image 3.14: Conservation and Promotion of Landraces on farm**



#### **Seed Production of Finger Millet in Kharif:**

In the 2022-23 period, seed production initiatives were launched in 12 Blocks located in Sundargarh and Angul districts. This initiative underscored the pressing need for millet farmers to produce quality seeds from specific and popular varieties. Earlier, the state seed corporation was only able to fulfil a mere 2% of the seed demand, leaving the remaining 98% to be met by the informal seed sector.

Two finger millet varieties selected from the Participatory Varietal Testing (PVT) program underwent seed production on about 1 hectare of land, collaborating with chosen seed farmers. Following the completion of all necessary procedures, these seeds were securely stored in Community Seedbanks. These Community Seedbanks play a pivotal role in safeguarding and distributing locally adapted and favoured crop seeds, ensuring seed security for small-scale farmers who might face challenges accessing formal seed sources.

The seed conservation initiative under OMM has received excellent responses from farmers. The Government of Odisha has approved extension of this model for other crops as well. Crop diversity blocks by progressive farmers also bring back memories and history of landraces in that region, which were lost to time.

Image 3.15: Principal Secretary, A&FE with custodian farmers in a PVT field



Source: OMM/MSSRF

### 3.8. Conclusion

SDG 2, commonly known as 'Zero Hunger,' and its associated eight targets are resolute in their mission to eradicate all forms of hunger and malnutrition by the year 2030. These goals are steadfast in ensuring access to adequate and nutritious food year-round, particularly for vulnerable populations such as children, women, older individuals, and marginalized communities. Among the diverse array of targets, SDG 2 places significant importance on endorsing sustainable agricultural practices, supporting small-scale farmers and producers, enhancing access to economic resources, technology, and markets, and strengthening development cooperation for infrastructure and support systems at all levels.

In alignment with these global aspirations, OMM has made dedicated efforts to prioritize the alleviation of hunger among all vulnerable communities in the state, particularly the tribal population. A striking example of this commitment is the procurement and distribution of millets via the Public Distribution System (PDS). This endeavour aims to distribute 4.025 lakh quintals of finger millets to benefit 113.76 lakh households across 14 districts in the state through the PDS. The promotion of millet consumption, both in rural and urban settings, underscores the remarkable potential of millets in combating malnutrition due to their exceptional nutritional value. Millets, ingeniously incorporated into diverse programs like the Integrated Child Development Services (ICDS), and Mid-Day Meal (MDM), have made their way into schools and hostels across the state. This proactive embrace of millets epitomizes Odisha's resolute commitment to eliminating hunger and malnutrition.

In response to the mounting nutritional demands exacerbated by the climate crisis, OMM has taken substantive steps to lay the foundation for sustainable agriculture. The revival of millets within the state's farming practices marks a significant stride toward sustainable agricultural

practices. The program's reach has expanded to encompass additional blocks and districts, instigating a noteworthy shift towards millet cultivation across the state. The land area allocated to millet cultivation has experienced a substantial surge, marking an impressive increase of 78.30 percent since the program's inception. This noteworthy uptick can be attributed to the program's unwavering commitment to enhance agricultural production by providing technical and financial support to farmers for the adoption of improved agronomic practices. This dedication is vividly illustrated in the remarkable 121.27 percent surge in millet production and a notable 45.68 percent increase in yield following the program's intervention.

OMM's relentless endeavours to promote millet consumption encompass numerous initiatives, including strategic collaborations with various restaurants, the establishment of cafes and outlets, and the introduction of millet-based menus. These initiatives poignantly exemplify OMM's dedication to popularizing millets as a preferred dietary choice. Furthermore, the program's remarkable contributions to conserving and nurturing landraces through Participatory Variety Trials (PVTs) have been widely acknowledged for their role in safeguarding agricultural genetic diversity. Consequently, many of OMM's interventions directly align with the core objective of SDG 2, 'Zero Hunger,' as they play an active role in addressing pressing food security challenges and advancing the broader agenda of eradicating hunger and malnutrition.



**3** GOOD HEALTH  
AND WELL-BEING



# SDG 3:

# Good Health and Well-Being

Promoting millet consumption within households and integrating millets into supplementary nutrition programs are the core strategies employed by OMM to enhance the health and overall well-being of the people in Odisha. This initiative significantly contributes to advancing the attainment of Sustainable Development Goal 3 (SDG 3), which focuses on ensuring universal access to good health and well-being.

SDG 3 aims to promote general well-being and healthy lives for all individuals, encompassing crucial health aspects such as maternal and child health, disease prevention, universal healthcare access, and affordable medications and vaccines. Its primary objective is to reduce suffering and premature deaths by targeting critical health objectives for a nation's population.<sup>18</sup>

Millets emerge as a promising resource in the global endeavour to achieve good health and well-being. Millets are densely packed with essential nutrients like protein, dietary fiber, vitamins, and minerals. Their integration into diets can contribute significantly to the reduction of malnutrition and the prevention of non-communicable diseases (NCDs), thereby directly supporting the fulfilment of SDG3 targets.

**4.1. Role of Millets in Prevention and Treatment of Non-Communicable Disease:<sup>19</sup>**

Non-communicable diseases (NCDs), including conditions like diabetes, heart disease, and obesity, pose a significant and widespread global health concern. Annually, NCDs account for the loss of 41 million lives, representing a substantial 74percent of all global fatalities.<sup>20</sup> Millets, enriched with dietary fiber, have shown promise in weight management and the prevention of NCDs. Following are the factors that makes millets suitable to combat NCDs.

Figure 4.1: Millets & NCDs



**Low Glycemic Index (GI) :**

Millets such as pearl and foxtail millet, have a low glycemic index compared to other grains like rice or wheat.



**High Dietary Fiber Content :**

Millets are rich in dietary fiber, which plays a crucial role in managing NCDs like obesity and heart disease.



**Nutrient Density :**

Millets are packed with essential nutrients such as vitamins (e.g., B vitamins), minerals (e.g., iron, magnesium, and potassium), and antioxidants.



**Gluten-Free Options :**

Some millets like sorghum and finger millet, are naturally gluten-free.



**Phytochemicals and Antioxidants :**

Millets contain various phytochemicals and antioxidants, which have demonstrated protective effects against cancer.

18 THE 17 GOALS | Sustainable Development (un.org)

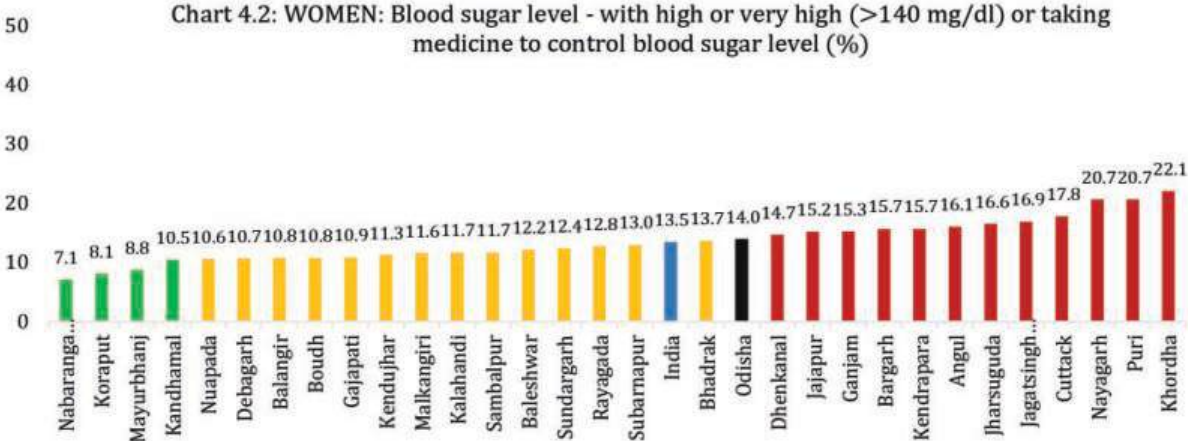
19 Biswas & Jena (2023)

20 Noncommunicable Diseases (who.int)

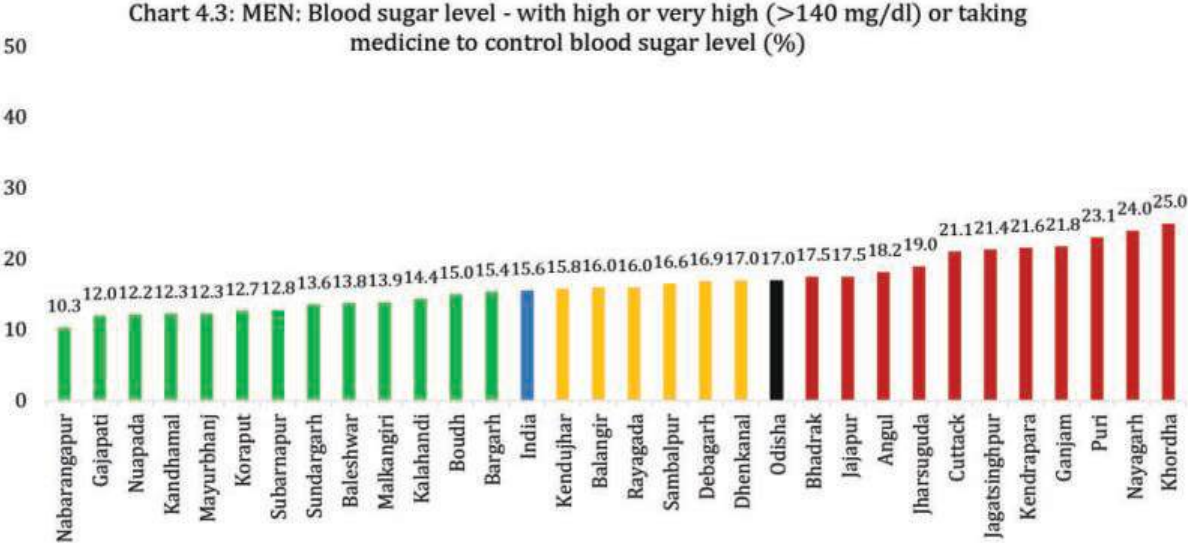
occurs, and the body's cells are unable to efficiently take in glucose for energy, leading to the accumulation of excess sugar in the bloodstream.<sup>22</sup>

According to NFHS-5, Odisha reports a prevalence of 14.0 percent among women aged 15 years and above with elevated blood sugar levels or under medication to manage blood pressure, while India registers a slightly lower percentage at 13.5 percent. Nabarangpur (7.1%), Koraput (8.1%), and Mayurbhanj (8.8%) exhibit the lowest proportions of women with high blood pressure, while Khordha (22.1%), Puri (20.7%), and Nayagarh (20.7%) show comparably higher prevalence.

Source: NFHS-5 (2019-22)



Source: NFHS-5 (2019-22)

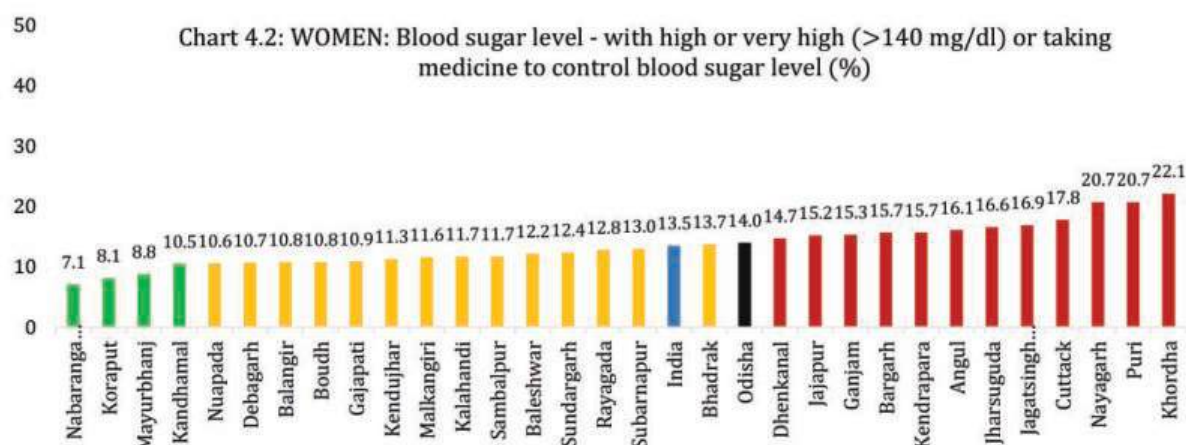


Based on NFHS-5 data, Odisha reports a 17.0 percent prevalence of men with high blood sugar levels or those using medication to manage blood sugar, slightly higher than India's figure of 15.6 percent. Notably, Nabarangpur (10.3%), Gajapati (12.0%), and Nuapada (12.2%) record lower percentages of men with elevated blood sugar levels, while Khordha (25.0%), Nayagarh (24.0%), and Puri (23.1%) exhibit the highest prevalence in this regard.

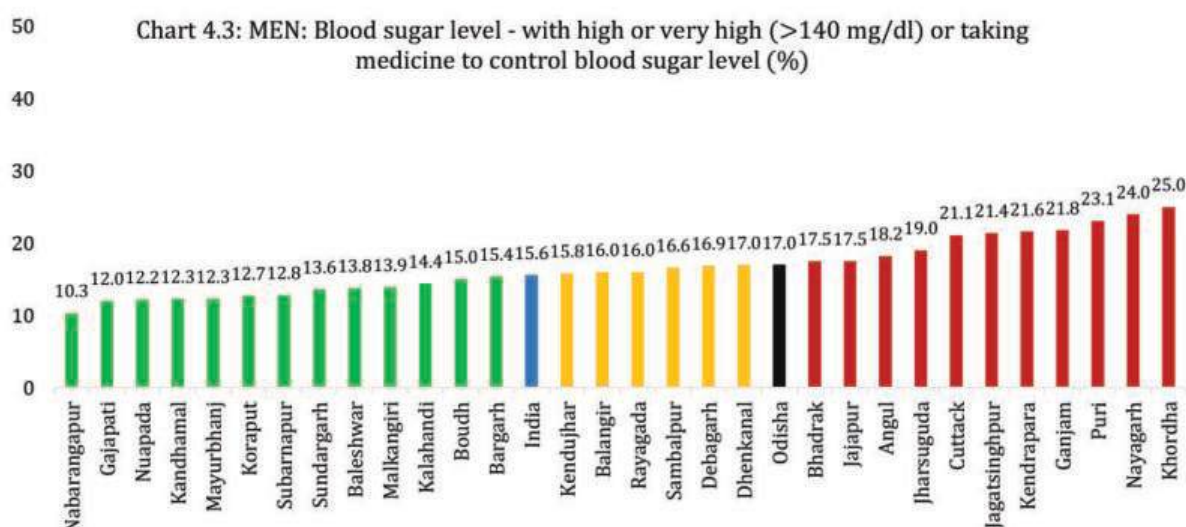
<sup>22</sup> Biswas & Jena (2023)

glucose (sugar) into the body's cells, where it is utilized for energy. However, in diabetes, a malfunction occurs, and the body's cells are unable to efficiently take in glucose for energy, leading to the accumulation of excess sugar in the bloodstream.<sup>22</sup>

According to NFHS-5, Odisha reports a prevalence of 14.0 percent among women aged 15 years and above with elevated blood sugar levels or under medication to manage blood pressure, while India registers a slightly lower percentage at 13.5 percent. Nabarangpur (7.1%), Koraput (8.1%), and Mayurbhanj (8.8%) exhibit the lowest proportions of women with high blood pressure, while Khordha (22.1%), Puri (20.7%), and Nayagarh (20.7%) show comparably



Source: NFHS-5 (2019-22)



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<sup>22</sup> Biswas & Jena (2023)

#### **Role of millets in reducing risk of diabetes:<sup>23</sup>**

- Millets significantly contribute to glycaemic control by reducing  $\alpha$ -glucosidase and pancreatic amylase activities, leading to a reduction in postprandial hyperglycemia. Foods based on sorghum, for example, have a low glycemic index (GI) that helps in lowering postprandial blood glucose levels.
- Over a span of 28-180 days, individuals consuming millets experience an impressive 11.8% decrease in fasting blood sugar (FBS) levels. In contrast, those consuming diets based on other staple cereals do not exhibit any significant reduction.
- Millet consumers show a remarkable 15.1% decrease in post-prandial blood sugar (PPBS) levels over 28-180 days, whereas the comparator group do not display any significant reduction.
- Millet-consuming groups also experience a 12.0% decrease in glycated hemoglobin (HbA1c) levels, compared to an insignificant reduction in group consuming other staple cereals.

#### **4.1.3. Millets and Cardiovascular Diseases:**

Cardiovascular diseases (CVDs) are the leading cause of death globally. An estimated 17.9 million lives were claimed by CVDs in 2019, representing 32 percent of all worldwide deaths. Of these fatalities, 85 percent resulted from heart attacks and strokes.<sup>24</sup> Studies show that most cardiovascular diseases can be averted by addressing behavioural risk factors including tobacco use, unhealthy dietary habits, physical inactivity, obesity, and excessive alcohol consumption.

#### **Role of millets in reducing risk of cardiovascular diseases:<sup>25</sup>**

- Opting for diets that effectively reduce LDL (low-density lipoprotein) is the preferred strategy for minimizing the risk of cardiovascular diseases. Millets, being rich in niacin, play a vital role in improving lipoprotein abnormalities by lowering LDL and triglyceride levels in the bloodstream.
- Additionally, millets contain beneficial phytochemicals such as phytic acid, which contribute to the reduction of cholesterol levels in the blood, thereby helping prevent cardiovascular diseases by decreasing plasma triglycerides.

#### **4.1.4. Millets and Cancer:**

Cancer is responsible for nearly one in six deaths worldwide. 10 million people died due to cancer in 2020.<sup>26</sup> The vast array of cancer types underscores the complex nature of this disease. Nevertheless, the risk of developing cancer can be significantly diminished through the adoption of a healthy diet, the avoidance of tobacco and alcohol, the maintenance of a balanced weight, and the incorporation of regular physical activity into one's lifestyle.

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<sup>23</sup>OMM: Millets Foundation Guide - Scientific evidence & research priorities - draft version.

<sup>24</sup>Cardiovascular diseases (CVDs) (who.int)

<sup>25</sup>Biswas & Jena (2023)

<sup>26</sup>Cancer (who.int)

<sup>27</sup>Biswas & Jena (2023)

### Role of Millets in reducing risk of cancer:

- Millets are abundant in phenolic acids, phytates, and tannins, which contribute to lowering the risk of colon and breast cancer.
- Consumption of sorghum millet has been linked to reduced instances of oesophageal cancer, with lower mortality rates compared to wheat and corn consumption.
- Dietary supplementation with foxtail millet has demonstrated efficacy in treating colitis-associated colorectal cancer by activating gut receptors.

#### 4.1.5. Millets and Celiac Disease:

Celiac disease is an immune-mediated enteropathic condition typically induced by the consumption of grains containing gluten, such as wheat, barley, and rye, in susceptible individuals. The ingestion of gluten initiates an immune reaction in the small intestine, which, over time, results in damage to the intestinal lining. Common complications of celiac disease include diarrhoea, fatigue, weight loss, bloating, and anaemia. The primary solution to this issue is adopting a gluten-free diet.

### Role of millets in reducing risk of celiac disease:

- Millets, being gluten-free, play a pivotal role in minimizing the risk of celiac disease by reducing the irritation caused by common cereal grains that contain gluten.
- Millets are gentle on the digestive system, as they do not produce acid in the digestive tract, and they are less likely to trigger allergic reactions.

#### 4.2. Health Awareness Campaigns in Hospitals:

Several awareness campaigns focusing on the health benefits of millets have been jointly conducted by OMM with prominent government and private hospitals as well as medical colleges in the state. In addition to these awareness initiatives, a comprehensive workshop and tasting event, centered on the manifold health advantages of millets was organized on August 2, 2023, in partnership with the Department of Health and Family Welfare (H&FW). The event saw the participation of over 200 attendees, including officials of H&FW Department, healthcare professionals, nutritionists, dieticians, medical practitioners, and students from both government and private healthcare institutions.

Table 4.1: Details of Health Awareness Campaigns Organised

S. No.	Name of the Hospital	Govt / Pvt	No. of days	Participants
1	AIIMS, Bhubaneswar	Govt	3	2250
2	Capital Hospital, Bhubaneswar	Govt	3	1500
3	KIMS Hospital and Medical College, Bhubaneswar	Pvt	2	900
4	Kalinga Hospital, Bhubaneswar	Pvt	1	300

Source: OMM

Image 4.1: Health Awareness Campaign at KIMS, Bhubaneswar



Following are few posters developed by OMM as a part of the awareness campaign in collaboration with Health and Family Welfare (H&FW) Department.

Image 4.2: Awareness posters created by OMM



### 4.3. Health Awareness Campaigns in Schools:

In collaboration with the School and Mass Education (S&ME) Department, OMM launched several school-based campaigns to encourage the adoption of millets. These initiatives encompassed a range of awareness activities conducted at the district level, targeting various schools. These activities included quizzes, painting competitions, recipe cooking events, and sports events. OMM's vision is to sustain these ongoing efforts, and similar events have been scheduled for the academic year of 2024-25.

### 4.4. Conclusion:

SDG 3 is dedicated to promoting enhanced well-being and healthier lives for all individuals. It encompasses a wide range of critical health domains, including maternal and child health, disease prevention, universal access to healthcare, and the affordability of essential medications and vaccines. The overarching goal is to alleviate suffering and prevent premature deaths.

Millets play a significant role in alleviating malnutrition and combating non-communicable diseases (NCDs), directly contributing to SDG 3.4, which focuses on reducing NCDs. OMM places strong emphasis on the health benefits of millets and strives to enhance household millet consumption, particularly in urban areas.

OMM continues to make an impact by employing various strategies to educate the public about the advantages of incorporating millets into their diets. Initiatives like introducing millet-based menus in hotels, restaurants, sports hostels, and establishing Millet Shakti outlets collectively work towards enhancing the health and well-being of individuals and communities, aligning seamlessly with the targets of SDG 3.

The notable success of several awareness campaigns, particularly the global recognition achieved through the celebration of Millet Divas (*Mandia Dibasa*) on November 10<sup>th</sup>, underscores OMM's steadfast dedication to enhancing public health in Odisha.



# SDG 5 Gender Equality

SDG 5 encompasses a wide array of concerns related to gender equality, ranging from the elimination of discrimination, violence, and harmful practices against women and girls to ensuring their full and effective participation in all aspects of life. It promotes equal opportunities for leadership and decision-making while addressing the importance of recognizing and valuing unpaid care and domestic work. Additionally, it emphasizes the reduction of gender disparities in education, healthcare, and economic engagement, as well as the protection of reproductive rights.

In alignment with these objectives, OMM is committed to achieving gender equality in the agricultural sector and enhancing the economic empowerment of women by involving them in various millet-related entrepreneurial endeavours. The program acknowledges that women farmers often face challenges related to access to land ownership, resources, and markets within a predominantly patriarchal framework. Women farmers' contributions to agriculture often go underacknowledged and their participation in agricultural decision-making encounters numerous obstacles. Despite these challenges, the concerns of women farmers have gained recognition in recent times.

To address these issues, a Gender Analysis Committee was established to examine various aspects of the Odisha Millet Mission from a gender perspective. Committee members conducted field visits to different districts and conducted Focus Group Discussions (FGDs) with various stakeholders. Some key recommendations from these efforts include a focus on the inclusion of single women, the development of scale-appropriate value chains, and the adoption of different community outreach strategies. These recommendations are currently being piloted in various districts of Odisha to combat gender inequality.

### 5.1. Gender and Millet Farmers

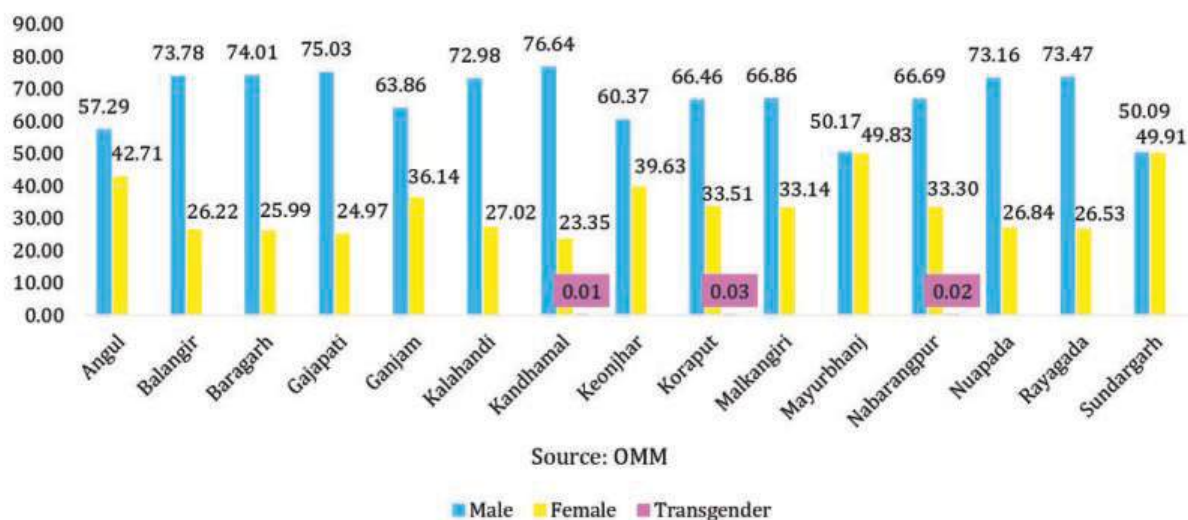
Traditionally, millet cultivation has predominantly involved male farmers, with a substantial gender imbalance. In 2018-19, nearly three-quarters of millet farmers were men. However, with the initiation of OMM, there has been a consistent increase in the proportion of women farmers engaged in millet cultivation. This proportion has risen from 26.55% in 2018-19 to 31.50% in 2021-22, marking a notable positive shift towards greater gender inclusion in this agricultural sector.

Chart 5.1: Proportion of Millet Farmers by Sex (%)



Source: OMM

Chart 5.2: District-wise distribution of millet farmers by Sex (%), 2021-22



In the year 2021-22, Sundargarh district exhibited the highest proportion of female millet farmers, accounting for 49.91% of the total, approaching a near gender parity in comparison to other districts. Conversely, Kandhamal district had the lowest proportion of female millet farmers, standing at 23.35%. Notably, there is an active strategy in place, currently being implemented, to foster gender inclusion as an integral component of millet-related interventions, as outlined below.

#### Women SHGs at the forefront:

- Women SHGs have been actively participating in millet cultivation since the inception of the OMM.
- OMM has empowered women to establish and manage businesses dedicated to millet packaging and marketing.
- Women play a central role in all major millet-related activities, both during production and in post-production phases.

#### Reducing drudgery in millet cultivation:

- OMM has facilitated the distribution of various farming implements, tools, and equipment to farmers through Farmers' Producer Organizations (FPOs) and Women's Self-Help Groups (WSHGs). This approach enhances farm mechanization, boosts productivity, minimizes post-harvest losses, and facilitates millet marketing via a cluster-based model.
- The availability of mechanization tools has notably reduced the laborious aspects of millet cultivation.
- Compared to traditional methods where it would take 9-12 women an entire day to weed a field, the introduction of weeders has streamlined the process, enabling one woman to complete the task in just 2 days.

- Women have taken on an active role in challenging societal norms by establishing enterprises dedicated to input supply and post-production sales.
- Women SHGs are now also actively engaged in the financial decision-making processes for their businesses and enterprises.

**Table 5.1: Details of Agriculture Equipment or tools provided to farmers under OMM**

<b>S. No.</b>	<b>Name of Equipment</b>	<b>No. of Units Provided</b>
1	Cycle Weeder	7829
2	Sprayer	1644
3	Pump set	550
4	Marker	1152
5	Drums (Plastic)	2029
6	Sieves	252
7	Rose Can (Jar)	79
8	Stitching Machine	206
9	Multi Threshers	7
10	Winnowing Fan	12
11	Delivery Pipe	537
12	Watering Can	30
13	Battery Sprayer	980
14	Storage Bin	112
15	Wheel Finger Weeder	260
16	Dry Land Weeder	113
17	Garden Rake	350
18	Rake weeder	10
19	HDPE Pipe set	1594
20	Grader	1
21	Seed Drill	54
22	Sprinkler	120
23	Electronic Weighing Machine	368
24	Moisture Meter	284
25	Tarpaulins Sheets	5175
26	Hand Test Sieves	126
27	Hand Winnower	95
28	Seed Treatment Drum	770
29	Seed Divider	1
30	Storage Bin	1101
31	Gunny Bag	3641
32	Eye Scanner	10
33	Dunnage	67
34	Packaging Material	72

Source: OMM

## 5.2. Gender Action Committee

In September 2022, OMM constituted a Gender Action Committee (GAC) in line with the theme for the International Year of Millets 2023 – ‘Gender Equitable, Climate Resilient, and Nutritionally Secure.’ The defined roles and responsibilities of the Gender Action Committee include:

- Conducting an in-depth assessment and analysis of gender-related issues, concerns, and ongoing processes within OMM at both institutional and community levels.
- Formulating recommendations for a gender mainstreaming strategy for the project over the next five years

The Gender Action Committee conducted a comprehensive survey across three OMM districts: Koraput, Nuapada, and Sundargarh. The primary aim of this study was to gain insights into participants' perspectives on gender and their comprehension of the gender-specific aspects within OMM. The findings were based on field observations and inputs gathered from Women's Self-Help Groups (WSHGs), farmers, district and block-level officials, as well as facilitating agencies.

The Gender Action Committee has put forth a set of key recommendations, which OMM has embraced to address gender-related issues and create an inclusive and secure environment for women.

### Awareness and Capacity Building:

- Mandate gender-oriented orientation and sensitization programs for all stakeholders at every level (State, District, Block), encompassing departmental personnel, Programme Secretariat (WASSAN), local NGO partners, and Farmer Producer Organizations (FPOs).
- Promote greater participation of women in leadership roles and decision-making processes, along with providing training and capacity-building opportunities.

### Livelihoods and Entrepreneurship:

- Encourage investment and local marketing avenues to support collective enterprises led by Women's Self-Help Groups (WSHGs) and ensure the sustainability of these ventures.
- Facilitate the establishment of smaller processing and packaging units, allowing women SHGs to independently manage and expand these enterprises. This approach prevents women from being

Image 5.1: Honourable Chief Minister with Milletpreneurs



marginalized in large-scale processing units where men often dominate operations and decision-making, relegating women to labor roles.

#### **Inclusion of Gender Indices:**

- Develop gender-related indicators and implement regular monitoring mechanisms. • Incorporate insights from gender experts as a mandatory aspect of the design process for all schemes.
- Ensure that at least 50 percent of positions (at all levels) are held by women, with selection criteria emphasizing expertise in gender and development.
- Adopt gender-based micro-planning and budgeting to integrate provisions that promote gender equality and women's empowerment within OMM.
- Prioritize access to OMM and departmental schemes for single women farmers, who represent one of the most vulnerable categories, not only in farming but also in post-harvest and entrepreneurship.

#### **Leadership and Governance:**

- Offer incentives to Women SHGs for undertaking village-level planning and mobilization activities.
- Enhance awareness and understanding of the Forest Rights Act (FRA) to promote convergence with OMM for post-claim actions related to field management and millet promotion.

#### **Access to Resources:**

- Develop specific indicators to evaluate women's access to resources, training, technology, participation, and influence in institutions and decision-making processes within their families.
- Assess women's involvement and influence in aspects related to cultivation, supplementary programs, and decisions regarding millet production, consumption, sale, and access to benefits, ensuring their active engagement and representation.

### **5.3. Inclusion of Single Women**

Single women represent one of the most marginalized and vulnerable groups in India, including widows, divorcees, unmarried women, and those separated from their husbands. Recognizing their specific challenges, OMM has formulated a policy focused on the inclusion and empowerment of single women. This policy entails capacity-building initiatives, entrepreneurship development, exposure visits to relevant sites, and visioning exercises.

To assess the gender responsiveness of the OMM, a study was conducted in three districts: Koraput, Nuapada, and Sundargarh. Among the 150 female participants, 17 were identified as single women. Notably, 64.7 percent of these single women reported receiving limited training or no training.

Consequently, OMM has devised two key strategies for their inclusion:

- Ensure that 10 percent of participants in residential and non-residential training programs are single women; and
- Prioritize potential single women for operating millet-based enterprises.

The initial steps to integrate single women into the program began with pilot interventions in three areas: Lamtaput block in Koraput district, Lathikata block in Sundargarh district, and Bangiriposi in Mayurbhanj district. A total of 490, 638, and 500 single women farmers were identified from a pool of 6,000, 1,809, and 686 OMM farmers across Koraput, Mayurbhanj, and Sundargarh, respectively. OMM is committed to expanding this intervention to other blocks based on the outcomes of these pilot initiatives.

**Image 5.2: Woman in a Millet Field**



### Success Story: A single woman farmer<sup>28</sup>

In 2011, tragedy struck Jyoti Dang as she lost her husband, leaving her with the responsibility of caring for her 7-year-old son and very limited means of livelihood. Facing the challenges of not owning any agricultural land, Jyoti resorted to working as a daily wage laborer to make ends meet.

However, in 2018, a ray of hope emerged when DISHA, a Facilitating NGO operating under the Odisha Millet Mission (OMM), visited Jyoti's village to introduce the concept of millet cultivation. During these introductory meetings, Jyoti discovered that millets could be successfully grown in wastelands with minimal labor requirements and fewer inputs. The knowledge that the government offered incentives for millet cultivation and that there was an established market to sell her produce solidified Jyoti's decision to venture into millet farming.

Jyoti began discussing the idea of initiating sharecropping on fallow lands with fellow community members. Through her efforts, she successfully secured access to one acre of land to commence millet cultivation. Jyoti's commitment to this endeavor led her to participate in several training sessions conducted by Community Resource Persons of OMM, where she acquired the knowledge and skills required to implement Sustainable Millet Intensification (SMI) agronomic practices. Additionally, she took the initiative to prepare her own bio inputs, further demonstrating her dedication to millet farming.

#### Impact:

Between 2018 and 2020, Jyoti managed to expand her cultivated land from 1 acre to 1.25 acres, resulting in a rise in millet production from 5.3 quintals to 6.8 quintals. Notably, her income levels demonstrated a consistent increase during this period, even as the incentive amount under OMM decreased each subsequent year.

*"She is a remarkable woman in the village, truly dedicated to her path. Despite facing numerous challenges, her unwavering determination has given her a sense of dignity and a sustainable livelihood. She seized every opportunity provided by OMM, actively participating in training programs and made the most of the benefits. Today, she stands as an inspiration to other women in the village, encouraging them to engage with OMM and contribute to their family's development."*

- Block Coordinator, DISHA

## 5.4 Gender and Livelihoods

OMM has been a catalyst for numerous entrepreneurial endeavors, fostering livelihood opportunities along the entire millet value chain. At present, 153 Millet Tiffin Centers, 8 Millet Cafés, and 6 Millet Outlets are up and running in diverse locations throughout Odisha. These enterprises are entirely spearheaded and overseen by first-generation women entrepreneurs, marking a significant achievement in the empowerment of women in the region.

<sup>28</sup> WFP & OMM (2022)

Image 5.3: Women Entrepreneurs with the millet products



### Success Story<sup>29</sup>

Subhashree Women's Self-Help Group (WSHG), situated in Sundargarh district, has achieved remarkable success through the operation of a Millet Shakti Tiffin Centre. This center has curated a diverse menu, featuring traditional Odia breakfast items such as ragi dahi-vada, ragi chakuli, and ragi samosa, alongside evening snacks like piyaji, chowmein, and aaloo chop. After actively participating in district-level recipe training and securing a grant of Rs 30,000 to enhance their tiffin center, the SHG expanded its offerings to introduce innovative millet-based recipes. This transformation has enabled them to offer healthier and more nutritious options to their patrons, playing a pivotal role in advancing the promotion of millets as a wholesome food source in the region.

#### Impact:

As on date, the tiffin center generates an average monthly profit of Rs. 30,000, serving as an additional source of livelihood for the WSHG group. This initiative has not only provided the WSHG members with financial independence but has also contributed to the enhancement of their self-awareness and business skills throughout the process.

## 5.5 Conclusion

SDG 5 is a global commitment to achieve Gender Equality and empower all women and girls. It addresses numerous aspects of gender inequality, including the elimination of violence and harmful practices against women, ensuring access to education, healthcare, and economic opportunities for women, promoting their participation in decision-making processes, and recognizing the importance of unpaid care and domestic work. SDG 5 seeks to break down gender barriers, challenge social norms that perpetuate discrimination, and create a world where women's rights are fully upheld. By achieving this goal, societies can benefit from the full potential and contributions of women and girls, fostering more inclusive, equitable, and sustainable communities and economies.

OMM has taken substantive strides in promoting gender equality within the agricultural sector and empowering women through various millet-related entrepreneurial initiatives. OMM

<sup>29</sup> GoO (2023a)

acknowledges the challenges that women farmers face, such as limited access to land ownership, agricultural inputs, and markets within a predominantly patriarchal system. Despite these challenges, women's issues within the farming community have gained recognition in recent years. OMM's notable achievements include the inclusion of single women and the establishment of a Gender Action Committee, both pivotal milestones. OMM seeks to systematically address gender inequality through affirmative actions.

While there has been an increase in the involvement of women farmers in millet cultivation over the years, the sector remains predominantly male-dominated, particularly in most districts. OMM's gender inclusion strategy involves empowering WSHGs, reducing the physical toll of millet farming through mechanization, and challenging traditional social norms that restrict women's participation in agriculture and entrepreneurship. OMM also recognizes the significance of collecting gender-disaggregated data on critical areas such as wage disparities, women's entrepreneurship, and other relevant metrics to effectively monitor progress and promote gender equality.

Furthermore, OMM underscores the importance of assessing women's adaptability to agricultural machinery. Recognizing that standard machinery specifications often favour men, OMM is committed to designing machinery and tools that meet women's requirements, considering their distinct agronomic characteristics. Additionally, OMM strives to provide women with the necessary information on accessing credit and capital, recognizing that these are significant barriers to their participation in mechanized agriculture.



# SDG 8:




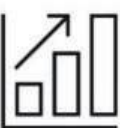
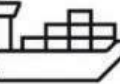
## Decent Work and Economic Growth

SDG 8 tackles a broad spectrum of economic challenges and opportunities, with a focus on fostering inclusive economic growth, job creation, and ensuring fair working conditions. It acknowledges that sustainable economic development goes beyond GDP growth, emphasizing the importance of ensuring that economic progress benefits all, especially marginalized and vulnerable groups.

Traditionally, millet has been consumed primarily as a coarse food grain and is celebrated in various culinary traditions. However, in recent years, there has been a surge in the development of processed and packaged millet-based foods. Initiatives promoting millet product development, marketing, and trade have generated employment opportunities from farm to supermarket, contributing to the realization of SDG 8.

OMM has taken strategic steps to harness millets' potential for economic development and job creation, with a focus on these key interventions.

**Table 6.1 OMM Strategies for Economic Development and Employment Generation<sup>30</sup>**






	<p><b>Fuelling Demand by Increased State Procurement</b>  <b>M-PAS (Millet Procurement Automation System)</b></p> <ul style="list-style-type: none"> <li>Ease farmer registration and operations through online process</li> </ul> <p><b>Finger Millet Procurement at MSP</b></p> <ul style="list-style-type: none"> <li>MSP for Finger Millet has ensured guaranteed sale for farmers.</li> </ul>
	<p><b>Developing Capacity</b></p> <p><b>Training and Exposure Visits</b></p> <ul style="list-style-type: none"> <li>For CBOs/ FPOs/ SHGs members on millets recipes, processing, packaging, value addition, etc</li> <li>Exposure visits for experiential learning</li> </ul> <p><b>Cadre of Community Resource Persons (CRP)</b></p> <ul style="list-style-type: none"> <li>Training and recruitment of CRPs</li> <li>Capacity and hands on support to farmers by CRPs</li> </ul>
	<p><b>Promoting Entrepreneurship</b></p> <ul style="list-style-type: none"> <li>Capital support (Rs. 30,000) for SHGs/ CBOs/ FPOs for setting up millet product kiosks</li> <li>Start-up capital support (Rs 4 lakh) to FPOs/ SHGs/ CBOs/ for producing millet-based food items for sale through mobile outlets/ farmer sales outlets</li> <li>Capital support (up to Rs 7.5 lakhs) for pulverizing/ grinding enterprises</li> <li>Financial support to enterprises for processing and value addition</li> </ul>
	<p><b>Business partnership &amp; network</b></p> <ul style="list-style-type: none"> <li>Partnering with entrepreneurs for setting up millet kiosks and cafés</li> <li>Millet-based packaged and hot cooked food stalls at exhibitions/fairs</li> <li>Tie ups with retailers for sale of millets and millet products</li> <li>Tie ups with hotels across Bhubaneswar to include millet in their menu</li> </ul>
	<p><b>Export and Trade</b></p> <ul style="list-style-type: none"> <li>Partnering with APEDA, Dept. of Commerce &amp; Industry, GOI for Millet export</li> <li>First millet consignment (total quantity 975 kg.) has been flagged off to UAE</li> </ul>

<sup>30</sup> UNWFP (2021)

## 6.1. Training and Capacity Development of Millet Farmers:<sup>31</sup>

Unlocking the substantial potential of millets for livelihood generation and increased farmer income requires ongoing and rigorous capacity development. In pursuit of this goal, OMM has made consistent efforts to enhance farmers' knowledge and skills.

Table 6.2: Capacity Development Interventions on Millets

 <div style="border: 2px solid black; padding: 5px; text-align: center; font-weight: bold;">7500</div>	7500 training programmes covering 148,706 participants (WSHG, Farmer and Community Resource Persons) till the year 2022-23	 <div style="border: 2px solid black; padding: 5px; text-align: center; font-weight: bold;">1041</div>	1041 Cluster level Festivals and workshop covering 832,800 participants conducted till 2022-23.
 <div style="border: 2px solid black; padding: 5px; text-align: center; font-weight: bold;">1434</div>	1434 awareness campaigns covering a total of 860,400 participants till 2022-23.	 <div style="border: 2px solid black; padding: 5px; text-align: center; font-weight: bold;">660</div>	660 exposure visit covering 13200 farmers and community resource persons till 2022-23.
	1292 field days completed covering a total of 72,950 farmers/households till 2022-23.	 <div style="border: 2px solid black; padding: 5px; text-align: center; font-weight: bold;">1292</div>	

Source: Draft OMM Annual Report, 2022-23

OMM has actively undertaken about 1,434 awareness campaigns, reaching out to a remarkable 8,60,400 farmers and their households till 2022-23. Moreover, a comprehensive total of 7,500 training programs, with an impressive 1,48,706 participants, have been organized by OMM through a combination of residential and non-residential sessions. These programs have spanned across various aspects, including sustainable agricultural practices, entrepreneurship development, millet processing, value addition, and millet recipes. Additionally, OMM has also conducted 1,041 cluster-level festivals and workshops, engaging an extensive audience of 8,32,800 participants, as of 2022-23.

## 6.2. Millets and Livelihoods:

The heightened support for millet farmers in Odisha has spurred a significant increase in millet production. This, in turn, has paved the way for numerous entrepreneurs to venture into the realm of millet-based enterprises.

### Farmer Producer Organization (FPO):

Till date, OMM has successfully established 177 Farmer Producer Organisations (FPOs). These FPOs serve as a crucial strategy to empower small and marginal farmers improve their

<sup>31</sup> GoO (2022-23b)

economies of scale by enabling collective negotiation in larger markets. The growth of FPOs has also given rise to numerous small enterprises that provide essential input support and cost-effective services, ultimately reducing the workload of farmers.



Additionally, OMM has set up a total of 710 Millet Thresher units, 792 Pulverisers units, 44 Cleaner-Grader-Destoners units, and 16 Minor Millet Dehuller units. These units have resulted in the creation of valuable community assets that make a significant contribution to livelihood generation activities centered around millets, at the grassroots level.

**Primary small millet processing units:**

Image 6.1: Primary small millet processing unit

OMM has fortified the strength of Women SHGs by setting up 1419 primary processing and post-harvesting units for small millets in rural areas. These millet-based enterprises not only substantially alleviate the labour burden but also enhances the millet value chain. Their presence is pivotal in encouraging farmers to expand their millet cultivation efforts.



**Custom Hiring Centre (CHC):**

38 CHCs have been established under OMM, each serving a cluster of 30,285 millet farmers. The main objective of CHC is to supply farm machinery, implements and equipment to small and marginal farmers at subsidized rates on hire.

Table 6.3: Different Models of Foodservice Enterprises

	8 Millet café run by Women Self Help Group established.		153 Millet Tiffien center is running at various location across Odisha.
	6 Millet Outlet is currently functioning.		4 Millets on Wheel units have been established.

Source: OMM

Under OMM, start-up capital has been provided for establishing and managing kiosks including outlets, tiffin centers, cafés, etc. for selling millet-based food items and products. These initiatives are primarily driven by FPOs, CBOs, and SHGs, particularly Women SHGs under the Mission Shakti umbrella. As on date, 171 millet based foodservice enterprises of four different models (Millet café, Millet Outlet, Millet on Wheel and Millet Tiffin Centre) have been established.

### **Bio-Input Units:**

Among the various entrepreneurial activities facilitated by OMM in the state, the establishment of Bio-input units has emerged as a significant area, contributing to women's economic empowerment. These Bio-input Centres have been promoted at the block and Gram Panchayat (GP) levels to enhance the production of organic input manure and promote its usage, among millet farmers

**Image 6.2: Women preparing Bio-input**



### **Urban Internship:**

The launch of a summer internship program for students, aimed at establishing and operating millet food stalls in 26 different locations in Bhubaneswar, also represents an outstanding initiative of OMM for nurturing future entrepreneurs.

## **6.3. Conclusion:**

SDG 8, which focuses on "Decent Work and Economic Growth," places emphasis on fostering sustained, inclusive, and sustainable economic growth, ensuring full and productive employment, and promoting decent work opportunities for all. Within the 12 targets delineated in Goal 8, the Odisha Millets Mission (OMM) has been particularly committed to creating sustainable and productive employment, directly contributing to Target 8.3 of this Goal.

OMM's strategic endeavours aimed at livelihood development have encompassed various avenues, such as state procurement, capacity enhancement, and the promotion of entrepreneurship. These initiatives significantly advance the attainment of SDG 8. They have not only empowered farmers but have also given rise to women-led enterprises and small-scale millet processing units. The remarkable success stories of millet-based businesses underscore the transformative influence of millet cultivation on livelihoods. Notably, the successful export of millets to the UAE has served as a compelling testament to the potential of millets in the international market. In line with this, 70 farmers have undergone specialized training in millet export, with expectations of substantial expansion this year, thereby generating more income opportunities for farming communities.

Looking forward, OMM is poised to collect and analyze data related to the economic dimensions of the millet value chain. This includes evaluating income prospects, assessing debt situations, and appraising the efficacy of entrepreneurship models. These efforts aim to further propel millet cultivation, empower farmers, and fortify the sustainability of millet-related enterprises. Additionally, OMM is also committed to exploring emerging options in technology, skill development, and institution-building, all of which will be instrumental in capitalizing on the benefits of millet cultivation and trade, marking the focal point of OMM's aspirations.



# SDG 12:

# Responsible Consumption and Production




As the world's population continues to grow, the demand for food production is increasing at a rapid pace. Therefore, it is crucial to draw valuable lessons from the Green Revolution and transition to more sustainable and responsible methods of food production. Sustainable Development Goal 12 (SDG 12) aims to promote responsible consumption and production patterns within society.

In order to achieve both economic growth and sustainable development, it is imperative that we promptly reduce our ecological footprint by changing the way we produce goods and manage resources. Agriculture is particularly significant in this regard, as it is the largest global consumer of water, accounting for nearly 70 percent of all freshwaters used by humans.<sup>32</sup> Effective management of natural resources, along with responsible waste disposal practices that prioritize recycling and waste reduction, are essential objectives of SDG 12.

## 7.1. Millets for Sustainable Production

Millets have the potential to serve as a cornerstone of sustainable food production systems, as they contribute only a minuscule fraction to the environmental footprint when compared to major crops like rice and wheat.




Table 7.1: Role of Millets in contributing to sustainable food production systems

	<b>Low Input Requirement:</b> Millets require fewer inputs like chemical fertilizers/pesticides, water compared to other grains		<b>Soil Health:</b> Millets help in maintaining soil structure and retaining water
	<b>Zero Carbon Footprint:</b> Millets are carbon neutral crops.		<b>Resource Efficiency:</b> Millets are efficient in utilizing the available nutrients
	<b>Biodiversity Promotion:</b> Millets reduce the risk of monoculture farming and its associated vulnerabilities to pests and diseases		<b>Sustainable Farming:</b> Millets are often grown using traditional practices like organic farming, agroecology and crop rotation

## 7.2. OMM's Commitment towards Responsible Production

OMM has adopted a range of practices to ensure sustainable production as outlined below<sup>33</sup>:

Table 7.2: OMM initiatives contributing to sustainable food production systems

	<b>Bio-inputs:</b> Use of organic bio-inputs for production of millets help in maintaining the soil quality while reducing grain wastage by pests.
	<b>Protective Irrigation:</b> Protective irrigation provides a supplementary source of water, ensures that the crop is not affected during dry spells and saves the farmers from loss of income.
	<b>Improved Agronomic Practices:</b>

<sup>32</sup> UNDP

<sup>33</sup> GoO (2021-22)

Farmers are incentivised for promotion and adoption of improved agronomic practices which increase productivity and ensures resource efficiency.



**Community Seed Centres (CSC):**

CSCs ensure steady supply of quality millet seeds that suit the local conditions and preserve the indigenous varieties.



**Solar Millet Processing Unit:**

Solar millet processing units are energy efficient and have a significantly lower environmental impact.

### 7.2.1. Promotion of Organic Farming through Bio-input Units

Bio-inputs offer an environmentally friendly alternative to chemical inputs, which not only harm the environment but also affect the health of both farmers and consumers. They are also a cost-effective solution, sparing farmers from unnecessary expenses and potential debt burdens. Under OMM, bio-input units have been established to promote the production and use of organic fertilizers and encourage their adoption at the Gram Panchayat level. The primary goal is to reduce reliance on chemical fertilizers and pesticides for addressing nutrient and pest-related issues in millet farming. Additionally, the aim is to lower input costs by promoting the utilization of locally available raw materials to create organic inputs.

Image 7.1: WSHGs with different bio-inputs produced by them



These units are promoted in 143 blocks across 19 districts through Farmer Producer Organisations (FPOs) and Women Self Help Groups (WSHGs), who have pursued this as a business model. The production is done by WSHGs and marketing of the bio-inputs in the local market is the responsibility of the FPOs. Currently, 54 FPOs and 115 WSHGs have started bio-input enterprises. The FPOs and WSHGs also produce vermicompost, decomposers, Ghanajibamruta, etc. in addition to the bio-inputs mentioned. These are used for self-consumption and for selling in the local market.

### 7.2.2. Protective Irrigation – Promoting Water Use Efficiency in Irrigation

Millets are typically rainfed crops and require minimal irrigation. However, during dry periods, protective irrigation is employed to maintain sufficient soil moisture for optimal productivity.

Access to protective irrigation is facilitated in specific areas ranging from 4 to 10 hectares, with a focus on:

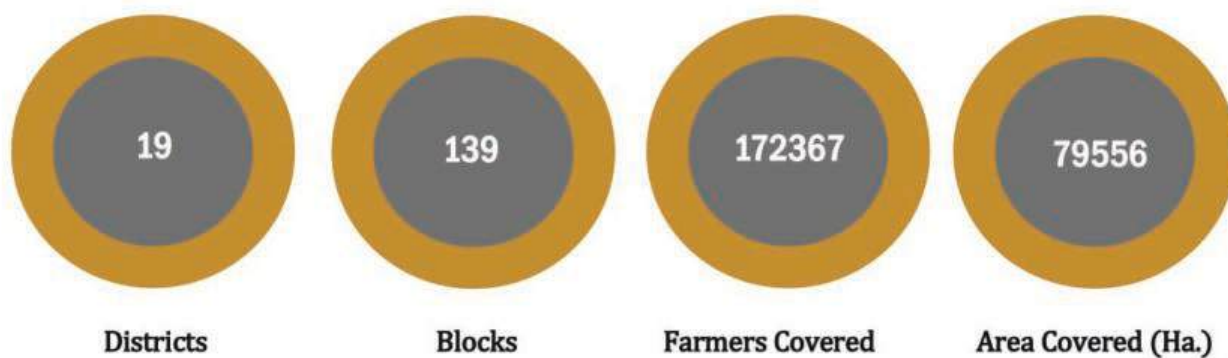
- Continuous/contiguous patches covering adjacent clusters/villages
- Patches of land nearest to the existing water sources
- Areas where farmers are willing to collaborate and share additional resources
- Land employed for seed production for millets<sup>34</sup>

Financial support for Site-Specific Protective Irrigation Infrastructure (SSPII) is provided, including various options such as farm ponds, Community Lift Irrigation Points (LIPs), PVC and HDPE pipes, pipeline grids with sprinklers, solar pumps, electric pumps, etc. based on the specific needs of the site. This support aims to prevent millet crop failures during dry spells. The implementation of protective irrigation is carried out in convergence with various government departments, including Water Resources, Panchayati Raj & Drinking Water.

### 7.2.3. Promotion of Improved Agronomic Practices

OMM has been actively encouraging the implementation of enhanced agronomic practices that encompass a diverse range of millet crops. This initiative aims to enhance millet production, increase productivity, and preserve or enhance soil health. In its quest to make a meaningful impact at the community level, OMM has adopted a farmer-to-farmer learning and extension approach.

Under this approach, progressive farmers receive motivation, support, and incentives. They also benefit from practical guidance provided by community resource individuals, thematic experts, and local civil society organizations. This approach is geared towards promoting knowledge sharing and the widespread adoption of improved agronomic practices in the millet farming community.



Enhanced agronomic practices have been implemented across a total of 139 blocks spanning 19 districts, encompassing an area of 79,556 hectares, and benefiting 172,367 farmers.

<sup>34</sup> UNWFP (2021)

Image 7.2: Line Transplantation on millet farm

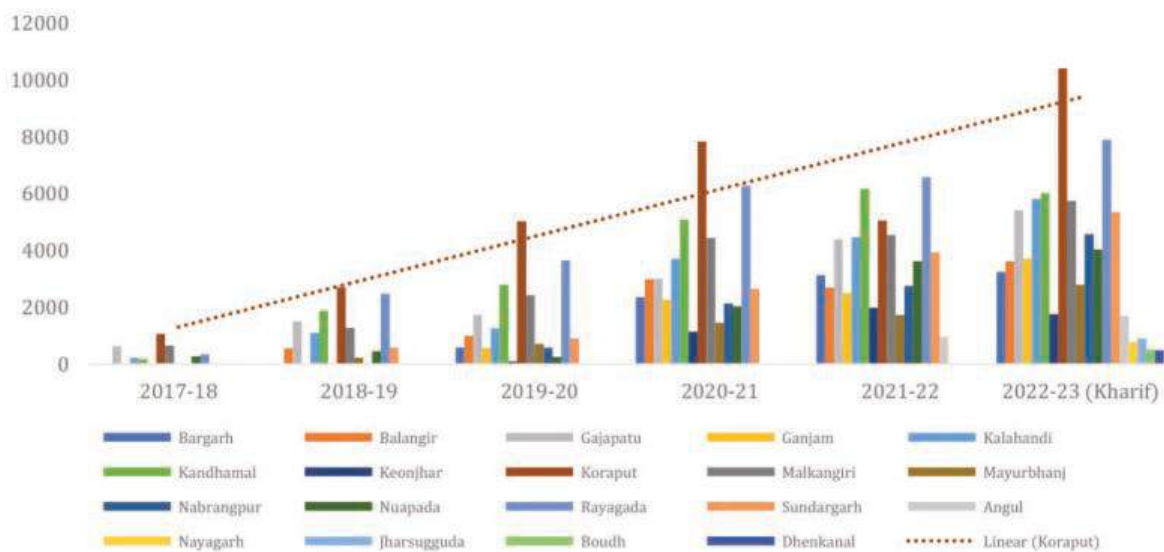


Types of improved agronomic practices promoted under OMM are<sup>35</sup>:

- i. System of Millet Intensification (SMI)
- ii. Line Transplanting (LT)
- iii. Line Sowing (LS)
- iv. Intercropping

The adoption of improved agronomic practices by a growing number of farmers has resulted in a significant increase in the land area dedicated to these practices. Farmers who have embraced these methods have reported notable improvements in soil quality and water use efficiency. As a result, this shift has led to increased productivity and higher yields in millet cultivation.

Chart 7.1: Land Area under agronomic practices (ha.)



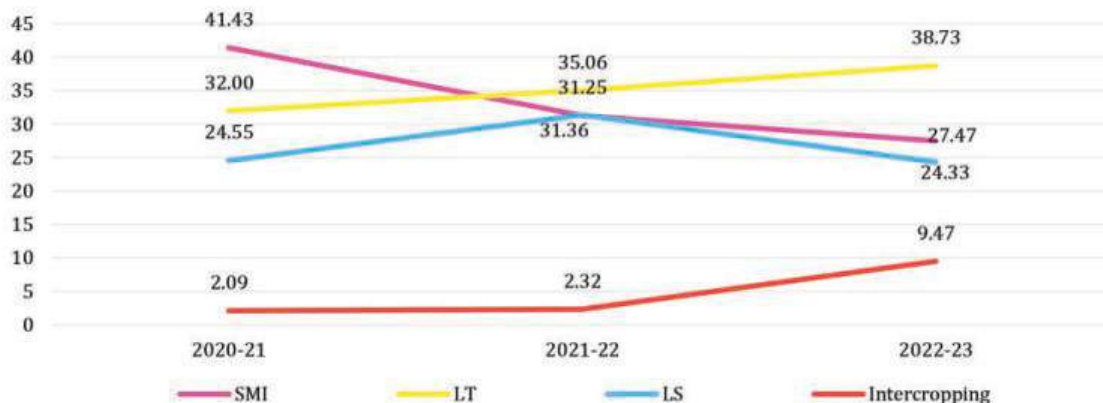
Source: OMM Data

<sup>35</sup> GoO (2020-21)

Area under LT is the highest at 38.73 percent followed by SMI at 27.47 percent and LS at 24.33 percent. Area under intercropping is much lower in terms of coverage (9.97 percent). However, intercropping has showed significant improvement (by 7.38 percent) from 2020-21 to 2022-2023.

Year-on-year trends indicate a growing adoption of various agronomic practices among farmers in the OMM districts over the past few years. Farmers who have embraced these practices have reported improvement in the quantity and quality of yield, resulting in reduced input costs and minimized water usage. Simultaneously, they have also observed higher crop productivity while maintaining soil health.

Chart 7.2: Method wise coverage (%)



Source: OMM Dashboard, September 2023

Among the methods, the highest yield was consistently observed in System of Millet Intensification (SMI), while the lowest yield was found in Line Sowing (LS) method, during all three years. The most significant increase in yield, at 4.44 (Qtl./ha.), was recorded under LS, while SMI and Low Tillage (LT) saw increments of 2.06 (Qtl./ha.) and 2.69 (Qtl./ha.) respectively, over the same period.

Among all the millet types, finger millet had the highest crop coverage under improved practices, at 81.01 percent, as it was the most widely cultivated. Little Millet followed with a crop coverage of 11.28 percent, while Sorghum stood at 4.24 percent, foxtail millet at 1.90 percent, and Kodo millet at 1.27 percent.

Chart 7.3: Area under different methods (%)

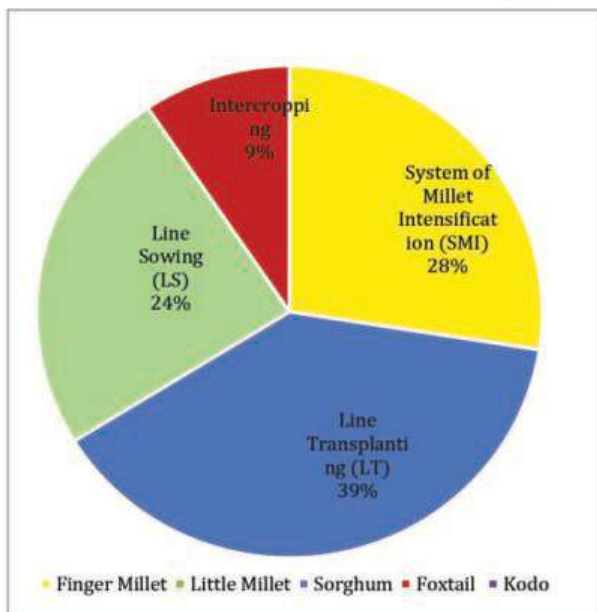
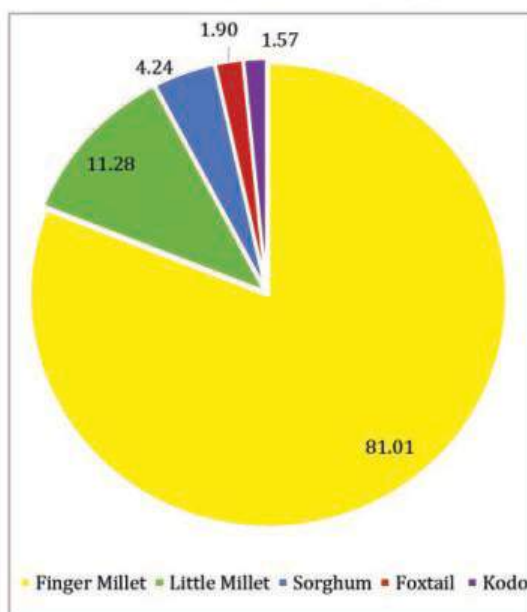


Chart 7.4: Crop-wise coverage (%)



Source: OMM Dashboard, September 2023

*"I used to harvest 5 quintals of ragi from a 1.5-acre plot. Now, from that same land, I can yield 15 quintals. This enables us to retain an ample amount for personal use while also selling in the market"*

*- Neela Challa*

Among the tribal communities residing in Lamtaput block of Koraput district, finger millet holds a prominent position as a major crop and constitutes a significant part of their daily diet. Neela Challa, a 40-year-old tribal farmer, described how finger millet is a staple food consumed three times a day, with the majority of his harvest reserved for personal consumption.

Earlier, farmers like Challa had opted to cultivate commercial crops like paddy, primarily due to the relatively lower productivity of millets. However, with the implementation of package of improved agronomic practices under OMM, farmers have succeeded in enhancing millet productivity, enabling them to consider commercial cultivation for sale in the market.

#### 7.2.4. Community Managed Seed Centres (CMSCs)

Before the implementation of OMM, 46.8 percent of farmers had expressed dissatisfaction with the quality of millet seeds used for cultivation. Under OMM, Community Millet Seed Centers (CMSCs) were established at Gram Panchayat level to ensure the production and distribution of high-quality seeds tailored to local conditions and the preferences of farmers.

CMSCs played a pivotal role in identifying promising millet varieties through Participatory Varietal Trials (PVTs). Subsequently, they actively engaged in the mass selection of the two most high-performing landraces or varieties from the PVTs and carried out seed multiplication activities in response to the demand. These CMSCs are managed by Farmer Producer Organizations (FPOs) and Women Self Help Groups (WSHGs), who have been trained in proper techniques for storing and preserving quality seeds.

##### Key features of the CMSCs:

- **Decentralised Seed System Managed by FPOs/WSGHs:** CMSCs have been established at the local level to make quality seeds easily accessible to farmers at a reasonable cost. The FPOs/WSGHs ensure timely production, processing, and procurement of seeds from farmers, alongside packaging, storage, and payment to farmers. They are also responsible for distributing the subsidized seeds to the farmers.
- **Participatory Varietal Trial (PVTs):** PVTs were executed in a farmer's field with the aim of discerning the preferred millet varieties among a collection of landraces. This trial included a reference or released variety for comparison and was conducted within a specific agroecological region. The PVT followed a Randomised Block Design (RBD) with three replications. Field days were convened, uniting farmers and researchers in a collaborative setting. Within this context, the participants collectively identified and selected the two preferred and suitable varieties for subsequent seed production, with a focus on meeting the specific requirements of the micro-agroecological zone.

- Preservation and Multiplication of Quality Seeds: Quality seeds have now been directly linked to the crop yield. Farmers from the block level have been selected for ensuring preservation, production, and multiplication of quality seeds.

In the long run, the purpose of the CMSCs is to ensure demand driven seed supply to local farmers with less dependence on government subsidies/traders.<sup>36</sup> To conserve local seed varieties and make quality seeds easily accessible to farmers, 230 CMSCs have been set up by WSHGs and FPOs.

Image 7.3: Nursery for PVT Keonjhar



#### Kantomera: An Orange Ragi<sup>37</sup>

A variety that is set apart from other varieties because of its distinct orange colour, Kantomera is preferred by the tribal communities of Gajapati districts not only for its taste and high yield but also due to its climate resilience against cyclones that hit the region in the months of October and November.

Kantomera is one of the indigenous varieties that has been taken up by OMM through its PVT process. Taptapani Farmer Producer Company supported by OMM has undertaken seed multiplication of Kantomera variety to meet the local demand of the variety.

#### 7.2.5. Solar Millet Processing Unit

In August 2021, Odisha's first ever solar millet processing unit was set up in Mohana block, Gajapati. The unit is managed by Taptapani Famer Producer Company (FPC) and facilitated by SACAL. The unit is a result of a multistakeholder support involving OMM, WASSAN and SELCO Foundation.

<sup>36</sup> UNWFP (2021)

<sup>37</sup> GoO (2023a)

Despite facing a severe shortage of electricity in the region, the team remained undeterred in their efforts to establish their own processing unit. Confronted with this challenge, they harnessed their innovation and resourcefulness to find a solution. The innovative answer to this predicament came in the form of a solar processing unit, which not only proved to be cost-effective but also environmentally friendly.

This solar processing unit has significantly contributed to the production of millet flour for both personal consumption and sale in the market. Additionally, it has offered local farmers the opportunity to have their millets processed at a minimal cost, eliminating the need for costly travel to distant processing facilities and simultaneously bolstering business for the Farmer Producer Company (FPC).

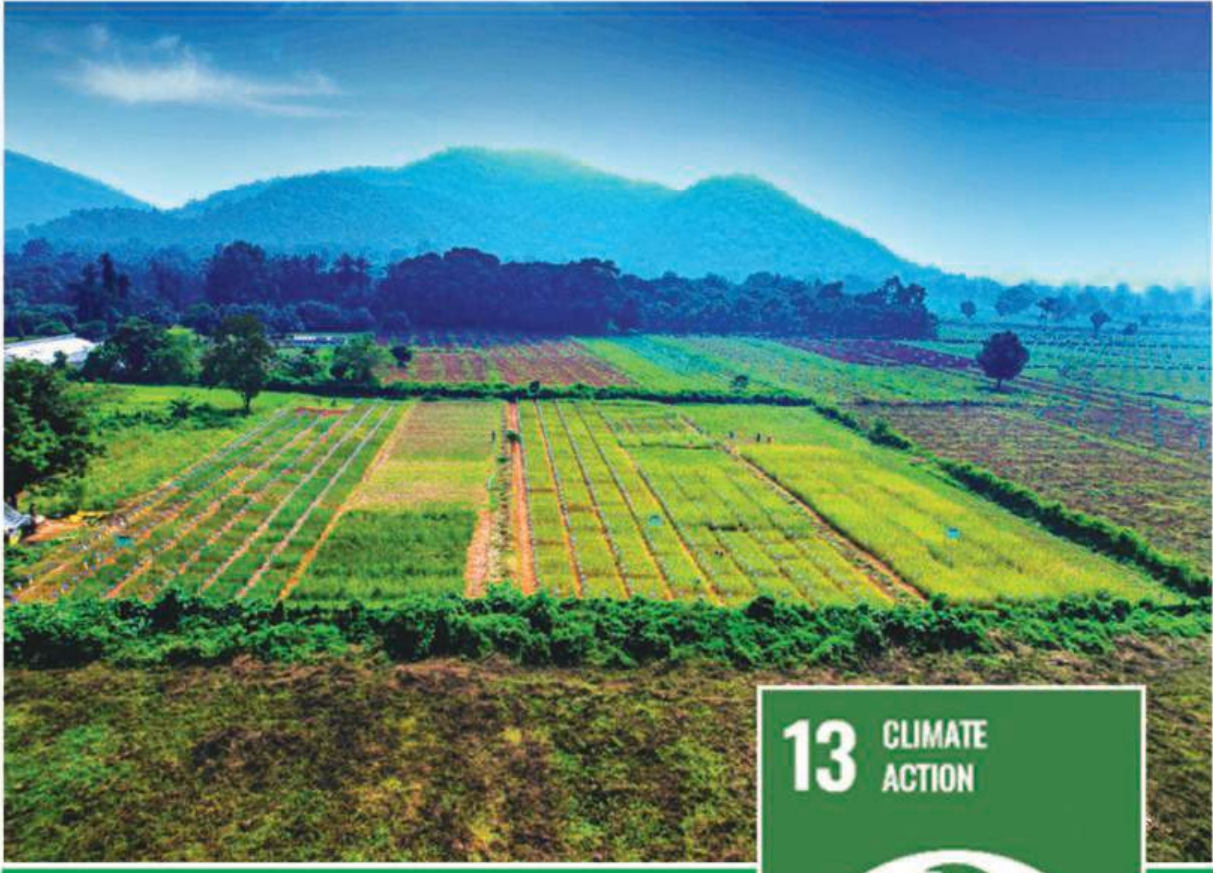
### 7.3. Conclusion

Achieving economic growth and sustainable development demands a radical transformation in resource consumption and production practices. SDG 12 encompasses critical goals, including responsible management of our shared natural resources and improved handling of hazardous waste and pollutants. Agriculture, the largest global water consumer, coupled with chemical-intensive methods, necessitates substantial reform. Concurrently, the surging food production exacerbates the issue of unbridled food wastage, a concern that, if effectively managed, can bolster food security, particularly for vulnerable populations.

Millet cultivation presents a sustainable alternative to resource-intensive crop systems. Renowned for their resource efficiency, millets contribute to the preservation of ecosystem health. OMM has undertaken a comprehensive range of initiatives to promote sustainable millet production. To reduce dependence on chemical fertilizers, the establishment of bio-input units across 19 districts is a pivotal step. Substantial progress has been made in embracing improved agronomic practices, covering 79,556 hectares and benefiting 1,72,367 farmers through initiatives like System of Millet Intensification (SMI), Line Transplanting (LT), and Line Sowing (LS). The adoption of protective irrigation systems enhances responsible water use on farms.

Furthermore, laudable efforts have been made to safeguard and rejuvenate traditional millet varieties, bolster community-based seed management, and propagate multiplication techniques. Community-managed seed centers are now vital for conserving and promoting landraces. These centers play a crucial role in identifying promising millet varieties through Participatory Varietal Trials (PVTs) and subsequently engage in mass selection of the two highest-performing landraces or varieties identified in the trials. They also conduct seed multiplication activities based on demand.

OMM's emphasis on enhancing economic opportunities for vulnerable communities as well as addressing hunger and malnutrition through sustainable agricultural practice of millet cultivation, directly contributes to the objectives of SDG 12, 'Sustainable Consumption and Production'.



# SDG 13: Climate Action

The consequences of climate change and the increasing frequency of extreme weather events have profound implications for all the Sustainable Development Goals (SDGs) and our ability to achieve them. Unfortunately, we are falling behind in our pursuit of the objectives set out in the Paris Agreement, which aim to limit global warming to well below 2 degrees Celsius above pre-industrial levels, with the aspirational target of limiting the increase to 1.5 degrees Celsius. To meet these ambitious targets, we must make substantial reduction in global greenhouse gas emissions by 30 percent and 45 percent, respectively.<sup>38</sup>

The challenges confronting the agriculture sector due to the impacts of climate change have grown more severe, presenting a significant and imminent threat to the global food system. Even though there has been an increase in agricultural productivity worldwide, climate change has impeded this progress over the past five decades (IPCC, 2023). The brunt of climate change's adverse effects will disproportionately affect marginal and small-scale producers. These producers are not only essential for ensuring food security but also play a pivotal role in the transition towards sustainable food systems. The achievement of food and nutritional security is intricately linked to effectively managing climate-related risks, particularly within the agri-food value chain, which is highly vulnerable to extreme weather events.

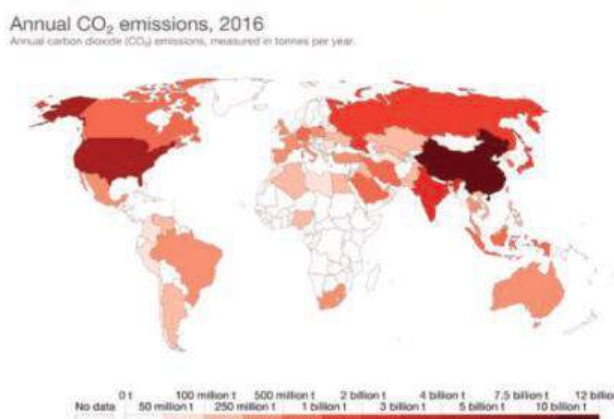
SDG 13, "Climate Action," emphasizes the need for concrete steps to address climate change and its repercussions. This entails taking measures to curtail greenhouse gas emissions, implementing strategies to mitigate the impact of climate change, and mobilizing financial resources for climate-related actions. Climate change has brought about substantial disruptions in weather patterns, ocean conditions, and critical ecosystems, exerting a detrimental impact on life on Earth. These alterations represent a significant threat to the pursuit of sustainable development and the attainment of the 2030 targets associated with the SDGs.

### 8.1. Millets for Climate Action:

While climate change has a substantial impact on agriculture, it is important to recognize that agricultural practices, in turn, exert a significant influence on the climate system over the long term. The current methods employed in agriculture and food systems represent a crucial component of the human-driven factors that contribute significantly to global warming. Agriculture plays a dual role in the context of climate change: it is a source of Greenhouse Gas (GHG) emissions while also acting as a 'sink.' It possesses the potential to both mitigate and adapt to climate change. Therefore, it is imperative to integrate climate-smart agricultural practices into our existing food production systems.

The surging global population's growing food requirements have led to a significant rise in the demand for food production. However, the agricultural sector is contending with adverse impacts stemming from shifts in the climate system. These changes are characterized by

**Figure 8.1: Annual CO<sub>2</sub> Emissions across the Globe**



Source: Global Carbon Project

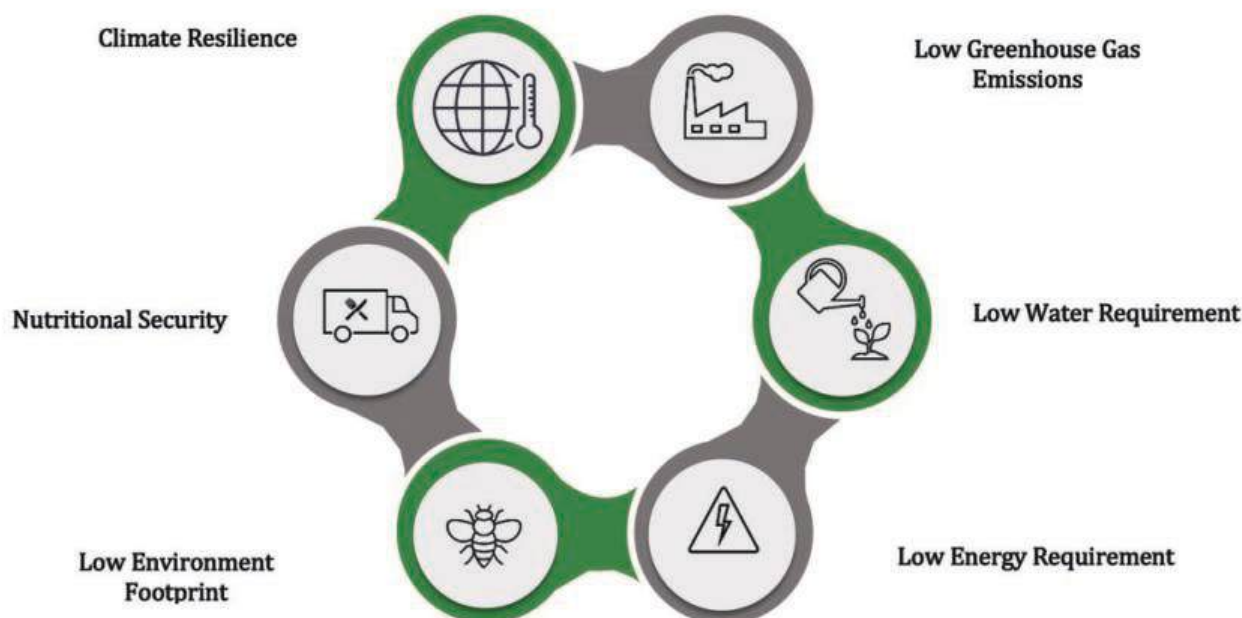
<sup>38</sup> WMO (2023)

increasing temperatures, unpredictable rainfall patterns, the proliferation of invasive species and pests, and a heightened frequency of extreme weather events.

Cereal crops serve as a major source of essential macronutrients, including carbohydrates, fats, and proteins, crucial for global nutrition. However, they also pose a significant global warming potential. Wheat, among the major cereal crops, exhibits the highest global warming potential, estimated at approximately 4 tons of CO<sub>2</sub> equivalent per hectare, followed by rice and maize, which have values of around 3.4 tons of CO<sub>2</sub> equivalent per hectare. These crops also contribute a substantial amount of carbon equivalent emissions, with 1000, 956, and 935 kilograms of carbon per hectare for wheat, rice, and maize, respectively.<sup>39</sup> Despite their relatively higher emission rates, they are extensively cultivated and remain primary sources of nutrition for the global population.

Conversely, the carbon footprints of minor cereal crops such as millets are comparatively lower. Millets not only fulfil people's nutritional requirements but also play a crucial role in adapting to climate change and mitigating its long-term impact. This is a key reason why millets have the potential to be among the crops that can help reduce the global carbon footprint in the world<sup>40</sup>.

Figure 8.2: Role of Millets in combating climate change:



## 8.2. Low Greenhouse Gas (GHG) Emissions:

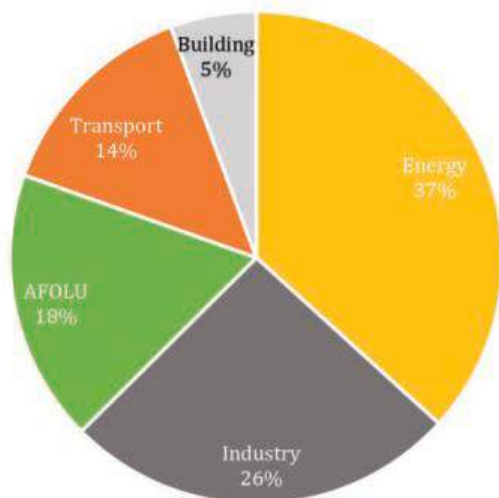
According to the Emissions Gap Report 2022, the world is currently off-track from the trajectory required to limit global warming to 1.5 degrees Celsius. The emissions of Carbon Dioxide (CO<sub>2</sub>) and other greenhouse gases (GHGs) due to human activities represent a fundamental driver of climate change, presenting one of the most pressing challenges facing the world today (IPCC, 2013). Among these gases, CO<sub>2</sub> stands out as the primary greenhouse gas released because of human activities. It is a natural component of the Earth's carbon cycle, which involves the

<sup>39</sup> Jain et al. (2016)

<sup>40</sup> Prasad and Staggenborg (2009)

continuous exchange of carbon throughout the atmosphere, oceans, soil, vegetation, and wildlife. However, human activities are perturbing this carbon cycle by elevating CO<sub>2</sub> levels in the atmosphere and diminishing the natural carbon sinks.

**Chart 8.1: Sector Emissions Trends**

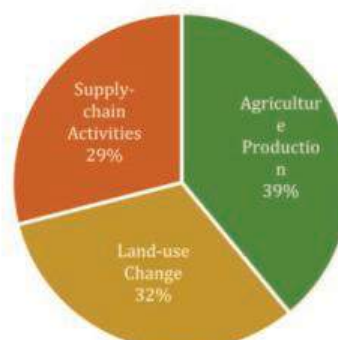


Source: Emissions Gap Report, 2022

A staggering 18 percent of the world’s total greenhouse gas emissions in 2020 originated from Agriculture, Forestry and Other Land Use (AFOLU), contributing to 9.5 GtCO<sub>2</sub>e. The highest contributor was the Energy sector contributing 20 GtCO<sub>2</sub>e, followed by Industry sector contributing 14 GtCO<sub>2</sub>e, making up 37 percent and 26 percent share of the total greenhouse emissions. Transport and Buildings contributed 7.6 GtCO<sub>2</sub>e and 3.1 GtCO<sub>2</sub>e, with 14 percent and 5 percent share in the total.

Agri-food systems play a significant role in not only contributing to climate change but also altering land-use change, causing biodiversity loss, depleting freshwater sources and polluting both terrestrial and aquatic ecosystems. The current food system is responsible for one-third of total greenhouse gas (GHG) emissions, equivalent to 18 GtCO<sub>2</sub>e. The largest share of these emissions, amounting to 7.1 GtCO<sub>2</sub>e, emanates from agricultural production, followed by contributions of 5.7 GtCO<sub>2</sub>e from land-use change and 5.2 GtCO<sub>2</sub>e from supply chain activities. In order to align with the temperature goals outlined in the Paris Agreement, it is imperative to undertake a profound transformation of the current food system. This transformation involves changes in dietary choices and preferences, significant modifications in existing agricultural practices, and a concerted effort to reduce carbon emissions throughout the entire food supply chain.<sup>41</sup>

**Chart 8.2: Food-system Emission Trends**



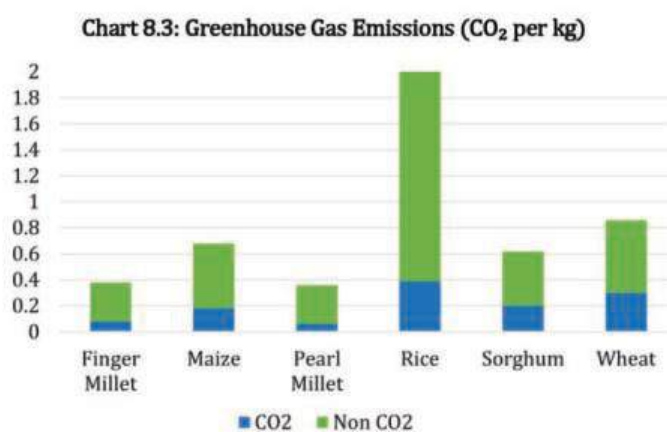
Source: Emissions Gap Report, 2022

Rice cultivation is a significant contributor of emissions within the agriculture sector, particularly in low- and middle-income countries. The tradition method of cultivating paddy, which relies on flooded fields, results in substantial methane emissions. Additionally, the application of synthetic fertilizers in farming results in the release of nitrous oxide, another potent greenhouse gas (GHG). In 2019, N<sub>2</sub>O emissions from soil accounted for 25 percent of

<sup>41</sup> UNEP (2022)

total GHG emissions from agriculture(FAO, 2021), making it the second largest source of emissions within this sector.

Rice is responsible for a significant portion, approximately 12 percent, of greenhouse gas (GHG) emissions within the food sector. It is followed by wheat at 5 percent and sugarcane at 2 percent.<sup>42</sup> Millets have the potential to play a crucial role in reducing GHG emissions. The cultivation and consumption of millets yield several positive environmental impacts that aid in mitigating GHG emissions. Unlike rice, millets do not demand substantial water usage or flooding, resulting in a reduction in methane emissions. Additionally, millets are associated with more sustainable farming practices, leading to significantly lower nitrous oxide emissions. Depending on the specific agricultural practices employed, millet cultivation can also contribute to carbon sequestration in the soil, further bolstering their role in reducing GHG emissions.



Source: White Paper on Millets, 2021

### 8.3. Low Water Requirement:

Climate change and water resources are intricately intertwined, with climate change manifesting various effects on the world's water systems. These effects encompass irregular rainfall patterns, the thinning of ice sheets, rising sea levels, and an increased frequency of both floods and droughts. Notably, one of the consequences of climate change is the simultaneous exacerbation of water scarcity and water-related hazards. The global rise in temperatures has disrupted the entire water cycle, significantly impacting the availability and distribution of water (UN Water).

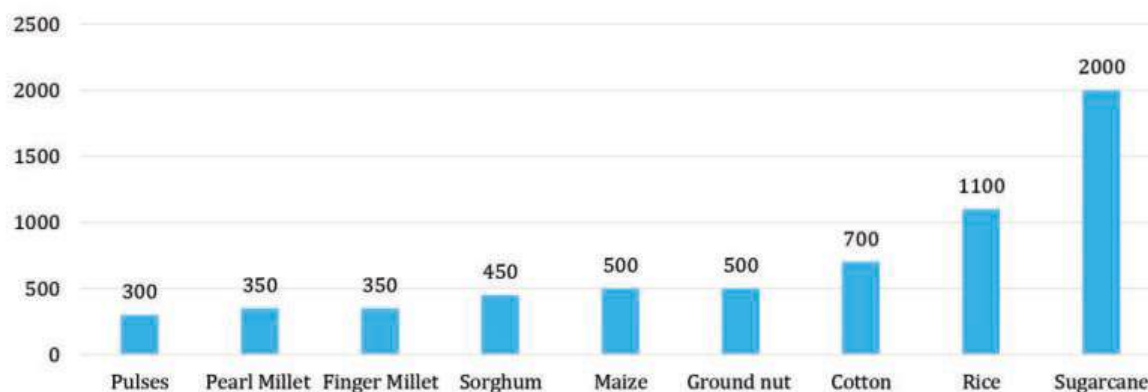
The current state of agricultural production heavily relies on water resources and faces growing vulnerabilities associated with water-related challenges. At present, agriculture accounts for roughly 70 percent of total global freshwater withdrawals (World Bank). Given that the agricultural sector is both the largest consumer of water and a substantial contributor to water pollution, the sustainable and efficient management of water resources within agriculture is pivotal for the long-term sustainability and productivity of the agri-food industry.

Millets have the potential to address the nutritional needs of the expanding population and ensure food security, particularly in times when agricultural productivity is negatively affected by erratic rainfall, rising temperatures, and other consequences of climate change. For example, millets require 70 percent less water than rice.

<sup>42</sup> Xiaoming, X and Jain, A. (2021)

Millets are rain fed and require less labour and capital in comparison to other important cereals. While paddy, the most widely grown crop in Odisha, requires about 1100-1500 mm of water, millets have a much lower water footprint, with pearl and finger millet even requiring less than 350 mm. The increased production of crops with high water requirements, such as rice, sugarcane, and cotton, has led to the depletion of approximately 7191 litres of groundwater per hectare.

Chart 8.4 Water Requirement of various crops (mm)



Source: Food and Agriculture Organisation (FAO)

#### 8.4. Low Energy Requirement:

Modern agriculture requires energy input at every stage of the production process. This involves the direct utilization of energy in tasks like operating farm machinery, irrigation, cultivation, and harvesting. In addition to these direct energy uses, post-harvest activities such as food processing, storage, and transportation to markets also demand energy resources. Moreover, agriculture also depends on various indirect energy inputs, including mineral fertilizers, chemical pesticides, insecticides, and herbicides.<sup>43</sup>

The agri-food chain constitutes 30 percent of the world's overall energy consumption (FAO,2011). In India, the total energy consumption of the agriculture sector is 20 – 22 percent (PIB, 2015). Energy requirements for cereal cultivation exhibit notable regional variations, differing by up to fourfold across the country. These variations arise from differences in water needs, irrigation sources, and groundwater table depths.

Among cereals, rice stands out as the most energy-intensive, whereas millets are the least demanding in terms of energy resources. Rice cultivation contributes to 16 percent of greenhouse gas (GHG) emissions in the context of total energy use, largely due to its substantial methane emissions. The production and use of fertilizers play a dominant role in GHG emissions from all cereal crops, contributing 52 percent to GHGs associated with cereals. Substituting rice with other cereal crops such as millets holds the potential to reduce both energy consumption and GHG emissions.<sup>44</sup>

<sup>43</sup> FAO (2001)

<sup>44</sup> Rao et al. (2019)

Millet, characterized by their unique attributes, have minimal input requirements. They do not necessitate deep ploughing and can be planted using basic tools or machinery. Since millets thrive in arid and challenging environments, primarily relying on rainfall for their growth, they do not demand substantial water resources for cultivation. Millets also do not depend on chemical fertilizers and exhibit resistance to pest attacks and diseases, making organic farming a common practice for their cultivation. Remarkably, despite their modest input needs, millets can yield significant grain harvests in comparison to more widely cultivated crops. Consequently, their energy consumption is notably lower in contrast to other crops.

**Table 8.1: Key production characteristics influencing energy intensity of cereals, 2010:**

Cereal	Total Production (in Million Tonnes)	Fertilizer Input (kgN/ton)	Irrigated Share of Cultivated Area (%)
Finger millet	7	28	10
Maize	22	52	25
Pearl millet	7	28	10
Rice (Paddy)	90 (144)	59	65
Sorghum	7	42	11
Wheat	81	41	86

Source: Rao et al. 2019

### 8.5. Low Environment Footprint:

Agricultural production is a resource-intensive activity that has been linked to adverse environmental consequences. As the demand for food has surged, there has been a significant increase in the use of chemical fertilizers, pesticides, and electricity in agriculture, with a rise of 17.6 percent, 54.1 percent, and 86.3 percent, respectively, observed between 1996 and 2018 (FAOSTAT, 2020). Concurrently, the consumption of water, nitrogen, and phosphorus within the agricultural system has accounted for a substantial portion of the world's total. The global demand for food continues to grow, and to meet this demand, a substantial increase in agricultural inputs will be necessary. Several reports and forecasts indicate that environmental challenges associated with agricultural production are likely to become more pronounced in the future.

Agricultural production is not only a resource-intensive activity but often leads to degradation of natural resources and harms the ecology. It is a primary contributor to soil degradation, leading to issues such as soil depletion, erosion, and alterations in its nutrient composition. The excessive reliance on and use of chemical fertilizers and pesticides have had adverse consequences on soil health and non-target insects. These chemicals seep into the soil, resulting in soil pollution.

Agriculture also stands as a prominent contributor to water pollution. Agricultural activities release substantial quantities of agrochemicals, pharmaceutical residues, sediments, metals, and saline runoff into aquatic ecosystems. Nitrate contamination stemming from farms has emerged as the most prevalent chemical pollutant affecting groundwater aquifers.<sup>45</sup>

<sup>45</sup> FAO & IWMI (2017)

In this context, millets exhibit a remarkably smaller environmental footprint when contrasted with major crops like rice and wheat. They offer a sustainable and health-conscious dietary and production option, marked by their significantly lower ecological impact. The inputs essential for millet production are substantially less in comparison to crops such as rice and wheat. Millets predominantly grow organically, resulting in reduced dependence on chemical fertilizers and pesticides. Despite their lower input requirements, millets boast high productivity, and the implementation of enhanced agronomic practices holds significant potential for further increasing their productivity.

## 8.6. Climate Resilience:

Climate resilience is a fundamental component of managing risks associated with climate change. It refers to the ability of an agricultural system to anticipate, prepare for, adapt to, withstand, and recover from the impacts of climate variations and extreme weather events. Strengthening resilience entails the implementation of both immediate and long-term strategies for climate mitigation and adaptation. The adoption of climate-resilient crops is crucial in addressing the ongoing climate challenges. These crops can endure rising temperatures, adapt to shifting precipitation patterns, and withstand extreme weather events such as droughts and floods.

Promoting the consumption and production of millets is a part of climate adaptation strategies. Millets exhibit high heat tolerance and drought resistance, making them a wise choice for cultivation in a changing climate. Their short growth cycle reduces exposure to weather-related stress. Additionally, millets have low water requirements, rendering them suitable in the face of global water scarcity. These unique qualities make millets an excellent crop for addressing the challenges of climate change as they qualify as climate-resilient crops.

Figure 8.3: Pillars of Climate Smart Agriculture



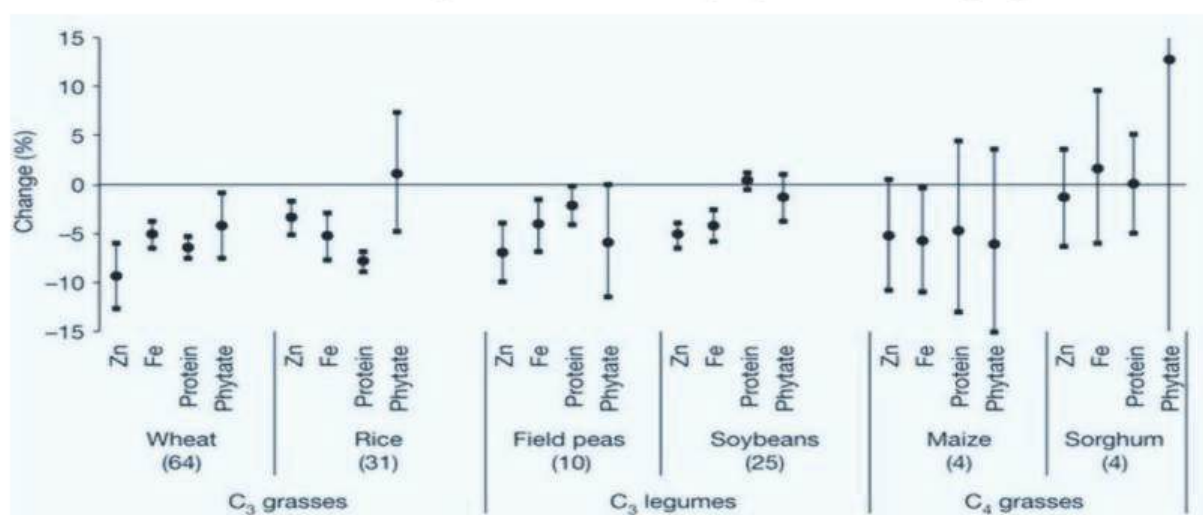
## 8.7. Nutritional Security:

Progress in the global battle against hunger has experienced a notable deceleration in recent years. The Global Hunger Index (GHI) for 2022, at 18.2, falls within the moderate category. Unless there is a substantial shift in our approach, neither the global community nor

approximately 46 specific countries are expected to achieve even a minimal reduction in hunger by 2030, failing to meet the SDG 2 target of zero hunger. The situation is anticipated to worsen further due to the simultaneous convergence of global crises, including conflicts, the impacts of climate change, and the economic repercussions resulting from the COVID-19 pandemic. All of these factors significantly contribute to the prevalence of hunger. This emphasizes the urgent need for transformative actions to address this enduring global challenge. Given the escalating crises, there is an imperative to increase the allocation of resources to address immediate emergencies. Simultaneously, there is a pressing need to overhaul food systems, making them more equitable, inclusive, sustainable, and resilient. This transformation is essential not only for addressing existing crises but also for preventing future.<sup>46</sup>

Increasing consumption and production of millets addresses the issue of food and nutritional security. Due to their climate-resilient characteristics, millets can endure the ongoing climate crisis. They are locally cultivated and boast a significant nutritional value. A transformational shift towards millets consumption and production would play a pivotal role in achieving the SDG 2 'Zero Hunger'.

Chart 8.5: Percent change in nutrients at elevated [CO<sub>2</sub>] relative to ambient [CO<sub>2</sub>]



Source: Myers et al. (2014)

**Note:** Numbers in parentheses refer to the number of comparisons of a particular cultivar for which mean nutrient values are compared with identical cultivars under identical growing conditions except grown at ambient [CO<sub>2</sub>].

C3 grains and legumes have lower concentrations of zinc and iron when grown under field conditions at the elevated atmospheric CO<sub>2</sub> concentration predicted for the middle of this century. C3 crops other than legumes also have lower concentrations of protein. On the other hand, C4 crop (Sorghum) appear to be unaffected or less affected overall.

### 8.8. Odisha and Climate Action:

Odisha, given its geographical attributes, is highly vulnerable to the impacts of climate change. The state's extensive 480 km coastline is often subjected to cyclones originating in the Bay of

<sup>46</sup> Concern Worldwide and Welthungerhilfe (2022)

Bengal. Additionally, Odisha falls within Zone-3 on the earthquake hazard map and is intersected by 11 major river systems, rendering it susceptible to cyclones, earthquakes, and floods. Climate change has the potential to disrupt ongoing development initiatives and further escalate poverty rates. The immediate repercussions of extreme climate-induced events may involve the loss of human lives, livelihoods, assets, and critical infrastructure.

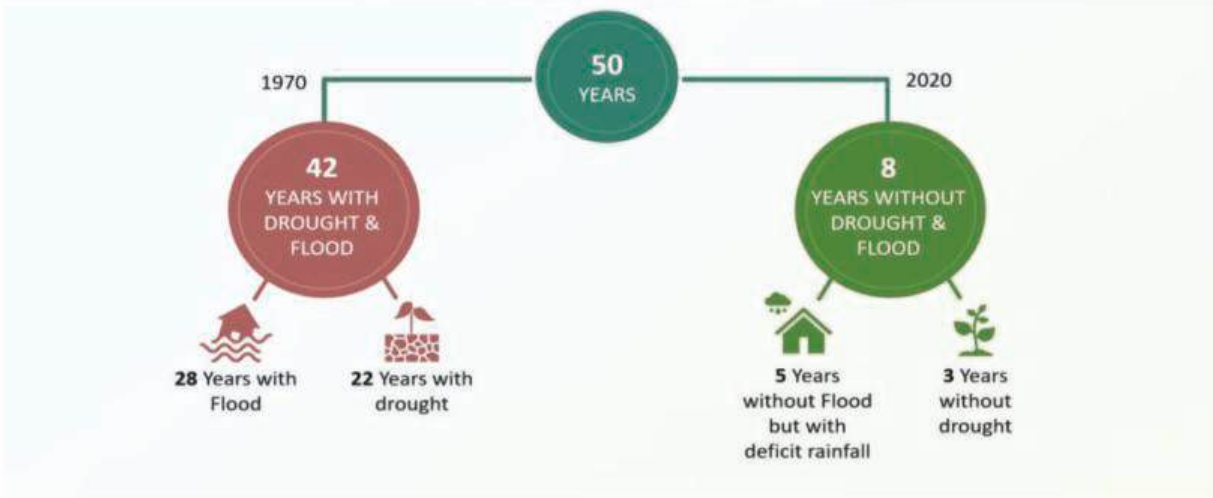
Table 8.2: Carbon footprint in India and Odisha

S. No.	Per capita emission (2010-15)	Per capita emission (2015-20)
Odisha	1.88 MT	2.35 MT
India	1.7 MT	1.9 MT

Source: SAPCC

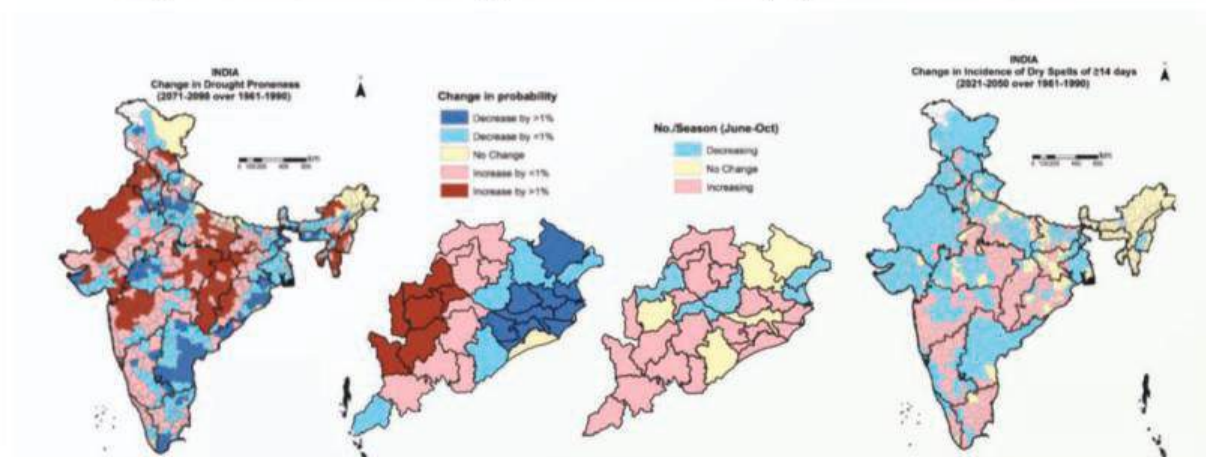
Odisha's overall carbon footprint stands at 98.52 Megatonnes of CO2 equivalent, based on data from the baseline year 2012. Within the state, the agriculture sector alone contributes 25.07 Megatonnes of CO2 equivalent to this carbon footprint. When examining per capita emissions for the state, data from the years 2015 to 2020 reveals a rate of 2.35 metric tonnes per person, which exceeds the national average of 1.9 metric tonnes. This indicates that Odisha has a higher per capita carbon emission level compared to the national average.

Figure 8.4: Situation of Natural Disasters in Odisha



Source: SAPCC

**Figure 8.5: Forecast of Drought Proneness and Dry Spell in India and Odisha**



Source: SAPCC

Recognizing the risks associated with climate change, Odisha has demonstrated a proactive approach in addressing the challenges. It was the first state in the country to formulate the State Action Plan for Climate Change (SAPCC), aligning with the National Action Plan for Climate Change (NAPCC). The SAPCC outlines key priorities for the agriculture sector, including:













- Continuing livelihood-focused, people-centric integrated watershed development programs.
- Establishing an institutional delivery mechanism to promote best practices in climate change mitigation and adaptation.
- Capacity building initiatives.
- Development of water-efficient micro-irrigation methods.
- Establishing automated weather stations and seed banks at the village level.
- Promotion of the System of Rice Intensification (SRI) and stress-tolerant crop varieties.
- Encouraging the adoption of climate-resilient cropping techniques.
- Documentation of Indigenous Technical Knowledge (ITK) in agriculture.
- Implementation of green energy-efficient models.
- Crop diversification efforts.
- Promotion of organic farming practices.

These priorities reflect Odisha's commitment to addressing climate change's impact on agriculture while ensuring the sustainability and resilience of the state's farming systems.

### 8.8.1. Climate Change Cell, A & FE Department:

Recognizing the pivotal role of agriculture as the economic backbone of Odisha and its susceptibility to climate-related risks, the state took a significant step by establishing a Climate Change Cell (CCC) within the Department of Agriculture and Farmers' Empowerment in January 2023. The CCC has been tasked with the vital responsibility of executing and overseeing the Odisha Climate Change Action Plan. This proactive measure underscores the state's unwavering commitment to addressing the detrimental impacts of climate change on its agricultural sector and its firm dedication to bolstering the resilience and sustainability of its farming communities.

**Table 8.3: Major roles and responsibilities of the CCC**

	<b>Climate Finance</b>		<b>Mainstreaming climate change in policy formulation</b>
	<b>Climate Finance:</b> Seek and avail climate finance through project proposal		<b>Action Research:</b> On climate related issues at critical vulnerable areas of the state
	<b>Capacity Building and Awareness Generation:</b> Build capacities of resource persons and generate awareness among farmers		<b>Collaboration and Convergence:</b> With national and international institutions to develop plans, reports, research. (Departments, Ministries, Institutes, etc.)
	<b>Creation of Database:</b> Collect, analyse, quantify GHGs, SDGs, etc. and publish reports for policies.		<b>Policy Recommendations:</b> Mainstreaming climate change/carbon space in the policy framework
	<b>Monitoring and Evaluation:</b> Of the sector specific key activities building resilience in the agriculture production system		<b>Gender Sensitive Approach:</b> Policy support for sustainable gender sensitive adaptation in agriculture sector
	<b>Identify climate change hotspots:</b> Identify agricultural sensitive climate change hotspots. Help identifying climate sensitive, climate proofing and climate resilient innovative approaches to replicate.		<b>Adaptation and Mitigation Strategies:</b> Find out and assess the co-benefits owing to the implementation of the defined adaptation and mitigation pathways in agriculture sector

### 8.8.2. Climate Budgeting:

The formulation and implementation of State Action Plans on Climate Change (SAPCCs) have yielded significant results by identifying priority areas in the state that align with its unique needs and objectives. This process has also been instrumental in pinpointing potential gaps and devising sector-specific interventions to address these challenges effectively. Notable achievements in this regard include the following:

- Odisha's pioneering status in securing two Green Climate Fund (GCF) projects, making it the first state in India to achieve this milestone.
- Odisha's ground-breaking introduction of Climate Change Budget Coding and the publication of an annual Climate Budget document alongside the regular budget. This innovative step aims to provide policymakers with valuable insights into the climate change implications and the significance of public spending across various sectors outlined in Odisha's State Action Plan on Climate Change (SAPCC). It does so through comprehensive budget coding analysis.
- The Climate Change Impact Assessment (CCIA) analysis at the departmental level, included in the Climate Budget for 2023-24, underscores the strong connections between program expenditures and climate change concerns in the Departments of Water Resources, Energy, Agriculture & Farmers' Empowerment, and Forests,

Environment and Climate Change. This indicates promising opportunities for integrating adaptation and/or mitigation measures within these sectors.

- This granular examination of each sector offers policymakers valuable insights into specific areas that require significant attention for climate-proofing and enhancing resilience within Odisha's budgetary framework.<sup>47</sup>

### 8.9. Climate Resilience in Agriculture, Odisha:

The Department of Agriculture and Farmers' Empowerment has implemented a range of climate-smart strategies in response to the challenges posed by climate change in agriculture. These strategies encompass both adaptation and mitigation measures.

- **Adaptation Strategies:** These involve taking proactive steps to prepare for and adjust to the existing impacts of climate change, as well as the anticipated future consequences. Adaptation measures are designed to enhance resilience and reduce vulnerability to climate-related challenges.
- **Mitigation Strategies:** Mitigation strategies aim to reduce or eliminate the risks associated with climate hazards. In the context of climate change, mitigation focuses on efforts to minimize or prevent the emission of greenhouse gases. This can involve the adoption of innovative technologies, the utilization of renewable energy sources, enhancing the energy efficiency of existing equipment, and modifying management practices and consumer behavior to reduce the overall carbon footprint. Mitigation strategies are pivotal in curbing the adverse effects of climate change and promoting sustainability.

**Key interventions towards developing climate resilient agriculture in Odisha include:**

-  Odisha Millets Mission (OMM)
-  Odisha Integrated Irrigation Project for Climate Resilient Agriculture
-  Green Agriculture
-  Crop Diversion Program (CDP)
-  Save Soil Initiative
-  Integrated Farming System (IFS)
-  Harnessing Irrigation Potential
-  Ama Krushi
-  Mukhkyamatri Krushi Udyog Yojana

<sup>47</sup> GoO (2023b)

## 8.10. OMM – A Climate Mitigation and Adaptation Strategy:

The efforts of the Odisha Millets Mission to promote the resurgence of millets, both in agricultural practices and on people's plates, represent a significant step toward the adoption of a sustainable agricultural system. OMM's advocacy for millets aligns seamlessly with broader climate mitigation and adaptation strategies. This multifaceted approach goes beyond meeting the nutritional and food security needs and extends to the goal of reducing environmental carbon emissions and actively addressing the challenges presented by climate change.

Figure 8.6: Change in Gross Cropped Area

“The gross cropped area under non-paddy cereals has increased in 2021-22 by 7.56% over the previous year whereas the crop area under paddy has decreased by 1.5% in the same period because of promotion of millet mission and crop diversification measures by the State” Economic Survey of Odisha 2022-23.



Several OMM interventions are in harmony with the objective of enhancing agricultural productivity while concurrently safeguarding environmental well-being.

Table 8.4: OMM Interventions Safeguarding Environment







	Protective Irrigation		Bio-inputs
	Improved agronomic practices		Conservation and Promotion of Landraces
	Promotion of mixed and intercropping		Promoting consumption of millets

Image 8.1: Farmer using bio-input on millet farm

OMM's commitment to elevating millets to a central role in Odisha's agriculture and food system represents a holistic strategy that transcends conventional agricultural norms. It harmonizes nutritional security, environmental sustainability, and climate resilience, making it a potent instrument for the realisation of both local and global development goals.



### 8.11. Conclusion:

Numerous initiatives are currently underway to reduce carbon emissions and promote actions that facilitate the storage and removal of carbon from the atmosphere. This collective effort has elevated carbon to the status of a valuable economic commodity. Simultaneously, carbon markets have emerged, functioning similarly to traditional financial markets. In these carbon markets, the unit of exchange is a "carbon credit," where one carbon credit is equivalent to one ton of CO<sub>2</sub> emissions. Individuals or entities that take steps to reduce emissions or capture carbon are compensated. Meanwhile, those obligated to reduce their emissions can purchase carbon credits to offset their emissions. This practice is known as "carbon offsetting," which involves compensating for emissions that cannot be entirely avoided by financially supporting others in their efforts to mitigate or sequester greenhouse gases.

Agriculture, Forestry, and Other Land Use (AFOLU) projects are highly regarded in the carbon market, especially in voluntary market, due to their significant social and environmental benefits. These projects are particularly esteemed because they directly impact people's livelihoods and preserve critical ecosystems. Land-based carbon sequestration projects include afforestation, restoration of degraded lands, and agricultural production that promotes the adoption of sustainable agricultural practices related to land and crop management.

As discussed above, millets are significant due to their climate-resilient attributes, which encompass their ability to adapt to a wide range of ecological conditions, reduced irrigation needs, enhanced growth and productivity in low-nutrient environments, decreased reliance on synthetic fertilizers, carbon sequestration capabilities, and minimal vulnerability to environmental stresses. Projects centered around millets hold considerable promise within the domain of carbon trading. With the growing demand and recognition of millets for their health benefits, they offer an enticing avenue for revenue generation in both commodity and carbon markets. Millets represent substantial potential in helping the nation achieve its greenhouse gas emission targets. Simultaneously, they have the capacity to generate income through carbon markets, incentivizing farmers to transition to sustainable agricultural practices by providing an additional income source.



**SDG 17:**

**Partnership for the Goals**

The Odisha Millet Mission stands out as a unique initiative where the Government, Civil Society, and Academia collaborated in the project's conception and development, right from its inception. The Agriculture & Farmers' Empowerment Department (A&FE Dept), the Nabakrushna Choudhury Centre for Development Studies (NCDS), and the Watershed Support Services and Activities Network (WASSAN), in partnership with the Revitalising Rainfed Agriculture (RRA) Network and the Alliance for Sustainable and Holistic Agriculture (ASHA) Network, joined forces to craft a strategy for the revival of millets in Odisha on January 27th, 2016. These deliberations culminated in the creation of a program framework, which paved the way for the announcement of a special programme to promote millets in tribal areas on March 20th, 2016. The program was formally launched in February 2017 and was subsequently rebranded as the Odisha Millets Mission.

Partnerships and collaborations have been fundamental for OMM since its establishment in 2017. The mission has actively engaged with numerous NGOs and community-based organizations (CBOs) to facilitate effective program implementation at the grassroots level. Furthermore, OMM has formed partnerships with research institutes and academic institutions as knowledge and research collaborators, significantly influencing the design and execution of its initiatives. The collaborative approach of OMM has fostered an environment for interdisciplinary knowledge generation concerning millets. Additionally, OMM has established partnerships with both international entities such as the Food and Agriculture Organization (FAO) and the World Food Programme (WFP), as well as national organizations including the Agricultural and Processed Food Products Export Development Authority (APEDA), the Revitalising Rainfed Agriculture (RRRN) Network, the Indian Institute of Packaging (IIP), and the Federation of Indian Chambers of Commerce and Industry (FICCI). These collaborations serve a broader purpose, encompassing research studies, millet trade promotion, product quality testing, and the capacity development of millet farmers and entrepreneurs.

OMM has collaborated with several government departments, including Mission Shakti, Women and Child Development, ST&SC Development, School and Mass Education, Sports and Youth Services, and more, to implement various millet-related interventions in Odisha. These partnerships have fostered entrepreneurship, social inclusion, and economic empowerment among millet farmers. OMM, in conjunction with these departments, has organized numerous promotional events that underscore the health benefits of millets. Additionally, OMM's interventions have spurred conversations on the intersection of climate change and millet cultivation. This approach, aligns with the achievement of Goal 17 of the SDG, emphasizing the importance of partnerships and collaboration for sustainable development.

Goal 17, known as "Partnership for the Goals," seeks to bolster the mechanisms for realizing the SDGs and rejuvenate partnerships to support sustainable development. Partnerships play a pivotal role in the successful implementation of the SDGs and are indispensable for translating agenda into tangible outcomes. Goal 17 specifically emphasizes the need to fortify the means of implementation and cultivate and amplify partnerships with a wide array of stakeholders. The convergence strategies of OMM align with these objectives, emphasizing the significance of collaborative efforts in the pursuit of sustainable development.

Below is a compilation of the key partners collaborating with the Odisha Millets Mission (OMM):

International Partners	National Level partnership	State Level partnership
<ul style="list-style-type: none"> <li>➤ APAARI</li> <li>➤ FAO</li> <li>➤ IFAD</li> <li>➤ WFP</li> </ul>	<ul style="list-style-type: none"> <li>➤ APEDA</li> <li>➤ IIP</li> <li>➤ FICCI</li> <li>➤ RRAN</li> <li>➤ ISB</li> <li>➤ ICAR-IIMR</li> <li>➤ AIIMS</li> <li>➤ CFTRI</li> </ul>	<ul style="list-style-type: none"> <li>➤ Mission Shakti Dept.</li> <li>➤ Women &amp; Child Development Dept.</li> <li>➤ ST&amp;SC Development Dept.</li> <li>➤ School &amp; Mass Education Dept.</li> <li>➤ Sports and Youth service Dept.</li> </ul>

### 9.1 . Key Partnerships at International Level:

#### World Food Programme (WFP)

The Odisha Millets Mission (OMM) and the World Food Programme (WFP) have initiated a long-term partnership in line with the International Year of Millets (IYoM) 2023 initiative. The following chart outlines some of the key anticipated outcomes of this partnership.

Figure 9.1: Some key aspects of partnership between WFP & OMM



As this collaboration is currently in progress, the actual outcomes have not yet been realized. However, over the long term, it is expected that this partnership will culminate in the

development of comprehensive policy documents, advocacy for policy reforms, the creation of climate-resilient food system proposals, and the exchange of knowledge and expertise.

#### **Farmers and Agriculture Organisation (FAO)**

Partnership between the Food and Agriculture Organization (FAO) and the Department of Agriculture and Farmers' Empowerment, Government of Odisha, is currently in progress and focuses on four key areas: Seed System Land Races (SSLR), Climate Green Fund, Migration Multi-Partner Trust Fund, and the Green Earth Project.

The primary objectives of this partnership are as follows:

- **Seed System Land Races (SSLR):** FAO and the department are working together to advance and enhance the millet seed system. This includes activities such as preserving traditional millet land races, improving seed quality, and ensuring that farmers have access to high-quality millet seeds.
- **Green Climate Fund:** The partnership involving the Green Climate Fund emphasizes the promotion of climate-resilient millet cultivation practices and adaptation to the challenges posed by climate change.
- **Migration Multi-Partner Trust Fund:** The inclusion of the Migration Multi-Partner Trust Fund in the partnership indicates a focus on addressing migration-related issues within the context of millet farming and agriculture.
- **Green Earth Project (Seed Value):** The Green Earth Project, particularly the "Seed Value" component, encompasses initiatives related to the conservation and sustainable management of millet seeds.

The Odisha Millets Mission (OMM) has already initiated interventions related to landraces and the promotion of climate-resilient millet cultivation. This partnership is expected to further enhance OMM's ongoing efforts in these areas.

## **9.2 . Key Partnerships at National Level:**

#### **Agricultural and Processed Food Products Export Development Authority (APEDA)**

The Department of Commerce and Industry, Government of India, and the Department of Agriculture and Farmers' Empowerment, Government of Odisha, joined forces to facilitate the inaugural millet export shipment from Odisha to the United Arab Emirates (UAE) through the Agricultural and Processed Food Products Export Development Authority (APEDA). This successful consignment, totalling 975 kg of millet in various forms (grain, rice, and flour), marked a significant achievement. The Mission Shakti Department played a pivotal role in this endeavor, with the coordination of the millet consignment overseen by the Shaktimayee Federation, promoted by the Department.

The collaboration resulted in the following outcomes:

- The export operation was successful, encompassing a variety of millet types, including Kodo, Finger, Foxtail, Little, and Pearl millet.
- 70 Farmer Producer Organizations (FPOs) received comprehensive training on millet export through APEDA at the national level.
- This initiative is poised for significant expansion in the upcoming fiscal year of 2023-24.

### **Indian Institute of Packaging (IIP)**

OMM has initiated a partnership with the Indian Institute of Packaging, focused on standardizing the packaging of millets and millet products. Within this collaboration, OMM has the vision of establishing mini packaging units, led by Women Self-Help Groups and Farmer Producer Organizations, at various locations. Additionally, there are provisions for Startups and Micro, Small, and Medium Enterprises (MSMEs) to set up packaging units with technical support from the Indian Institute of Packaging through MKUY (Mukhyamantri Krishi Udyog Yojana) and Startup Odisha.

The process is currently in progress, and it is expected that numerous standard packaging units will emerge, benefiting from the technical expertise provided by the Indian Institute of Packaging.

### **Revitalising Rainfed Agriculture Network (RRAN)**

The Revitalising Rainfed Agriculture Network (RRAN) established a national-level platform by organizing the 'People's Convention on Millets' at the National Agricultural Science Complex (NASC) in New Delhi. The event, known as "Millets for Millions," was graced by the presence of government officials, farmers, Farmer Producer Organizations (FPOs), Self-Help Groups (SHGs), facilitating agencies (including NGOs/CBOs), and various other stakeholders from all over the country. The event aimed to collaboratively pave the way for civil society, research institutions, enterprises, and government bodies to reintegrate millets into localized food systems.

Sukdeb Silpadia from Koraput was honoured for his substantial contributions to the revival of millets in farming. Around 40 representatives from Odisha actively participated in this convention.

### **Federation of Indian Chambers of Commerce & Industry (FICCI)**

The Department of Agriculture & Farmers' Empowerment has partnered with the Federation of Indian Chambers of Commerce & Industry (FICCI) to commemorate the International Year of Millets 2023. The key objectives of this collaboration include:

- Organizing prelude activities and events in preparation for the International Year of Millets 2023, both in India and abroad.
- Showcasing the achievements and successes of the Odisha Millet Mission.
- Hosting the International Convention on Millets to inaugurate the International Year of Millets 2023.

FICCI is actively working with the Department of Agriculture & Farmers' Empowerment, Government of Odisha, and other committees formed by the State Government to oversee a series of events throughout the year and to provide support in the implementation of all plans related to the International Year of Millets 2023.

### **Council of Scientific & Industrial Research-Central Food Technological Research Institute**

The Central Food Technology Research Institute (CFTRI) is a renowned research institution in India specializing in the field of food science and technology. It plays a pivotal role in various facets of the food industry, encompassing research, development, and the provision of technical support.

The partnership between the Department of Agriculture & Farmers' Empowerment and the Central Food Technology Research Institute aims to support the initiatives of the Odisha Millets Mission (OMM) in the following ways:

- Live demonstrations of millet cultivation by students at the International Convention on Millets.
- Arrangement of various district-level events, such as quiz competitions and cooking contests, conducted in districts like Sundargarh and Gajapati, with additional events planned for the forthcoming fiscal year.

Furthermore, a range of other activities are in the pipeline, including the introduction of millet-themed board games. Through this collaboration, OMM is dedicated to fostering awareness about millets among students by actively involving them in these initiatives.

### Sports and Youth Services Department

OMM and the Sports & Youth Services Department have joined forces to raise awareness and promote millets. Sports is a crucial facet of this collaboration, aligned with the International Year of Millets (IYoM) framework. Within this partnership, the following activities have been executed:

- Millet Tasting Event with the Indian Hockey Men's Team, featuring the introduction of millet-based items into the sports hostel menu at Kalinga Stadium.
- The inauguration of Millet Shakti outlets at Kalinga Stadium and Birsa Munda Stadium.
- Showcasing OMM videos during Hockey World Cup matches.



- Distribution of Millet Gift Hampers to teams and delegates in various hotels.
- A Trophy Tour conducted across all districts, which includes special training sessions combined with millet tasting events at the Kalinga Stadium Sports Hostel.

This collaboration has effectively propelled millet awareness among athletes, international delegates, and the general public. Further activities are in the pipeline to fortify this partnership, maintaining the momentum of millet promotion through sports.

### Scheduled Castes and Scheduled Tribes Research and Training Institute (SCSTRTI)

OMM has entered into a collaboration with the Scheduled Caste and Scheduled Tribe Research and Training Institute (SCSTRTI) to conduct a thorough change detection study, with a specific focus on the dietary practices centered around millets within tribal communities in Odisha.

The primary objectives of this study encompass several facets: examining the dietary habits involving millets, evaluating the factors that drive changes in these practices, documenting traditional millet recipes, assessing their nutritional potential, and exploring millets' role in supplementary nutrition programs and enterprise development.

Through this collaboration, the goal is to produce comprehensive and data-driven documentation including creation of booklets, video documentaries that showcase traditional millet recipes,

human interest stories that emphasize the significance of millet consumption from the perspective of tribal communities, and the establishment of a seed display centre at the Tribal Museum.

### Women and Child Development Department

One of the key objectives within the Odisha Millets Mission was to incorporate millets into supplementary nutrition programs, OMM has undertaken several pilot programs in collaboration with the Women and Child Development Department to achieve this goal.

Image 9.2. Distribution of Ragi Ladoos to school children



Since 2020, a pioneering initiative to provide ragi-based laddoo as an additional serving to pre-school children under the Integrated Child Development Scheme (ICDS) has been piloted and then expanded to universalize its reach, in Keonjhar and Sundargarh districts of Odisha. This program has been extended to serve 1.5 lakh pre-school children across 7066 Anganwadi centers. The active involvement of Women Self-Help Groups (WSHGs) and WSHG Federations has been instrumental in the execution of program activities.

This endeavour is a collaborative effort of OMM with the District Mineral Foundation (DMF) and the Women and Child Development Department. The core objective of this program is to diversify the morning snacks provided at Anganwadi centers by introducing ragi laddoo as an additional serving for pre-school children aged 3 to 6 years.

In Sundargarh district, 60164 pre-school children consume four laddoos per week, encompassing 3809 Anganwadi centers and collaborating with 38 Take Home Ration units (Value Addition Units) managed by WSHGs. Similarly, in Keonjhar district, the initiative spans 19 Take Home Ration Units, covering 3257 Anganwadi centers and serving 84183 pre-school children with two laddoos weekly. Ragi, also known as finger millet, offers nutritional advantages, with over 30 times more calcium and four times more iron than polished rice, as well as increased fiber, minerals, and antioxidants.

Beyond the nutritional benefits, this initiative contributes to the livelihood and economic empowerment of 59 WSHGs involved in cleaning and millet-based processing enterprises. To uphold quality and hygiene standards, a ragi processing unit, complete with a grader-cum-aspirator and destoner, has been established at the community level with funding support from the DMF.

Furthermore, in addition to the initiatives mentioned earlier, a pilot program involving the provision of Little Millet Khichdi for pre-school children and Ragi-based take-home ration for pregnant and lactating mothers has been launched in the Mathili and Laxmipur blocks of the Malkangiri and Koraput Districts, respectively.

### Mission Shakti Department

The partnership between the OMM and the Mission Shakti Department has been in effect since the very inception of the program. In the year 2022-23, Mission Shakti joined hands with OMM in commemorating Mandia Divas and organizing key events such as Millet Mother gatherings and millet cooking competitions.

The Women SHGs of Mission Shakti play a pivotal role in the preparation of millet-based food items and the promotion of enterprises focused on millet-based food services, across Odisha.

Mission Shakti's contribution is particularly notable for their role in coordinating the first millet export shipment from Odisha this year.

### Hotels and Restaurant Associations (RAO) of Odisha

In line with its mission to promote millets in cafes and restaurants throughout Odisha, OMM organized a millet-focused gathering in collaboration with the Restaurant Association of Odisha (RAO). This event took place on October 31<sup>st</sup>, 2022 and saw the participation of over 20 members from RAO.

During the gathering, a diverse array of delectable millet-based dishes, including khichdi, sandwiches, brownies, soups, and ladoos, were thoughtfully prepared by Women Self-Help Groups associated with Mission Shakti.

Popular eateries such as BOCCA Cafe, Cafe Sundowner, Oberai Bakery, and Michael's Kitchen actively participated in celebrating Mandia Divas on November 10<sup>th</sup>, 2022. On this occasion, they included millet-based dishes in their menus for the day, effectively contributing to the promotion of millets among their cherished customers.

Image 9.3 Women SHG run Foodservice Enterprises



Image 9.4. Millet Recipe Training for Chefs



## **Bhubaneswar Municipal Corporation (BMC)**

OMM collaborated with the Bhubaneswar Municipal Corporation (BMC) to raise awareness about the health benefits of millets and other themes related to the International Year of Millets (IYoM).

Several activities were conducted, including the creation of wall paintings in schools, parks, and hospital areas. During Mandia Divas 2022, hoardings were prominently displayed, and announcement vans were mobilized across Bhubaneswar to promote Odisha Millets Mission and Mandia Divas 2022.

There are also ongoing discussions about establishing a Millet Shakti outlet in the BMC vending zone.

## **Bhubaneswar Development Authority (BDA)**

OMM collaborated with the Bhubaneswar Development Authority (BDA) to create awareness about millets among urban residents of Bhubaneswar through BDA park events.

These activities included the successful organization of park events in two phases, as well as BDA's participation in the International Food Festival at DotFest. During the festival, a Millet Shakti stall was set up in collaboration with Michael's Kitchen, offering both Odia and international fusion cuisine to visitors. Millet Shakti stalls were also established during BhuFeSto, contributing to the broader goal of millet promotion among urban communities.

### **9.4. Partnerships at District and Block Level:**

OMM has successfully onboarded several non-governmental organizations (NGOs), designated as Facilitating Agencies (FAs), through a transparent Expression of Interest (EOI) process. These Facilitating Agencies work closely with the local millet farmers, focusing on enhancing their knowledge and skills, planning and coordinating programme implementation, and overseeing the achievement of both physical and financial objectives of the programme, at the grassroots level.

Further, numerous events aimed at raising awareness and promoting millets for broader outreach and inclusion have been organized by OMM at district and block levels. In the year 2022-23, a comprehensive series of events was strategically planned across 19 districts and 143 blocks. These multifaceted events included millet-themed quiz competitions, cooking contests featuring millet-based recipes, millet tasting sessions hosted in diverse venues, including government offices, educational institutions, healthcare facilities, fitness centers, yoga studios, industry associations, restaurants, hotels, and even sporting events. These promotional initiatives extended to collaborations with Panchayati Raj Institutions that celebrated the significant role of 'millets in motherhood'. By March 2023, OMM had successfully engaged with over 30,000 individuals through events associated with the International Year of Millets (IYoM).

### **9.5. Partnership for Promotional Events:**

OMM has organized numerous events in collaboration with various government departments, national and international organizations, all aimed at stimulating discussions around millets across various sectors. These events have garnered an impressive number of participants. The table below provides a comprehensive overview of the collaborative events that OMM has successfully organized up to the year 2022-23.

Table 9.1: Promotional events organized in collaboration with various organizations in 2022-23

Event	Outreach	Collaboration
Millet inclusion event at BOCCA café	100	RAO/ Bocca café
Millet food testing event at Kalinga Stadium, Bhubaneswar	120	Department of Sports and Youth Services
Millet-based food testing with Indian hockey team at Kalinga Stadium, Bhubaneswar	40	Department of Sports and Youth Services
Millet food tasting and millet inclusion plan with RAO at BOCCA Café	20	Restaurant Association of Odisha
Celebration of Mandia Divas	800	FAO, WFP, Mission Shakti Department, OUAT
Inauguration of Milet Café at Kalinga Stadium, Bhubaneswar	10000	Department of Sports and Youth Services
Odisha Millet Mission tableau at State Republic Day	1000	Department of General Administration
Millet Exhibition and Food Stalls at Paschima Odisha Krushi Mela	2500	FICCI
Fan Village Park stall at Kalinga Stadium during Hockey World Cup	5000	Department of Sports and Youth Services
Millet stall at International Food Festival at Bhubaneswar	4500	Bhubaneswar Development Authority
Millet food stall at City Fest, Rourkela	2000	Rourkela Municipal Corporation
Humble Millets: Hope for future during Krushi Odisha	500	WFP, IIMR, IFAD, FAO & NITI Aayog
Millet for Millions: RRA People's Convention	800	RRAN
Millet mother events	7300	H&FW, WCD, Department of Mission Shakti
Quiz competition	2310	School & Mass Education, Department ST & SC Development
Millet cooking competition	1500	WCD, Department of Mission Shakti, H&FW
Millet and Sports event	1500	Sports and Youth Services Department, Department of School and Mass Education

Source: Draft OMM Annual Report, 2022-23

## 9.5. Conclusion:

Since its establishment in 2017, the Odisha Millet Mission (OMM) has consistently demonstrated a steadfast commitment to building partnerships and collaborations across a wide spectrum. These strategic partnerships have played a pivotal role in shaping the mission's interventions and achieving its multifaceted objectives. OMM's partnership approach significantly contributes to the fulfilment of SDG 17 (Partnership for the Goals) in the state of Odisha.

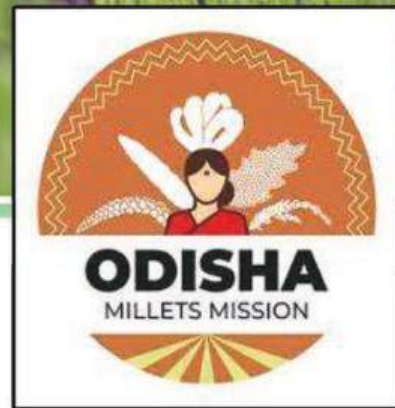
On the international front, OMM has forged partnerships with organizations such as the World Food Programme (WFP) and the Food and Agriculture Organization (FAO). These collaborations are focused on advocating for policy changes, promoting resilient food systems in the face of climate challenges, and strengthening millet seed systems. The potential impact of these partnerships is substantial and holds the promise of bringing about transformative change in the millet sector.

At the national level, OMM has worked closely with entities like the Agricultural and Processed Food Products Export Development Authority (APEDA) and the Indian Institute of Packaging (IIP). These collaborations have been instrumental in facilitating millet exports and ensuring standardized packaging. The overarching aim is to enhance market linkages and elevate the quality of millet products.

The mission's engagement with various government departments, including Mission Shakti, Women and Child Development, School and Mass Education, Sports and Youth Services, and more, has yielded a host of benefits. These partnerships have not only fostered entrepreneurship and economic empowerment but have also contributed to the integration of millets into school curricula, nutrition programs, and sporting events. These initiatives align seamlessly with the broader vision of mainstreaming millets into local food systems.

OMM has also partnered with organizations like the Federation of Indian Chambers of Commerce & Industry (FICCI), research institutions, and academic bodies to celebrate the International Year of Millets 2023 and highlight its noteworthy accomplishments. Additionally, collaborations at the district and block levels have effectively facilitated awareness campaigns, quiz competitions, cooking contests, and millet-themed events, actively engaging thousands of individuals. These initiatives have played a pivotal role in disseminating knowledge about the nutritional benefits of millets and in promoting their consumption.

OMM's extensive network of partnerships and collaborations, spanning local, national, and international levels, has been instrumental in advancing its goals. These partnerships exemplify the potency of collective action in the pursuit of sustainable and inclusive development, ultimately benefiting both millet farmers and consumers alike.



# Way Forward

Millets are poised to play pivotal role as we confront increasing vulnerabilities driven by climate change. The Odisha Millet Mission, through its innovative initiatives, has spearheaded transformative efforts which are bringing positive changes in the livelihoods of millet farmers in the state. To sustain and further enhance this momentum and effectively address emerging issues, it is imperative to consider the following policy and strategic interventions as next steps.

#### **10.1. Sustainable Intensification with Climate-Smart Practices**

- A wider menu of sustainable agronomic practices including crop rotation, intercropping, increasing diversity of millets and seed varieties, reduction in tillage, use of cover crops, integrated nutrient and pest management practices will be developed adopting Package of Practices approach.
- Interventions related to identifying and promoting local millet varieties will be intensified towards conservation and diversification of the millet gene pool across the state through establishment of gene banks.
- Integrated water resource management practices shall be further strengthened to ensure efficient water usage in agriculture.
- Use of chemical fertilisers and pesticides will be monitored meticulously with a view to gradually transition towards the use of organic inputs.
- For leveraging organic production of millets with organic certification process, required backward and forward linkages will be established and capacity of millet farmers will be developed.

#### **10.2. Diversifying the Millets Basket**

- To foster a more balanced and sustainable approach and to deter the mono-cropping of finger millets, the production, consumption and marketing of other millet varieties in the state will be encouraged.
- This will be achieved through the implementation of incentive mechanisms, comprehensive Information, Education, and Communication (IEC) campaigns, capacity building efforts, as well as technical and marketing support.

#### **10.3. Boosting Marketing and Trade of Millets**

- A robust market intelligence support system shall be established to support producers and entrepreneurs connect with markets for realizing competitive price for millets.
- An appropriate incentive framework that encourages the private sector to promote millets as the premier cereals both in national and international markets shall be developed.
- While finger millet farmers have benefited from access to government procurement at MSP, similar support shall be expanded gradually to cover other millet crops in the state.
- Segmentation and profiling of the consumers followed by bespoke marketing strategy will be undertaken for making a strategic shift from 'millets as a poor man's food to millets as a food for healthy lifestyle' through appropriate measures.
- State-led research and development (R&D) investment will be directed towards diversifying the value-added millets products for national and international markets through packaging innovations.

#### 10.4. Remunerative Prices for Marketable Surplus of Millets

- Procurement of marketable surplus of millets at Minimum Support Price (MSP) by government agencies and private traders after meeting the household consumption requirements will be done through a transparent and technology driven process with appropriate digital and agri-tech solutions.
- Efforts shall be made to drive the procured grains in government delivery channels like PDS, ICDS and MDM, etc. for ensuring food and nutrition security, particularly among children and women.

#### 10.5. Millets and Circular Economy

- Adopting circular economy practices can improve millet's economic viability and environmental benefits. For instance, refining techniques to extract maximum value from each fraction of the grain and cycle it back into production processes or new products will be important.
- Building integrated biorefinery systems that efficiently utilize millet by-products can create eco-friendly closed-loop systems. Leveraging millet's unique properties through novel uses of its multi-faceted by-products can support sustainable development goals.
- Millet processing generates multiple by-products that align well with circular economy principles of resource efficiency, recycling, and sustainability.
- The bran, hulls, starch and flour fractions can be utilized in various industrial applications rather than wasted. Millet's suitability for varied by-product applications highlights its potential within a circular economy context.

#### 10.6. Galvanizing Popular Imagination around Millets through Social Media

- Millets shall be promoted on lively consumer forums/platforms through internet and social media with support of media professionals.
- Participatory food carnivals shall be periodically organised around millets where cooking, eating and other fun-filled activities for both adults and children shall be featured to draw people in.
- Mass media promotional campaigns on healthy eating centred around millets shall be multiplied in partnership with media houses, corporate organisations and other agencies.

#### 10.7. Strengthening the Human Capital base of Millet Farmers with focus on Women Farmers

- A suitable strategy shall be developed to promote digital and financial literacy among millet farmers with particular emphasis on women.
- Participatory machinery development for drudgery reduction and participatory digital technology adoption will be undertaken from gender perspective. Capacities of different farm implements, post-harvest and processing machineries shall also be relooked from the gender adoption.

- Gender sensitive processes and innovative approaches will be adopted for ensuring women empowerment across different millet value chains.
- Skill development initiatives shall be expanded to provide training on sustainable agronomic practices, efficient irrigation methods, use of appropriate farm machinery and use of mobile apps for weather forecasting among other relevant skills.

#### **10.8. Enhancing Social Protection of Millet Farmers**

- Access of millet-farming households to social protection floors such as pensions, insurance, scholarships, etc. shall be expanded in convergence with respective government departments through convergence approach.
- Using appropriate eligibility discovery engines, millet farmers shall be linked to entitlements available under different schemes and programmes of the government.

#### **10.9. Adopting Data Driven Approach for Monitoring and Evaluation**

- A comprehensive and context-specific data repository will be developed to enable the implementation of data-driven and finely tailored solutions on the ground.
- Individual level farm and farmers traceability through new technologies and platforms will be developed for maximising the return on investment (ROI) for individual farmers.

#### **10.10. Stakeholder Engagement and Policy Feedback Mechanism for Promotion of Millets**

- Effective stakeholder engagement through coordination with NGOs/Civil Society Organisations (CSOs) and establishment of a Coordination Group for feedback on policy implementation will be undertaken.
- Close-loop feedback from ground practice to policy mechanism will be incorporated through regular dialogues with concerned stakeholders.

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## Annexure

### List of Sustainable Development Goals and Targets linked to Odisha Millet Mission

Goal 1: No Poverty	
No. of Targets in Goal 1: 7	
1.1	By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than \$1.25 a day.
1.2	By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions.
1.3	Implement nationally appropriate social protection systems and measures for all, including including floors, and by 2030 achieve substantial coverage of the poor and the vulnerable.
1.4	By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance.
1.5	By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters.
1.b	Create sound policy frameworks at the national, regional and international levels, based on pro-poor and gender-sensitive development strategies, to support accelerated investment in poverty eradication actions.
Goal 2: Zero Hunger	
No. of Targets in Goal 2: 8	
2.1	By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round.
2.2	By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older person.
2.3	By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment
2.4	By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality
2.5	By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed
2.a	Increase investment, including through enhanced international cooperation, in rural infrastructure, agricultural research and extension services, technology development and plant and livestock gene banks in order to enhance agricultural productive capacity in developing countries, in particular least developed countries
Goal 3: Good Health and Well-Being	
No. of Targets in Goal 3: 13	
3.4	By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being

Goal 5: Gender Equality	
No. of Targets in Goal 5: 09	
5.1	End all forms of discrimination against all women and girls everywhere
5.5	Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life.
5.a	Undertake reform to give women equal rights to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources, in accordance with national laws
Goal 8: Decent Work and Economic Growth	
No. of Targets in Goal 8: 12	
8.2	Achieve higher levels of economic productivity through diversification, technology upgrading and innovation, including through a focus on high value added and labour-intensive sectors.
8.3	Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-small-and medium-sized enterprises, including through access to financial services
8.4	Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-year Framework of Programmes on Sustainable Consumption and Production, with developed countries taking the lead
8.5	By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value.
Goal 12: Sustainable Consumption and Production	
No. of Targets in Goal 12: 11	
12.2	By 2030, achieve the sustainable management and efficient use of natural resources
12.7	Promote public procurement practices that are sustainable, in accordance with national policies and priorities
12.8	Promote public procurement practices that are sustainable, in accordance with national policies and priorities
12.a	Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production
Goal 13: Climate Action	
No. of Targets in Goal 13: 5	
13.1	Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries
13.2	Integrate climate change measures into national policies, strategies and planning
13.3	Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning
13.b	Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities
Goal 17: Partnership for the Goals	
No. of OSIF 2.0 Indicators: 19	
17.11	Significantly increase the export of developing countries, in particular with a view to doubling the least developed countries' share of global export by 2020.



