

Mid Term Evaluation of “Special Programme for Promotion of Millets in Tribal Areas of Odisha” (Odisha Millets Mission, OMM) Phase-I Blocks

Koraput District



Submitted to-



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Green India



Abbreviations

CBOs:	community-based organisations
CRPs:	Cluster Resource Persons
CSOs:	Civil Society Organisations
DAFP:	Directorate of Agriculture and Food Production
FAO:	Food and Agriculture Organisation
FAs:	Facilitating Agencies
FPC	Farmer Producer Company
FPO	Farmer Producer Organisations
GP:	Gram Panchayat
HSC:	High School Certificate
ICDP-CC:	Integrated Cereals Development Programmes in Coarse Cereals based Cropping Systems Areas
IFS:	Integrated Farming System
INSIMP:	Initiative for Nutritional Security through Intensive Millets Promotion
LS:	line sowing
LT:	line transplanting
MFP:	Minor Forest Produce
MGNREGS:	Mahatma Gandhi National Rural Employment Guarantee Scheme
MMA:	Macro Management of Agriculture
MT:	Metric Tonne
NAPCC:	National Action Plan on Climate Change
NCDS:	Nabakrushna Choudhury Centre for Development Studies
NMSA:	National Mission for Sustainable Agriculture
NPM:	Non-pesticide Pest Management
OMM:	Odisha Millets Mission
PCPDC:	Per Capita Per Day Consumption
PDS:	Public Distribution System
RADP:	Rainfed Area Development Programme
RKVY:	Rashtriya Krishi Vikas Yojana
SC:	Scheduled Caste
SMI:	systemic millets intensification
ST:	Scheduled Tribe
WASSAN:	Watershed Support Services and Activities Network

Chapter-I: Introduction

1.1 Background

History of millet is as old as the food history of human civilisation. There is evidence of millet cultivation in the Korean Peninsula dating back to the Middle Jeulmun Pottery Period (around 3,500–2,000BC). In India, millets have been mentioned in some of the oldest Yajurveda texts, identifying foxtail millet (*priyangava*), Barnyard millet (*aanava*) and black finger millet (*shyaamaka*), thus indicating that millet consumption for human food is as old as Indian Bronze Age (4,500BC).¹ It's mentioned in the Bible as one of the grains used to make bread. In ancient China, millet was one of five sacred grains and the Chinese believed that it was brought from the heavens by Houji or "Lord Millet," a culture hero worshiped as the founding ancestor of farming. In Europe, millet formed an important part of the daily diet during the Roman Empire, however lost relevance during Middle Ages in the name of inferior foods and poor men's foods.² Martin Jones, in his research work "Origin and Spread of Millets" notes that millets became common in North China heartland around 7500 years ago and later on these millets travelled from North China to Central Asia and Europe and South through Thailand to India through nomadic shepherds.³

Millet is an imprecise English term applied to a large number of smaller-grained, largely tropical cereals that are often distantly related. Millets tend to be small-seeded cereals, i.e., distinct from wheat, barley, oats, rice, and maize. The most important types are pearl, finger, proso, and foxtail millets; other types of local significance include kodo, little, barnyard, and fonio millets, and teff.⁴ In India, different types of millets continued to be a significant part of adivasi / tribal communities' diets in different parts of the subcontinent until the large-scale promotion of wheat and paddy through the green revolution. Millets were the staple grains of large sections of the population that did not have access to assured irrigation for their lands.⁵ Considering the simple cultivation process of millets, most often millet cultivation is ridiculed as 'lazy farmer's crop' because the usual process of cultivation does not require much technical process and inputs for its fruitful harvest. Simply the seeds are broadcasted and harvested after three months. Similarly, there is also social stigma associated with millet consumption as poor man's food.

1.2 Increased Relevance of Millet Production and Consumption

Despite societal discouragement for millet production and consumption, millets are nutritionally superior food which contain rich micronutrients compared to rice and wheat. Millets are rich in minerals like iron, magnesium, phosphorous and potassium. Finger millet is the richest in calcium content, about 10 times that of rice or wheat. In this fashion, nutrient to nutrient, every single millet is extraordinarily superior to rice and wheat and therefore can be considered as the solution for the malnutrition that affects a vast majority of the Indian population.

¹ ICRISAT Official website

² <https://foodprint.org/real-food/millet/>

³ Jones, Martin (2016): " Food Globalisation in prehistory: The agrarian foundations of an interconnected continent", Journal of the British Academy, Vol-4, PP 73-87

⁴ M.I. Gomez, S.C. Gupta, in Encyclopedia of Food Sciences and Nutrition (Second Edition), 2003

⁵ <https://themillet.org/a-brief-history-of-millets/>

As per one report of the FAO, historically India is the largest global producer of millets. However, during last two decades, the importance of millet as food staples, has been declining in India owing to rising income of the people, growing urbanization, and government policies. More than 50.0% of the millet production is currently finding its way into alternative uses as opposed to its consumption only as a staple.⁶ In recent years, in Europe and North America, millets are gaining prominence as staple food owing to their gluten-free and hypoglycaemic properties. As per the UN Food and Agriculture Organization's data, agriculture accounts for 70% of total water consumption among these sectors. It is highest for Asia and Africa where agriculture is in primary sector of economy. Among agricultural crops, rice and wheat are staple food in large parts of globe. However, these crops like paddy and wheat are water intensive and are unlikely to be sustainable, as freshwater resources are depleting around the globe. Millet grows easily in dry climate, have smaller harvesting period and require minimal water quantity. Millets could be a sustainable alternative to rice and wheat, as a new staple food. It can also help in providing food security to large population in the coming years. Given the nutritional value associated with millets and its climate resilient capacity there is growing emphasis on millets consumption as well as production. Despite decreased popularity of millets during past decades, continuation of millet cultivation is reemphasized in recent years owing to its historical versatility, resilience in difficult environments, nutritional properties and health benefits, long storage life and economic potential.⁷

1.3 Emphasis towards Millet Production in India

Nearly 60 percent of India's cultivated area is rain-fed, the damage caused by climate change is huge in the agriculture sector. In order to save the farmers from climate stresses, there is imperative need of promotion of climate smart agricultural practices among the farmers. Cultivation of millets is considered to be as one of the climate smart agricultural practices.⁸ In order to increase millet production in the country, Govt. of India has taken several initiatives under different policies formulated from time to time. The important policies in this regard include Initiative for Nutritional Security through Intensive Millets Promotion (INSIMP) and Rainfed Area Development Programme (RADP) which are part of Rashtriya Krishi Vikas Yojana" (RKVY), and Integrated Cereals Development Programmes in Coarse Cereals based Cropping Systems Areas (ICDP-CC) under Macro Management of Agriculture (MMA). Besides, the National Mission for Sustainable Agriculture (NMSA) adopted by Department of Agriculture & Cooperation, Ministry of Agriculture Government of India in 2014, has the objective of enhancing agricultural productivity especially in rainfed areas focusing on integrated farming, water use efficiency, soil health management and synergizing resource conservation. The programme has a mandate of improving millet production in the country. NMSA derives its mandate from Sustainable Agriculture Mission which is one of the eight Missions outlined under National Action Plan on Climate Change (NAPCC). NMSA aims at promoting sustainable agriculture through a series of adaptation measures focusing on ten key dimensions encompassing Indian agriculture namely; 'Improved crop seeds, livestock and fish cultures', 'Water Use Efficiency', 'Pest Management', 'Improved Farm Practices',

⁶ Rao, P. P. and Basavaraj, G. (2015). Status and prospects of millet utilization in India and global scenario, Millets: Promotion for Food, Feed, Fodder, Nutritional and Environment Security, Proceedings of Global Consultation on Millets Promotion for Health & Nutritional Security. Society for Millets Research, ICAR, Indian Institute of Millets Research, Hyderabad, Pp. 197-209.

⁷ Apetrei, Cristina (2012), "Food Security and Millet Cultivation in the Kumaon Region of Uttarakhand", Research Report for Gene Campaign, August 2012.

⁸ Behera, Manoj. (2017). Assessment of the State of Millets Farming in India. MOJ Ecology & Environmental Science. 2.

‘Nutrient Management’, ‘Agricultural insurance’, ‘Credit support’, ‘Markets’, ‘Access to Information’ and ‘Livelihood diversification’.⁹

1.3.1 Intensive Millet Promotion (INSIMP)

The Central government launched the Initiative for Nutritional Security through Intensive Millet Promotion (INSIMP) in 2011-12 to promote millets as “nutri-cereals”. The scheme aimed at increased production of millets in the country. The scheme proposed to bring 0.5 million hectares (ha) under millet cultivation. A key feature of INSIMP is giving input kits, comprising urea and pesticides; costing Rs 2,000-3,000 depending on the type of crop; and seed kits, comprising hybrid seeds to the farmers. These kits are supplied by nodal agencies in a state, and are, in turn, procured from various manufacturers. The other key aspects of the scheme such as the post-harvest handling of millets, involving establishment of processing and value-addition units were also taken into consideration. Composite millet processing centres, that handle de-stoning, de-hulling, flaking and rava- making, were planned to be established across millet producing areas in the country. The scheme has been implemented since Kharif 2011. As per the scheme provisions, Technology demonstrations in compact blocks were organized in selected districts for four categories of millets – Sorghum, Pearl millet, Finger millet and small millets. Technology demonstration kits of critical inputs of nutrients and plant protection measures comprising of micro-nutrients, fungicides and bio-fertilizers, DAP, urea, potash and pesticides including weedicides at a total cost of Rs. 3,000/- per ha for sorghum, pearl millet and finger millet and Rs. 2,000/- per ha for small millets would be supplied to all the farmers in the units. These kits would be supplied free of cost to the beneficiary farmers subject to maximum area of 2 hectare.

1.3.2 National Mission for Sustainable Agriculture (NMSA)

National Mission for Sustainable Agriculture (NMSA) has been formulated for enhancing agricultural productivity especially in rainfed areas focusing on integrated farming, water use efficiency, soil health management and synergizing resource conservation.

1.3.3 Rainfed Area Development Programme (RADP)

RADP put forward a holistic approach to rainfed area development through the promotion of rainfed farming systems and by focusing on the needs of small and marginal farmers through integrated farming practices, assistance to farmers in improving the productivity of existing cropping patterns and in diversifying production. Support to millets was only one component amongst its programme components. Similarly, millets through MMA under ICDP-CC being a sub-category had limited reach. As a part of the Rashtriya Krishi Vikas Yojana (RKVY), RADP aims at Developing and identifying new areas receiving adequate rainfall for millet farming. Implementation of RADP has been taken up since 2014-15. Rainfed Area Development Programme (RADP) is one of the four components of National Mission for Sustainable Agriculture (NMSA). RADP involves an area-based approach for development and conservation of natural resources along with appropriate integrated farming system. It explores potential utilization of natural assets created / available through Watershed Development and Soil conservation activities under MGNREGS/NWDPR / RVP /RKVY /IWMP etc. It aims at promoting Integrated Farming System (IFS) with emphasis on multi cropping, rotational cropping, inter cropping, mix cropping practices and allied activities of Horticulture, Livestock, Fishery, Forestry, Apiculture,

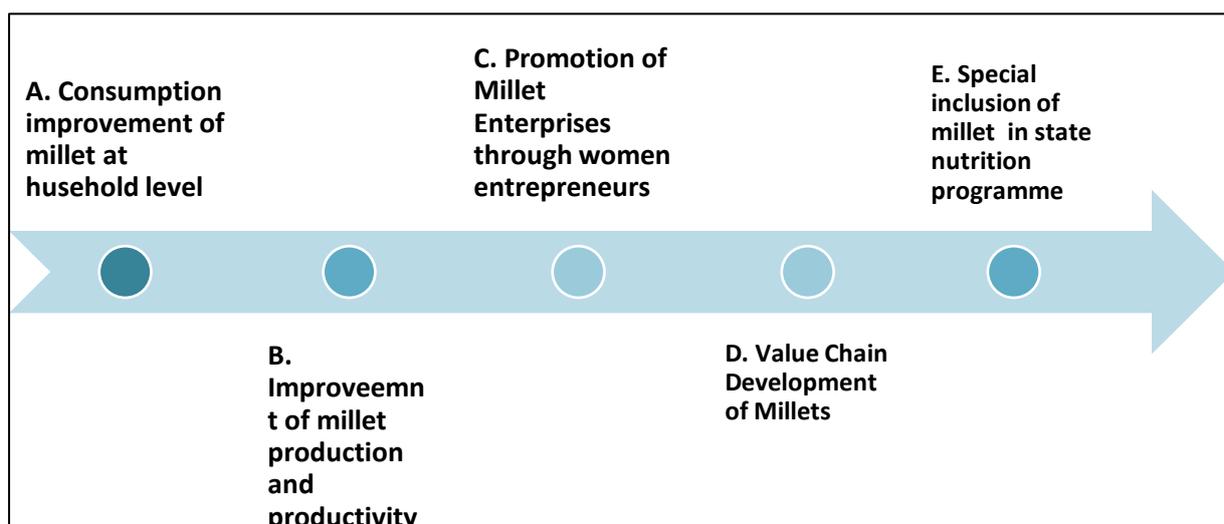
⁹ Department of Agriculture & Cooperation, (2014), “National Mission for Sustainable Agriculture (NMSA): Operational Guidelines”, Ministry of Agriculture, Government of India

Mushroom etc which enable the farmers in not only maximizing farm production for sustainable livelihood, but also to mitigate the impact of drought, flood and other extreme weather events.

1.4 Special Programme for Millets in Tribal Areas of Odisha

Special Programme for millets in tribal areas otherwise called Odisha Millet Mission (OMM) evolved in 2017, after a state level consultation organized by Planning and Convergence Department, Govt. of Odisha on the subject “Comprehensive Revival of Millets in Tribal areas of Odisha” to secure Nutrition Security and mitigate drought in South Odisha held at Nabakrushna Choudhury Centre for Development Studies on 27th January 2016. This led to a series of interactions and a memorandum of understanding (MoU) was signed on 27 February 2017 between the Directorate of Agriculture and Food Production (DAFP) as the state level nodal agency that would monitor and implement the programme, NCDS as the state secretariat that would also anchor the research secretariat, and Watershed Support Services and Activities Network (WASSAN) that would anchor the programme secretariat as part of the state secretariat. The date of signing of the contract was treated retrospectively as the start date of programme implementation. The programme period spans over a five-year time period from 2017 to 2022. The first three years of programme period constituted to be programme implementation phase and the subsequent two years comprise of consolidation, expansion and institutionalisation. As per the Programme Guidelines¹⁰, the key project objectives include increased household consumption of millets by around 25 percent, enhancement of household nutrition security and to create demand for millets with special focus on women and children.

The programme also aims at promoting millet processing enterprises at GP and block level to ensure household access for easy processing and value-added millets and millet products. Improvement of millet productivity, profitability from millet cultivation, development of millet-based enterprises with market led value chain activities, promotion of women entrepreneurs for millet-based activities, inclusion of millet in state nutrition programme including public distribution programme are the added objectives for which the special programme on millets is implemented in the state.



¹⁰ National Food Security Mission Cell, Directorate of Agriculture and Food Production, Govt. of Odisha, Guidelines for Implementation of “Special Programme for Millets in Tribal Areas of Odisha”, Letter No-40856, dated 25.11.2016.

Selected blocks within the districts covered under OMM are assigned to civil society organisations (CSOs), which are called as the facilitating agencies (FAs) of the programme. Mainly the NGOs are involved as the facilitating agencies at Block level. The FAs are very much involved in the last-mile delivery and adoption of OMM. Towards overall implementation of the programme, the government collaborates with CSOs and community-based organisations (CBOs), and seeks advice from external agencies on technical aspects and programme implementation. The programme focusses on training millet farmers to follow improved practices of systemic millets intensification (SMI), line sowing (LS), and line transplanting (LT). Farmers who adopt the improved methods receive a cash transfer directly to their bank accounts, upon successful verification. This is to note that SMI is the application of the principles of systemic rice intensification (SRI) on millets, whereby young seedlings are planted in a specific square pattern. It also involves maintaining a certain level of soil condition over the growing period. Line sowing is a method of sowing seeds directly on the field in the form of a line and maintaining precise spacing. Line transplanting involves transplanting a young sapling raised in a nursery, in the form of lines with specific spacing.¹¹ The programme also supports farmers in adopting improved crop management practices such as weeding, rolling, crop-cutting, and non-pesticide pest management (NPM). This is done via traditional agricultural extension models, using field demonstrations and trainings by the CSOs in collaboration with CBOs such as farmer producer groups, and women’s collectives.

1.5 Programme Outreach in Koraput District

The outreach of first phase of OMM is extended upto 22075.8 hectares of land area under ragi millet cultivation and the proportionate share of Koraput district in the overall ragi area of first phase OMM stands at 31.3 percent. There are seven blocks covered under first phase of OMM intervention in the district. Maximum coverage of land area for OMM ragi cultivation is noticed at Boipariguda block and minimum at Dashmantapur block.

Table –1.2: Coverage of Ragi under first phase OMM Project Intervention

Blocks	Land area taken up for ragi cultivation by Districts, blocks and crop years (in Hectares)				% Share of the block in district total	% Share of the district in state total
	2017-18	2018-19	2019-20	All Years		
Boipariguda	169.56	400.6	600	1170.16	17.0	31.3
Borigumma	125.05	242.2	772.18	1139.43	16.5	
Dasmantpur	149.86	200.02	420	769.88	11.2	
Kundra	131.1	344.3	454.9	930.3	13.5	
Lamtaput	176.07	298.7	559.7	1034.47	15.0	
Nandapur	197.89	517.2	215.7	930.79	13.5	
Semiliguda	142.11	307	478.06	927.17	13.4	
Sub total	1091.64	2310.02	3500.54	6902.2	100.0	
Grand Total	3161.03	7625.93	11288.8	22075.8		100.0

Source: Computed from WASSAN Official data

¹¹ Basu, Subhodeep et. al. (2021), “Addressing the nutrition crisis: Reflections from Odisha Millets Mission”, Ideas for India, <https://www.ideasforindia.in/topics/agriculture/addressing-the-nutrition-crisis-reflections-from-odisha-millet-mission.html>

With respect non – ragi millets, out of the total land area covered at the state level, percentage share of Koraput district is about 11.1 percent. Further, within the district, Boipariguda is having highest share in the overall non ragi millet cultivated area followed by Dashmantapur and Lamtaput blocks. Non ragi millets are not cultivated at Boipariguda block and negligible proportion of overall non ragi millet area of the district is found at Kundra, and Nandapur blocks.

Table- 1.3: Coverage of Non ragi Millets under first phase OMM Project Intervention (land Area in Hectares) in Koraput district

Blocks	Land area taken up for non-ragi millet cultivation by Districts, blocks and crop years (in Hectares)				% Share of the block in district total	% Share of the district in state total
	2017-18	2018-19	2019-20	All Years		
Boipariguda	0	70.6	123.2	193.8	45.25	11.1
Borigumma	0	0	0	0	0.00	
Dasmantpur	0	72.7	42	114.7	26.78	
Kundra	0	2.5	9.4	11.9	2.78	
Lamtaput	0	0	76.5	76.5	17.86	
Nandapur	0	0	1.2	1.2	0.28	
Semiliguda	0	30.2	0	30.2	7.05	
Sub total	0	176	252.3	428.3	100.00	
All districts	114.45	1880.8	1873.71	3868.96		100.0

Source: Computed from WASSAN Official data

Within the seven blocks covered under the first phase OMM intervention in the district, there are about 17062 millet farmers which accounts 27.1 percent share of the overall farmer outreach of OMM in the entire state. Maximum proportion of OMM registered millet farmers are at Nandapur block and the lowest proportion of them are at Kundra block.

Table-1.4: Farmer Outreach under first phase intervention OMM in Koraput district

Blocks	Number of farmers covered under first phase OMM by districts, blocks and crop years (No. of farmers)				% Share of the block in district total	% Share of the district in state total
	2017-18	2018-19	2019-20	All Years		
Boipariguda	423	696	1568	2687	15.7	27.1
Borigumma	298	578	1561	2437	14.3	
Dasmantpur	353	577	1197	2127	12.5	
Kundra	263	704	920	1887	11.1	
Lamtaput	729	715	1177	2621	15.4	
Nandapur	500	1710	567	2777	16.3	
Semiliguda	184	874	1468	2526	14.8	
Sub total	2750	5854	8458	17062	100.0	
All districts	8636	21972	32394	63002		100.0

Source: Computed from WASSAN Official data

1.6 Terms of Reference of the Study

Naba krushna Choudhury Centre for Development Studies (NCDS), Bhubaneswar has commissioned the mid-term evaluation study of Odisha Millet Mission covered under first phase implementation in 29 blocks except Chandrapur block in Rayagada district. Resultingly, the study covers all the 29 blocks of seven districts through a sample-based household survey of the millet farmers covered under OMM. In order to strengthen evidence-based decision making in further project implementation, the study is to compare the findings of the mid-term evaluation study with corresponding baseline findings so as to understand the changes taking place at farmers' household level as a result of OMM intervention. In this background, the objectives stipulated in the baseline study remains valid for the mid-term evaluation study.

1.7 Objectives

- To assess the socio-economic condition of Millet HHs in the project area.
- To outline the millet production Productivity and Package of Practices in the project area.
- To assess the consumption pattern of millets among the households in the project area.
- To examine the method of processing and mode of Marketing of millets produced by the farmers.

1.8 Methodology

1.8.1 Study Approach

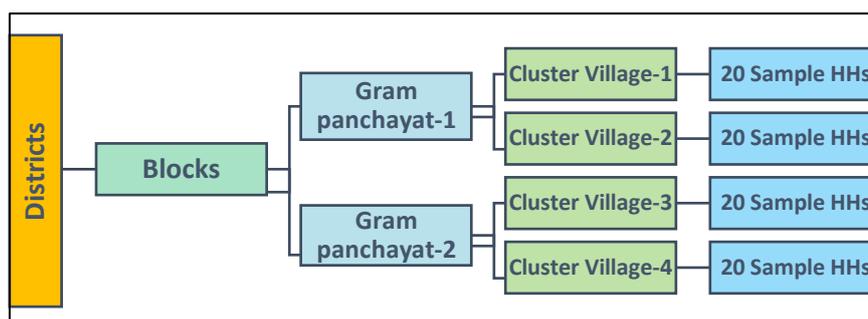
The midterm evaluation study is carried out with the objective of assessing the performance of OMM implementation on the basis of selected output and outcome and impact indicators as framed in the project log-frame as formulated under the project. The indicators at the district and block level are well aligned to gather consolidated evidence at the state level. The assessment of output and outcome and impact indicators entails the approach of impact pathway of project intervention under different project components. The four major components of OMM intervention



comprises increased millet production through enhancing millet area and adaption of improved package of practices by millet farmers, increased millet consumption at household level, improved practices of millet processing and improved millet marketing in the project area. These are collectively levelled as four pillars of OMM's intervention in the project area. This is to mention that the evaluation is carried out to measure the current values of those baseline indicators and to examine the pattern of changes taking place due to OMM intervention in the project area. The horizontal differences in the values of baseline indicators and midline indicators either positive or negative are treated as the outcome and impact of OMM intervention in the project areas.

1.8.2 Sampling Process

The Mid-Term Survey is conducted in all of 29 blocks of Seven Districts covered under the first phase implementation of OMM. The household samples at each of the block were selected on the



basis of three stage sampling process involving GP selection process in the first stage, Village selection process in the second stage and ultimately household selection process in the third stage. For each of the intervention block, by looking at the list of programme GPs, two GPs located in a cluster were identified in the first stage. From each of the selected GP, two programme villages located in a cluster were identified in the second stage. Thus, for each block the study ultimately covered four villages. From each of the selected village in a block, ultimately 20 households were randomly chosen from the list farmers registered under OMM. In this process, about 80 households (millet farmers registered under OMM) were covered for each of the selected block and accordingly the overall household sample size of the district stands at 559. Apart from household coverage, one Facilitating Agency in each Block, Community Resource Persons, CRPs/CBOs/ District Coordinators of WASSAN/ Key Informants were also covered. The Sample design of the study is as per table 1.5.

Table-1.5: Sample Design

Sl.	Districts	Blocks	Gram Panchayats	Villages	No. of households covered in the study
17	Koraput	Boipariguda	Boipariguda, Durgaguda	Jhadiguda & Padeiguda, Dumuriguda & Khangarapara	80
18		Boriguma	Benasur, Katragada	Dhuntiguda & Keraput, Mankadiatal & Tarunjiguda	79
19		Dasmantapur	Gadiguda Paika, Phulabeda	Paikapuki & Tamili Badamguda & Paikphulbeda	80
20		Kundra	Banuaguda, hupugaon	Ghuriaguda & Kandulguda, Banuaguda & Hentalguda	80
21		Lamtaput	Badigada, Ballel	Ancheipada & Raidel, Chilliba & Ballel	80
22		Nandapur	Atanda, Bheja	Atanda & Barangpali Badliguda & Bheja	80
23		Similiguda	Guntaput, Sadam	Jangarada & Jubarajpeta, Gunthaput & Phuldaba	80
				Sub total	559

1.8.3 Statistical Instruments

- Household Questionnaire for Millet Farmers
- Format for Facilitating Agency
- Format for CRP/ CBO/ District Coordinator (WASSAN)
- KII Check list
- FGD Discussion Points

1.8.4 Study Period

The field work pertaining to the study was undertaken simultaneously in all of the project districts by deploying separate study teams for each of the district during the period 1st June 2021 to 30th June 2021.



Chapter-II: Project Area under First Phase Implementation of Odisha Millets Mission in Koraput District

The first phase implementation of Odisha Millet Mission was started in seven southern Odisha districts Gajapati, Kalahandi, Kandhamal, Koraput, Malkangiri, Nuapada and Rayagada. A brief statistical profile by major socio-economic indicators of these districts is outlined in this chapter. The pattern of millet production in these districts are also highlighted. With the intension of providing a perspective to the ongoing study, the first phase intervention in terms of coverage of GPs, villages, number of farmers and area put for all types of millet cultivation under all types of agronomic practices are also highlighted in this chapter.

2.1 Koraput District

Koraput district located in the southern part of the state has a total geographical area of 8807 sq. km. Koraput District located between the parallels of 18° 13' to 19° 10' North Latitude and Medians of 82° 5' to 83° 23' east Longitude. The district is situated in the South Eastern region of Odisha surrounded by Rayagada district and Srikakulam of Andhra Pradesh in the east, Nabarangpur district in the North, Malkangiri district in the West and Visakhapatnam of Andhra Pradesh in the South. Physiologically the district is contiguous to the mainland of Eastern Ghat. The different areas in this zone are situated at an altitude of 1501000 meters above the mean sea level. (MSL). The district has famous Deomali hill and small hill range which exists parallelly from East to West. Apart from this Kolab and Machhkund and other smaller



tributaries pass through the district. The present district has 2 subdivisions, 14 Tahasils (as recently each Block has been declared as a Tahasil), 14 Community Development Blocks and 226 Gram Panchayats. The entire district comes under the Scheduled area. Total numbers of villages are 2028 out of which 106 are uninhabited villages. There are five assembly Constituency namely Laxmipur, Koraput, Pottangi, Jeypore & Kotpad. 5 towns including three municipality and one NAC. Geomorphologically, except the north western and west-west central part, almost the entire district is occupied by dense forest, highly rugged mountain, interspersed with narrow intermontane valleys. The average attitude of the hilly terrain ranges from 900 to 1400 m amsl. North Western and West-west central parts are characterized by gently undulating plain dotted with isolated hillocks. The Kolab and Indravati river and their tributaries constitute the main drainage system of the district. The main slope of the district is towards west and north-west. The drainage pattern in the district is controlled by Indravati, Sabari (Kolab), Sileru, Vegavati, Subarnamukhi, Jaryhavati and their tributaries. The river Indravati and Kolab drains the major

parts of Koraput district. Most of the tributaries of Kolab river and Indravati river are perennial in nature. The elevation of the hilly terrain ranges from 900 to 1400 mm above mean sea level with the highest peak of 1620 m amsl. The statistical profile of the district is presented in table 2.1.

Table 2.1: Brief Statistical Profile of Koraput District

Sl.	Particulars	Value	Sl.	Particulars	Value
1	Person	13.8	20	AGRICULTURE (2014-15) *	
2	Male	6.8		Total geographical Area (Sq. kms.)	8807
3	Female	7.0		Land Use Pattern (Area in '000 ha.)	
4	SC	2.0		Forest	81
5	ST	7.0		Land put to Non-agricultural use	47
6	Others	4.8		Barren & Non-Cultivable Land	144
7	Total HHs	3.4		Permanent Pasture & Other Agricultural Land	20
8	Average HH Size (In Nos.)	4.1		Net Area Sown	192
9	Sex Ratio (In %)	1032		Cultivable waste Land	16
10	Workers (In Lakh)			Old Fallow	24
11	Total Workers	6.9		Current Fallows	50
12	Main Worker	4.0		Misc. Trees and Groves	33
13	Marginal Worker	3.0		Average Fertilizer Consumption per ha (In Kg)	43.6
14	Non-Worker	6.9	21	Irrigation Potential Created (Area in '000 ha.) *	
15	WPR (In %)	50.3		Kharif	110.2
16	Literacy Rate (In %)	49.2		Rabi	43.5
17	No. of BPL Families	12688	22	No. of Village Electrified	1205
18	No. of Job Card Issued	276537	23	No. of Banks	78
19	No. of Beneficiaries provided employment in MGNREGS	178459	24	No. of AWCs	1488

Source: District Statistical Hand book, Koraput-2011, *District at a Glance-2016

2.2 Millet Production in Koraput district

Millet production in the district is shown in terms of decadal variation in the average annual area diverted for ragi and small millet cultivation in 2010s compared to 2000s. As per table 2.2, it is revealed that average annual land area used for ragi cultivation is reduced by 10.20 percent in 2010s compared to 2000s in Koraput district. However, diversion of ragi lands for other crops in Koraput district is found lower compared to the state figures. In the case of small millets, in 2010s, there is positive increase in land area under small millet cultivation. There is also positive improvement in the proportionate share of Koraput district in the total quantity of land under ragi and small millets cultivation in the state.

Tale-2.2: Area under ragi and small millets cultivation in Koraput district compared to All Odisha

Sl.	Region	Decadal variation in the land area under annual ragi and Small Millets cultivation in Koraput district compared to all Odisha (Land area in 000 hectares)					
		Ragi			Small Millets		
		2000s	2010s	Decadal Variation (%)	2000s	2010s	Decadal Variation (%)
1	Koraput	70.99	63.75	-10.20	8.34	8.43	1.08
2	All Odisha	189.07	148.05	-21.70	26.33	23.80	-9.61
	Koraput district as % to All Odisha	37.55	43.06		31.67	35.42	

Source: Computed from compiled data base from Odisha Agricultural statistics (2000-01 to 2017-18), Directorate of Agriculture and Food Production, Govt. of Odisha

As per table 2.3, it is evidenced that the yield rate of ragi as well as small millets in Koraput district stands lower compared to the all-Odisha average picture during 2000s and 2010s, albeit positive increase in 2010s over 2000s in Koraput district. The yield rate of ragi in Koraput district in 2010s has increased by 24.29 percent compared to 2000s. During the corresponding period, the yield rate of small millets has increased by 21.82 percent. There is improvement in yield index for ragi as well as small millets in 2010s compared to 2000s.

Table-2.3: Yield Rate of ragi and small millets in Koraput district compared to All Odisha

Sl.	Regions	Decadal Variation in average annual yield Rate of ragi and small millets in Koraput district compared to all Odisha (Yield Rate in Kg/ Hectare)					
		Ragi			Small Millets		
		2000s	2010s	Decadal Variation (%)	2000s	2010s	Decadal Variation (%)
1	Koraput	709.11	881.38	24.29	368.78	449.25	21.82
2	All Odisha	791.20	892.70	12.83	453.60	505.00	11.33
	Yield index of the district (All Odisha = 100)	89.62	98.73		81.30	88.96	

Source: Computed from compiled data base from Odisha Agricultural statistics (2000-01 to 2017-18), Directorate of Agriculture and Food Production, Govt. of Odisha

Despite negative variation in average annual production of ragi at all Odisha level in 2010s, there is positive increase in the average annual production of ragi in Koraput district. The average annual ragi production in Koraput district increased by 11.29 percent in 2010s compared to 2000s. Koraput district has a sizable share in the overall production of ragi and small millets in the state. Compared to the situation prevailing in 2000s, the percentage share of the district in the overall state's ragi and small millets production has tended to increase in 2010s. The decadal variation in the volume of production of ragi and small millets is presented in table 2.4.

Table-2.4: Ragi and small millets production in Koraput district compared to All Odisha

Sl.	Regions	Decadal Variation in Volume of Ragi and small millets Production in Koraput district compared to All Odisha (Production in 000 MT/ Hectare)					
		Ragi			Small Millets		
		2000s	2010s	% Variation over 2010 (%)	2000s	2010s	% Variation over 2010 (%)
1	Koraput	50.47	56.17	11.29	3.24	3.91	20.68
2	All Odisha	149.39	131.19	-12.18	11.71	12.07	3.07
	Koraput district as % to All Odisha	33.78	42.82		27.67	32.39	

Source: Computed from compiled data base from Odisha Agricultural statistics (2000-01 to 2017-18), Directorate of Agriculture and Food Production, Govt. of Odisha

2.3 Progress of Odisha Millet Mission in Koraput District

By the end of Kharif 2019-20, OMM has covered seven blocks in Koraput district. Cumulatively, in all these blocks, there is outreach of OMM in 204 GPs, 1197 villages, 19007 farmers and 7318.91 hectares of land area under millet cultivation. The details of progress of OMM in Koraput district is shown in the table 2.5 given below.

Table-2.5: Progress of Odisha Millet Mission in Koraput Districts

Sl.	Time Period	Coverage of OMM in Koraput district				
		Blocks	No. of GPs	No. of Villages/ Hamlets	No. of farmers	Land Area (Hectares)
1	Kharif 2017-18	Nandapur	5	15	500	202.35
		Boriguma	3	24	297	125.05
		Boipariguda	4	26	360	152.97
		Kundra	4	23	239	123.81
		Lamtaput	5	33	729	174.65
		Semiliguda	7	33	184	205.49
		Dasmantapur	5	48	353	150.12
		Sub Total	33	202	2662	1134.45
2	Rabi 2017-18	Boipariguda	5	8	87	51.95
		Kundra	3	3	24	9.45
		Sub Total	8	11	111	61.40
3	Kharif 2018-19	Nandapur	12	49	1929	609.00
		Boriguma	4	36	532	241.80
		Boipariguda	10	65	791	341.00
		Kundra	11	62	647	284.80
		Lamtaput	9	39	691	270.80
		Semiliguda	14	63	1011	339.32
		Dasmantapur	5	36	941	262.02
		Sub Total	65	350	6542	2348.74
4	Rabi 2018-19	Boipariguda	5	11	90	30.80
		Kundra	5	12	55	20.00
		Sub Total	10	23	145	50.80
5	Kharif 2019-20	Nandapur	12	33	590	225.60

	Boriguma	14	64	1339	535.60
	Boipariguda	13	98	1534	629.20
	Kundra	16	116	1125	455.20
	Lamtaput	10	108	1809	663.60
	Semiliguda	14	83	1468	480.20
	Dasmantapur	9	109	1682	734.12
	Sub Total	88	611	9547	3723.52
	Total	204	1197	19007	7318.91

Source: Compiled from the Tracking Sheets of State Odisha Millet Mission

Concluding Remarks

Average annual land area used for ragi cultivation is reduced by 10.20 percent in 2010s compared to 2000s in Koraput district. However, diversion of ragi lands for other crops in Koraput district is found lower compared to the state figures. In the case of small millets, in 2010s, there is positive increase in land area under small millet cultivation. There is also positive improvement in the proportionate share of Koraput district in the total quantity of land under ragi and small millets cultivation in the state. The yield rate of ragi as well as small millets in Koraput district stands lower compared to the all-Odisha average picture during 2000s and 2010s, albeit positive increase in 2010s over 2000s in Koraput district. The yield rate of ragi in Koraput district in 2010s has increased by 24.29 percent compared to 2000s. During the corresponding period, the yield rate of small millets has increased by 21.82 percent. There is improvement in yield index for ragi as well as small millets in 2010s compared to 2000s. The average annual ragi production in Koraput district increased by 11.29 percent in 2010s compared to 2000s. Koraput district has a sizable share in the overall production of ragi and small millets in the state. Compared to the situation prevailing in 2000s, the percentage share of the district in the overall state's ragi and small millets production has tended to increase in 2010s. By the end of Kharif 2019-20, OMM has covered seven blocks in Koraput district. Cumulatively, in all these blocks, there is outreach of OMM in 204 GPs, 1197 villages, 19007 farmers and 7318.91 hectares of land area under millet cultivation.

Chapter-III: Socio Economic Characteristics of Millet Farmers of Koraput District

The farmer households supported under OMM for undertaking millet production in their lands is defined as millet households in the ongoing study. The study covers a sample of 559 millet households spread across seven blocks in Koraput district. Details of the sample coverage is already discussed in the previous chapter. The socio-economic conditions of the millet farmers' households based on selected socio-economic characteristics is analysed in this chapter.

3.1 Sex Category

Millet farmers classified on the basis of sex category as male and millet farmers reveals that majority of registered millet farmers are male farmers. Overall, 58.9 percent of millet households are ST households followed by OC households (34.9 %) and SC households (6.3%). Proportionately, there are a greater number of non-ST category households in Dashmantamatapur and Similiguda blocks.

Table 1: No. of farmers by social category

Sl.	Blocks	No. of households				% of households			
		SC	ST	OC	Total	SC	ST	OC	Total
1	Boipariguda		53	27	80	0.0	66.3	33.8	100.0
2	Boriguma		52	27	79	0.0	65.8	34.2	100.0
3	Dasmantapur	4	23	53	80	5.0	28.8	66.3	100.0
4	Kundra	6	51	23	80	7.5	63.8	28.8	100.0
5	Lamtaput	16	51	13	80	20.0	63.8	16.3	100.0
6	Nandapur	3	58	19	80	3.8	72.5	23.8	100.0
7	Similiguda	6	41	33	80	7.5	51.3	41.3	100.0
	All District	35	329	195	559	6.3	58.9	34.9	100.0

3.2 Social Category

The mean age of millet farmers is overall found at 44.9 years. This implies that experienced farmers are found to have been registered as millet farmers under OMM. The mean age of millet farmers among ST, OC and SC categories is found at 45.3, 44.6 and 43.0 years respectively.

Table-3.2: Mean Age of farmers by Social Category

Sl.	Blocks	Mean Age of millet farmers in the OMM arae			
		SC	ST	OC	Total
1	Boipariguda		44.3	42.6	43.8
2	Boriguma		46.8	41.1	44.8
3	Dasmantapur	47.5	46.6	45.4	45.9
4	Kundra	42.5	49.6	47.1	48.4
5	Lamtaput	39.8	41.7	52.8	43.1
6	Nandapur	57.0	45.5	41.4	45.0
7	Similiguda	41.8	42.6	44.6	43.3
	All District	43.0	45.3	44.6	44.9

		Standard deviation in the mean age			
1	Boipariguda		14.3	14.0	14.1
2	Boriguma		10.9	7.7	10.3
3	Dasmantapur	8.7	10.6	12.0	11.4
4	Kundra	16.4	11.7	12.6	12.3
5	Lamtaput	14.8	13.4	10.9	13.9
6	Nandapur	6.0	10.3	11.2	10.7
7	Similiguda	6.6	11.9	10.5	11.0
	All District	13.3	12.2	11.7	12.1

3.3 Sex Category

Millet farmers classified on the basis of sex category as male and millet farmers reveals that majority of registered millet farmers are male farmers. Overall, about 69.4 percent of millet farmers of Koraput district are males and the remaining 30.6 percent are females. Incidence of female millet farmers is comparatively higher at Lamtaput block followed by Boriguma and Boipariguda blocks.

Table 3.3: No. of farmers by sex category

Sl.	Blocks	No. of farmers by sex category			% of farmers by sex category		
		Male	Female	Total	Male	Female	Total
1	Boipariguda	55.0	25.0	80.0	68.8	31.3	100.0
2	Boriguma	39.0	40.0	79.0	49.4	50.6	100.0
3	Dasmantapur	70.0	10.0	80.0	87.5	12.5	100.0
4	Kundra	70.0	10.0	80.0	87.5	12.5	100.0
5	Lamtaput	15.0	65.0	80.0	18.8	81.3	100.0
6	Nandapur	73.0	7.0	80.0	91.3	8.8	100.0
7	Similiguda	66.0	14.0	80.0	82.5	17.5	100.0
	All District	388.0	171.0	559.0	69.4	30.6	100.0

3.4 Educational Background

The educational background of millet farmers as indicated in table 3.4 reveals that majority of millet farmers of Koraput district are illiterates followed primary level of education. In percentage terms, out of the total registered millet farmers, as high as 70.8 percent are illiterates followed by upto primary level (16.8%), upto HSC standard (5.2%), upper primary (4.1%) and above HSC (3.0%).

Table-3.4: No. of farmers by educational background

Sl.	Blocks	No. of millet farmers					
		Illiterate	Primary	Upper Primary	Upto HSC	Above HSC	Total
1	Boipariguda	48.0	19.0	6.0	4.0	3.0	80.0
2	Boriguma	50.0	19.0	6.0	3.0	1.0	79.0
3	Dasmantapur	56.0	18.0	3.0	3.0		80.0
4	Kundra	42.0	17.0	5.0	14.0	2.0	80.0
5	Lamtaput	76.0	4.0				80.0
6	Nandapur	58.0	12.0	3.0	3.0	4.0	80.0
7	Similiguda	66.0	5.0		2.0	7.0	80.0

	All District	396.0	94.0	23.0	29.0	17.0	559.0
		% of millet farmers					
1	Boipariguda	60.0	23.8	7.5	5.0	3.8	100.0
2	Boriguma	63.3	24.1	7.6	3.8	1.3	100.0
3	Dasmantapur	70.0	22.5	3.8	3.8	0.0	100.0
4	Kundra	52.5	21.3	6.3	17.5	2.5	100.0
5	Lamtaput	95.0	5.0	0.0	0.0	0.0	100.0
6	Nandapur	72.5	15.0	3.8	3.8	5.0	100.0
7	Similiguda	82.5	6.3	0.0	2.5	8.8	100.0
	All District	70.8	16.8	4.1	5.2	3.0	100.0

3.5 Religion

By religion, majority of millet farmers are Hindus and a small chunk of them are Christians. Proportionately, 95.9 percent of millet farmers are Hindus and the remaining 4.1 percent are Christians.

Table-3.5: No. of farmers by religion

Sl.	Blocks	No. of millet farmers			% of farmers		
		Hindu	Christianity	Total	Hindu	Christianity	Total
1	Boipariguda	80		80	100.0	0.0	100.0
2	Boriguma	78	1	79	98.7	1.3	100.0
3	Dasmantapur	77	3	80	96.3	3.8	100.0
4	Kundra	78	2	80	97.5	2.5	100.0
5	Lamtaput	79	1	80	98.8	1.3	100.0
6	Nandapur	80		80	100.0	0.0	100.0
7	Similiguda	64	16	80	80.0	20.0	100.0
	All District	536	23	559	95.9	4.1	100.0

3.6 Farmer Category

On the basis of amount of land holdings farmers are categorised under marginal farmers (MFs), small farmers (SFs), medium farmers and large farmers. As per table 3.6, it is found that majority of millet farmers of the district are small farmers followed by marginal farmers. The proportionate share of small farmers, medium farmers, marginal farmers and large farmers are found at 44.9, 14.5, 35.1 and 5.5 percent respectively. The pattern is similarly noticed in all of the blocks covered under OMM.

Table-3.6: No. of farmers by farmer category

Sl.	Blocks	No. of farmers				
		MF	SF	Med. Farmers	Large Farmers	Total
1	Boipariguda	5.0	64.0	10.0	1.0	80.0
2	Boriguma	10.0	50.0	19.0		79.0
3	Dasmantapur	21.0	24.0	20.0	15.0	80.0
4	Kundra	11.0	50.0	19.0		80.0
5	Lamtaput	48.0	26.0	2.0	4.0	80.0
6	Nandapur	58.0	13.0	5.0	4.0	80.0
7	Similiguda	43.0	24.0	6.0	7.0	80.0

	All District	196.0	251.0	81.0	31.0	559.0
		% of farmers				
1	Boipariguda	6.3	80.0	12.5	1.3	100.0
2	Boriguma	12.7	63.3	24.1	0.0	100.0
3	Dasmantapur	26.3	30.0	25.0	18.8	100.0
4	Kundra	13.8	62.5	23.8	0.0	100.0
5	Lamtaput	60.0	32.5	2.5	5.0	100.0
6	Nandapur	72.5	16.3	6.3	5.0	100.0
7	Similiguda	53.8	30.0	7.5	8.8	100.0
	All District	35.1	44.9	14.5	5.5	100.0

3.7 House Structure

The housing structure of millet farmers as analysed in table 3.5 reveals that overall, marginally higher proportion of millet farmers of the district have semi-pucca houses followed kuchha houses and pucca houses. The incidence of kuchha houses is found with more proportion of millet farmers' households of Boipariguda block followed by Kundra and Boriguma blocks.

Table-3.7: No. of farmers by house Structure

Sl.	Blocks	No. of farmers by housing structure			
		Pucca	Semi Pucca	Kutchha	Total
1	Boipariguda	12	32	36	80
2	Boriguma	19	39	21	79
3	Dasmantapur	11	59	10	80
4	Kundra	12	46	22	80
5	Lamtaput	10	64	6	80
6	Nandapur	9	70	1	80
7	Similiguda	9	69	2	80
	All District	82	379	98	559
		% of farmers by housing structure			
1	Boipariguda	15.0	40.0	45.0	100.0
2	Boriguma	24.1	49.4	26.6	100.0
3	Dasmantapur	13.8	73.8	12.5	100.0
4	Kundra	15.0	57.5	27.5	100.0
5	Lamtaput	12.5	80.0	7.5	100.0
6	Nandapur	11.3	87.5	1.3	100.0
7	Similiguda	11.3	86.3	2.5	100.0
	All District	14.7	67.8	17.5	100.0

3.8 Household Structure

A household structure comprises of male as well as female members. As it can be seen from table 3.8, overall, there are 2.4 male and 2.3 female members per each millet farmers' household in the district. The average family size is found at 4.6 persons. The average family size at Boipariguda, Lamtaput and Kundra blocks is found at 5.1, 4.9 and 4.7 respectively. In these three blocks, the average family size is relatively higher. The overall sex ratio among the millet households of the district is found balanced.

Compared to Lamtaput and Boiparioguda blocks, the sex ratio at Kundra block stands very much advantageous.

Table-3.8: Average Household size

Sl.	Blocks	Males	Females	Total	Number of females per 1000 males
1	Boipariguda	2.7	2.5	5.1	926
2	Boriguma	2.3	2.4	4.6	1043
3	Dasmantapur	2.3	2.3	4.4	1000
4	Kundra	2.6	2.2	4.7	846
5	Lamtaput	2.6	2.4	4.9	923
6	Nandapur	2.4	2.1	4.4	875
7	Similiguda	2.3	2.1	4.3	913
	All District	2.4	2.3	4.6	958

3.9 Year of joining into OMM

In order to avail the benefits of OMM project intervention, the farmers in the programme area are required to register themselves with OMM. The sampled-out farmers covered in the study have joined into OMM since 2017-18. As it is evident from table 3.7, overall 88 percent of the farmers have joined into OMM in 2017-18 year, followed by 8.8 percent in 2018-19 and the remaining 3.2 percent in 2019-20. Majority of millet farmers of Boipariguda and Lamtaput block are found to have been registered under OMM in the year 2017-18. More than 85 percent of millets farmers in all of the reporting blocks except Boipariguda and Boriguma blocks have joined in OMM in the year 2017-18.

Table-3.9: No. of farmers by year of joining into OMM

Sl.	Blocks	No. of farmers by the year of joining into OMM			
		2017-18	2018-19	2019-20	All Years
1	Boipariguda	55	21	4	80
2	Boriguma	45	21	13	79
3	Dasmantapur	79		1	80
4	Kundra	76	4		80
5	Lamtaput	79	1		80
6	Nandapur	80			80
7	Similiguda	78	2		80
	All District	492	49	18	559
		% of farmers by the year of joining into OMM			
1	Boipariguda	68.8	26.3	5.0	100.0
2	Boriguma	57.0	26.6	16.5	100.0
3	Dasmantapur	98.8	0.0	1.3	100.0
4	Kundra	95.0	5.0	0.0	100.0
5	Lamtaput	98.8	1.3	0.0	100.0

6	Nandapur	100.0	0.0	0.0	100.0
7	Similiguda	97.5	2.5	0.0	100.0
	All District	88.0	8.8	3.2	100.0

Concluding Remarks

About 88 percent of the farmers have joined into OMM in 2017-18 year, followed by 8.8 percent in 2018-19 and the remaining 3.2 percent in 2019-20. Out of the total registered millet farmers of the district, 58.9 percent of millet households are ST households followed by OC households (34.9 %) and SC households (6.3%). Proportionately, there are a greater number of non-ST category households in Dashmantamatapur and Similiguda blocks. The mean age of millet farmers is overall found at 44.9 years. About 69.4 percent of millet farmers of Koraput district are males and the remaining 30.6 percent are females. Incidence of female millet farmers is comparatively higher at Lamtaput block followed by Boriguma and Boipariguda blocks. Majority of millet farmers of Koraput district are illiterates followed primary level of education. Proportionately, 95.9 percent of millet farmers are Hindus and the remaining 4.1 percent are Christians. Majority of millet farmers of the district are small farmers followed by marginal farmers. The proportionate share of small farmers, medium farmers, marginal farmers and large farmers are found at 44.9, 14.5, 35.1 and 5.5 percent respectively. Marginally higher proportion of millet farmers of the district have semi-pucca houses followed kuchha houses and pucca houses. The average family size is found at 4.6 persons. The average family size at Boipariguda, Lamtaput and Kundra blocks is found at 5.1, 4.9 and 4.7 respectively. In these three blocks, the average family size is relatively higher. The overall sex ratio among the millet households of the district is found balanced.



Chapter-IV: Millet Production, Productivity and Package of Practices in the project area

One of the objectives of the study is to outline the millet production, Productivity and Package of Practices in the project area. On the basis of empirical data obtained from millet farmers the pattern of millet production, productivity and package of practices adopted by the farmers, the objectives of the study are analysed in the current chapter. While doing so, a comparative analysis of current situation as a member of OMM and past situation when they were not the members are undertaken with the objective of ascertaining the changes taking place at farmers level as a result of OMM project intervention. Despite the focus of the chapter on highlighting the production behaviour of millets, the general scenario of cropping pattern is also discussed in the first section of the chapter.

4.1 Operational Land holding

The farmers' operational land holding as shown in table 4.1 comprises of own land, encroached land and shared in land. The overall operational landholding among the millet farmers of Koraput district stands at 3.7 acres. On an average, encroached land and shared in land per farmers is calculated at 1.5 and 1.9 acres respectively.

Table 4.1: Average Operational land holdings

Sl.	Blocks	Operational land holding / Farmer (Acres)			
		Owned Land	Encroached land	Shared in Land (Acres)	Operational Land holding (Acres)
1	Boipariguda	3.5	1.6	1.6	4.0
2	Boriguma	3.0	1.5	2.9	3.8
3	Dasmantapur	3.4	1.7	1.5	4.3
4	Kundra	2.8	1.7	2.0	3.7
5	Lamtaput	2.7	0.9	2.0	2.6
6	Nandapur	3.8	1.3	0.6	3.9
7	Similiguda	3.2	0.9	1.3	3.5
	All District	3.2	1.5	1.9	3.7

4.1 Cropping Pattern

Cropping of pattern of the millet farmers in the project area is analysed in terms of crop mix, which is combinations different crops grown by them. The millet farmers not only produce millet. In addition to millet, they cultivate paddy, pulses, vegetables, oil seeds, and cash crops. Ragi, suan, Kangu, Janha and kodo are different types of millets cultivated by the farmers. A comparative picture about number farmers cultivating different crops during post project situation compared to pre project situation is presented in the following table 4.2. The number of farmers cultivating different crops during post project situation is found changed relative to pre project situation and the pattern of such change in case of paddy remains unaltered implying same proportion of farmers are cultivating paddy during post project salutation as that of during pre-project situation. For all other crops, there is positive variation in the number of farmers.

Table-4.1: Crop mix among the farmers of project area (No. of Farmers cultivating the crops)

Sl.	Districts	Time Period	Overall agricultural practices of sample farmers (No. of farmers)							
			Boipariguda	Boriguma	Dasmantapur	Kundra	Lamtaput	Nandapur	Similiguda	All Districts
1	Paddy	Before Project	78	78	76	75	72	71	77	527
		After Project	80	78	76	76	70	70	77	527
		% Variation	3	0.0	0.0	1.3	-2.8	-1.4	0.0	0.0
2	Pulses	Before Project	40	28	15	16	22	26	14	161
		After Project	42	39	15	19	22	26	14	177
		% Variation	5.0	39.3	0.0	18.8	0.0	0.0	0.0	9.9
3	Vegetables	Before Project	34	11	21	61	22	46	38	233
		After Project	37	16	21	63	23	45	38	243
		% Variation	8.8	45.5	0.0	3.3	4.5	-2.2	0.0	4.3
4	Oil seeds	Before Project	21		3			11	2	37
		After Project	23		3			11	2	39
		% Variation	9.5		0.0			0.0	0.0	5.4
5	Cash Crops	Before Project	3	29	58	1	50	39	53	233
		After Project	3	30	58	1	49	38	54	233
		% Variation	0.0	3.4	0.0	0.0	-2.0	-2.6	1.9	0.0
6	Ragi	Before Project	78	71	79	79	78	80	78	543
		After Project	80	72	79	79	79	80	79	548
		% Variation	2.6	1.4	0.0	0.0	1.3	0.0	1.3	0.9
7	Suan	Before Project	42	11	1	3	2			59
		After Project	44	13	1	3	2			63
		% Variation	4.8	18.2	0.0	0.0	0.0			6.8
8	Kangu	Before Project								
		After Project								
		% Variation								
9	Janha	Before Project	1			1				2
		After Project	1			1				2
		% Variation	0.0			0.0				0.0
10	Kodo	Before Project								
		After Project								
		% Variation								

4.2 Crop Area

Crop wise land area among the sample farmers during pre-project period compared to post project period is separately shown for all the project blocks in the following table 4.2. It is observed that out of seven reporting blocks, in four reporting blocks, there is less than 1 percent negative variation in land utilisation for paddy crop. With respect to pulses, vegetables and oilseeds, there is marginal increase in land utilisation pattern compared to the same during pre-project situation. However, land area under cash crops has tended to decrease. Overall, there is about 4.7 percent increase in land area under ragi cultivation during post project situation.



Table 4.2: Area under crop in post project period compared to pre project period among the sample farmers (Land area in Acres)

Sl.	Districts	Time Period	Area under Crops in OMM Blocks of Koraput district (Acres)							
			Boipariguda	Boriguma	Dasmantapur	Kundra	Lamtaput	Nandapur	Similiguda	All Districts
1	Paddy	Before Project	156.1	166.7	130.5	160.7	67.1	103.5	106.5	891.1
		After Project	155.7	167.2	130.5	162.7	65.9	103.0	106.0	890.9
		% Variation	-0.3	0.3	0.0	1.2	-1.8	-0.5	-0.5	0.0
2	Pulses	Before Project	21.3	40.0	20.5	20.5	11.8	32.8	9.9	156.8
		After Project	19.9	45.7	20.5	22.6	11.9	32.8	9.9	163.2
		% Variation	-6.4	14.1	0.0	10.0	0.5	0.0	0.0	4.1
3	Vegetables	Before Project	8.7	5.3	23.5	30.6	11.1	40.0	36.1	155.2
		After Project	9.1	6.7	23.5	31.1	11.3	39.0	36.1	156.8
		% Variation	5.2	26.4	0.0	1.6	1.8	-2.5	0.0	1.0
4	Oil seeds	Before Project	16.7		3.0			6.4	0.6	26.7
		After Project	17.4		3.0			6.4	0.6	27.4
		% Variation	4.5		0.0			0.0	0.0	2.8
5	Cash Crops	Before Project	0.7	30.5	93.5	3.0	49.7	36.8	55.7	269.8
		After Project	0.7	30.6	93.5	3.0	44.2	36.1	56.2	264.3
		% Variation	0.0	0.3	0.0	0.0	-11.0	-1.9	0.9	-2.1
6	Ragi	Before Project	66.0	69.9	76.0	80.9	62.4	87.5	74.3	516.8
		After Project	74.7	74.6	76.0	85.1	68.4	87.5	74.8	541.0
		% Variation	13.3	6.8	0.0	5.2	9.6	0.0	0.7	4.7
7	Suan	Before Project	50.0	8.2	1.0	3.5	2.0			64.7
		After Project	56.5	9.2	1.0	3.5	2.0			72.2
		% Variation	13.0	11.6	0.0	0.0	0.0			
8	Kangu	Before Project	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		After Project	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		% Variation								
9	Janha	Before Project	0.1			0.5				0.6
		After Project	0.1			0.5				0.6
		% Variation	0.0			0.0				0.0
10	Kodo	Before Project	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		After Project	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		% Variation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

4.3 Package of Practices for Millet Production

4.3.1 Method of Cultivation

With the objective of increasing the productivity of millets improved agronomic practices among the farmers have been popularized by the OMM project. This includes Introducing System of Crop Intensification based on suitability, Promotion of Line transplanting/Line sowing/Inter cropping of millets, Improved manure/ composting / in-situ practices for better crop nutrition Pest and disease management practices in the lines of NPM and other organic/agro ecological practices as deemed necessary as per local needs. In this direction, method of cultivation of millets assumes significance. As it is indicated in table 4.3, method of millet cultivation comprises of mono cropping, mixed cropping and intercropping. The prevalence of different methods of cultivation of different millets by the millet farmers are comparatively shown during pre and post project period. For ragi crop, it is found that mono cropping practice is the dominant method of cultivation during pre-project as well as post project situations. However, in the blocks like Boipariguda, Boriguma and Kundra, there is great deal of shifting from mixed cropping cultivation of ragi during pre-project situation to mono cropping method of cultivation during post project period. For other reported millets also, overall mono cropping is found as the dominant method of cultivation.

Table-4.3: Method of cultivation adopted by millet farmers (Mono crop, mixed crop and inter crop)

Sl.	Millet Varieties	Blocks	Pre-Project (% of farmers)				Post-Project (% of farmers)			
			Mono Crop	Mixed Crop	Inter crop	Total	Mono Crop	Mixed Crop	Inter crop	Total
1	Ragi	Boipariguda	25.6	74.4	0.0	100.0	100.0	0.0	0.0	100.0
		Boriguma	25.6	74.4	0.0	100.0	100.0	0.0	0.0	100.0
		Dasmantpur	100.0	0.0	0.0	100.0	100.0	0.0	0.0	100.0
		Kundra	12.7	86.1	1.3	100.0	100.0	0.0	0.0	100.0
		Lamtaput	100.0	0.0	0.0	100.0	100.0	0.0	0.0	100.0
		Nandpur	100.0	0.0	0.0	100.0	100.0	0.0	0.0	100.0
		Similiguda	100.0	0.0	0.0	100.0	100.0	0.0	0.0	100.0
		All Blocks	66.7	33.2	0.2	100.0	100.0	0.0	0.0	100.0
2	Suan	Boipariguda	61.5	38.5	0.0	100.0	92.5	7.5	0.0	100.0
		Boriguma	100.0	0.0	0.0	100.0	100.0	0.0	0.0	100.0
		Dasmantpur								
		Kundra	66.7	0.0	33.3	100.0	100.0	0.0	0.0	100.0
		Lamtaput								
		Nandpur								
		Similiguda								
		All Blocks	63.6	34.1	2.3	100.0	93.3	6.7	0.0	100.0
3	Janha	Boipariguda	100.0	0.0	0.0	100.0	100.0	0.0	0.0	100.0
		Boriguma								
		Dasmantpur								
		Kundra	100.0	0.0	0.0	100.0	100.0	0.0	0.0	100.0
		Lamtaput								
		Nandpur								
		Similiguda								
		All Blocks	100.0	0.0	0.0	100.0	100.0	0.0	0.0	100.0

4.3.2 Agronomic Practices

Comparative analysis of the agronomic practices of millet farmers during post period compared to pre project period suggests that, there is declining importance of broadcasting and increasing importance of other type of agronomic practices like SMI, LT and LS methods. As per the following table 4.4, it is evident that agronomic practices of ragi is mainly SMI based followed LT methods during pre-project as well as post project situations.

Table-4.4: Cultivation Practices

Sl.	Millet Varieties	Blocks	Pre-Project (% of Farmers)					Post-Project (% of farmers)				
			SMI	LT	LS	Broadcasting	Total	SMI	LT	LS	Broadcasting	Total
1	Ragi	Boipariguda	49.4	44.2	1.3	5.2	100.0	49.4	44.2	1.3	5.2	100.0
		Boriguma	0.0	91.0	0.0	9.0	100.0	0.0	91.0	0.0	9.0	100.0
		Dasmantpur	100.0	0.0	0.0	0.0	100.0	100.0	0.0	0.0	0.0	100.0
		Kundra	68.4	30.4	0.0	1.3	100.0	68.4	30.4	0.0	1.3	100.0
		Lamtaput	100.0	0.0	0.0	0.0	100.0	100.0	0.0	0.0	0.0	100.0
		Nandpur	100.0	0.0	0.0	0.0	100.0	100.0	0.0	0.0	0.0	100.0
		Similiguda	92.5	0.0	0.0	7.5	100.0	92.5	0.0	0.0	7.5	100.0
		All Blocks	73.3	23.3	0.2	3.2	100.0	73.3	23.3	0.2	3.2	100.0
		2	Suan	Boipariguda	0.0	0.0	0.0	100.0	100.0	2.5	5.0	0.0
Boriguma	0.0			0.0	0.0	100.0	100.0	0.0	0.0	0.0	100.0	100.0
Dasmantpur												
Kundra	0.0			0.0	0.0	100.0	100.0	0.0	0.0	0.0	100.0	100.0
Lamtaput												
Nandpur												
Similiguda												
All Blocks	0.0			0.0	0.0	100.0	100.0	2.2	4.4	0.0	93.3	100.0
3	Janha			Boipariguda						0.0	100.0	0.0
		Boriguma										
		Dasmantpur										
		Kundra						100.0	0.0	0.0	0.0	100.0
		Lamtaput										
		Nandpur										
		Similiguda										
		All Blocks						50.0	50.0	0.0	0.0	100.0

4.3.3 No. of times weeding

Weeding is a traditional process undertaken in crop fields to remove weeds hampering the growth of crop on the crop field. More number of times of weeding better is the expected yield of the crop and consequently productivity. The OMM project intervention has systematically encouraged millet farmers to undertake a greater number of weeding on the millet fields. As a result of this, more than two-time weeding has positively increased for all types of millets. As per table 4.5, it is evident that weeding practices of millet farmers are mostly more than two times during pre-project as well as post project period.

Table-4.5: Weeding practices followed for cultivating different types of millets in the project area

Sl.	Millet Varieties	Blocks	Pre-Project (% of farmers)				Post-Project (% of farmers)			
			One time	Two times	More than two times	Total	One time	Two times	More than two times	Total
1	Ragi	Boipariguda	0.0	0.0	100.0	100.0	0.0	0.0	100.0	100.0
		Boriguma	0.0	1.4	98.6	100.0	0.0	1.4	98.6	100.0
		Dasmantpur	0.0	1.3	98.7	100.0	0.0	1.3	98.7	100.0
		Kundra	0.0	0.0	100.0	100.0	0.0	0.0	100.0	100.0
		Lamtaput	0.0	3.9	96.1	100.0	0.0	3.9	96.1	100.0
		Nandpur	0.0	0.0	100.0	100.0	0.0	0.0	100.0	100.0
		Similiguda	0.0	8.9	91.1	100.0	0.0	8.9	91.1	100.0
		All Blocks	0.0	2.6	97.4	100.0	0.0	2.6	97.4	100.0
2	Suan	Boipariguda	0.0	0.0	100.0	100.0	0.0	82.1	17.9	100.0
		Boriguma	0.0	0.0	100.0	100.0	0.0	100.0	0.0	100.0
		Dasmantpur								
		Kundra	0.0	0.0	100.0	100.0	0.0	100.0	0.0	100.0
		Lamtaput								
		Nandpur								
		Similiguda								
		All Blocks	0.0	0.0	100.0	100.0	0.0	84.1	15.9	100.0
3	Janha	Boipariguda	0.0	0.0	100.0	100.0	0.0	100.0	0.0	100.0
		Boriguma								
		Dasmantpur								
		Kundra	100.0	0.0	0.0	100.0	100.0	0.0	0.0	100.0
		Lamtaput								
		Nandpur								
		Similiguda								
		All Blocks	50.0	0.0	50.0	100.0	50.0	50.0	0.0	100.0

4.5 Production Behaviour of Ragi in the district

Ragi is found to be the major millet reported in the district. For other types of millets, there are only a few farmers involved during pre-project and post project period. So, taking note of the importance of ragi, the economics ragi production in the district compared to all Odisha situation (All OMM districts) is analysed in this section. On an average for the whole district production of argi per framer and per acre is found at 1.4 and 1.7 quintal respectively. Production per farmers in Koraput is slightly lower in the district compared to the overall performance in the state. Ragi, Suan and Janha are different types of millets cultivated by the millet farmers of the district.

Table-4.6: Behaviour of millet production in Koraput District (Pre-project period)

Sl.	Particulars	Ragi	Suan/Gurji	Kangu	Janha	Kodo	All millets
1	No. of farmer involved in millet cultivation	543	59		2		604
2	Area under millet cultivation (Acres)	517	65		1		582
3	Production /Farmer (Quintal)	1.4	2.2		0.75		1.5
4	Production /Acre (Quintal)	2.7	2		2.5		1.5
5	Total Sales Proceeds/Framer (Rs.)	377	1398		4912		626
6	Total Sales Proceeds/ Acre (Rs.)	396	2824		3340		650
7	Total Sales Proceeds/ Quintal of marketable surplus (Rs.)	1398	2577		11133		1216
8	Total Cost/Farmer (Rs.)	2281	1802		1676		1854
9	Total Cost/ Acre (Rs.)	2397	1894		1761		1948
10	Total Cost/ Quintal of marketable surplus (Rs.)	8885	937		2590		4558
11	Net Income/ Farmer (Rs.)	-1904	-404		3236		-1228
12	Net Income/ Acre (Rs.)	-2001	930		1579		-1298
13	Net Income/ Quintal of marketable surplus (Rs.)	-7487	1640		8543		-3342

Table- 4.7: Behaviour of millet production in Koraput District (Post-project)

Sl.	Particulars	Ragi	Suan/Gurji	Kangu	Janha	Kodo	All millets
1	No. of farmer involved in millet cultivation	548	63		2		613
2	Area under millet cultivation (Acres)	541	72		1		614
3	Production /Farmer (Quintal)	5.5	2.6		2.25		5.2
4	Production /Acre (Quintal)	5.5	2.3		7.5		5.2
5	Total Sales Proceeds/Framer (Rs.)	16156	2383		3221		15033
6	Total Sales Proceeds/ Acre (Rs.)	16365	5524		6925		15015
7	Total Sales Proceeds/ Quintal of marketable surplus (Rs.)	2960	4823		23083		3290
8	Total Cost/Framer (Rs.)	5265	4159		3868		4279
9	Total Cost/ Acre (Rs.)	5333	4213		3918		4335
10	Total Cost/ Quintal of marketable surplus (Rs.)	1172	1817		1822		1141
11	Net Income/ Farmer (Rs.)	10891	-1776		-647		10754
12	Net Income/ Acre (Rs.)	11032	1311		3007		10680
13	Net Income/ Quintal of marketable surplus (Rs.)	1788	3006		21261		2149

Table- 4.8: Behaviour of millet production in the first phase OMM intervention area in the state during pre-project period

Sl.	Particulars	Ragi	Suan/Gurji	Kangu	Janha	Kodo	All millets
1	No. of farmer involved in millet cultivation	1896	148	11	18	106	2179
2	Area under millet cultivation	1725	149	6	10	106	1996
3	Production /Farmer (Quintal)	1.7	1.7	0.73	1.28	1.3	1.6
4	Production /Acre (Quintal)	2.6	1.7	1.38	2.32	1.3	1.8
5	Total Sales Proceeds/Framer (Rs.)	1044	1380	6569	2457	2899	1228
6	Total Sales Proceeds/ Acre (Rs.)	1148	2097	2950	2298	2942	1340
7	Total Sales Proceeds/ Quintal of marketable surplus (Rs.)	1560	2076	5595	4157	2937	1490
8	Total Cost/Farmer (Rs.)	1904	1790	1575	1622	1752	1729
9	Total Cost/ Acre (Rs.)	2093	1968	1731	1783	1926	1900
10	Total Cost/ Quintal of marketable surplus (Rs.)	3128	1295	3855	1907	1898	2514
11	Net Income/ Farmer (Rs.)	-860	-410	4994	835	1147	-501
12	Net Income/ Acre (Rs.)	-945	129	1219	515	1016	-560
13	Net Income/ Quintal of marketable surplus (Rs.)	-1568	781	1740	2250	1039	-1024

Table- 4.9: Behaviour of millet production in the first phase OMM intervention area in the state during post-project period

Sl.	Particulars	Ragi	Suan/Gurji	Kangu	Janha	Kodo	All millets
1	No. of farmer involved in millet cultivation	2252	213	29	28	116	2638
2	Area under millet cultivation	2102	178	10	16	115	2422
3	Production /Farmer (Quintal)	5.6	2.1	0.83	1.45	1.2	5.0
4	Production /Acre (Quintal)	6	2.5	2.35	2.54	1.2	5.5
5	Total Sales Proceeds/Framer (Rs.)	16515	2256	5290	3671	3601	14700
6	Total Sales Proceeds/ Acre (Rs.)	17692	3886	2178	4296	4955	16012
7	Total Sales Proceeds/ Quintal of marketable surplus (Rs.)	2960	4646	6132	7541	4990	3294
8	Total Cost/Farmer (Rs.)	4341	4081	3591	3699	3995	3941
9	Total Cost/ Acre (Rs.)	4650	4371	3847	3962	4279	4222
10	Total Cost/ Quintal of marketable surplus (Rs.)	987	2537	9342	3386	3109	1030

11	Net Income/ Farmer (Rs.)	12174	-1825	1699	-28	-394	10759
12	Net Income/ Acre (Rs.)	13042	-485	-1669	334	676	11790
13	Net Income/ Quintal of marketable surplus (Rs.)	1973	2109	-3210	4155	1881	2264

4.6 Varieties of Ragi Cultivated

Varieties of ragi cultivated in the OMM project area is highlighted in the following table 4.11. In addition to promoting the outreach of existing millets among a greater number of farmers, the OMM has also successfully promoted new improved varieties of millets in selected project areas. Despite continuance of traditional varieties, ragi farmers in selected areas also undertake ragi cultivation by introducing improved varieties. The improved ragi varieties reported in the district include Chilika, Bhairavi, GPU-66, and ML-365.

Table-4.11: Reported varieties of ragi seeds used in the OMM area

Sl.	Blocks	Varieties of seeds used by ragi farmers	
		Traditional Varieties	Improved varieties
1	Boipariguda	Kala Kerenga, Tara, Ladoo, Richika, Dushara, Kadali, Dumuri	
2	Boriguma	Bada Mandia, Chilika, Telenga, Bati	
3	Kundra	Bada Mandia, Telenga, Bati	Chilika
4	Similiguda	Bada Mandia, Mami, Kala Kerenga, Dushara	Bhairavi, GPU-66, GPU-48
5	Dashmantapur	Kala Kerenga, Dushara, Mami, Kalia, Bada Mandia	Bhairavi, ML-365
6	Nandapur	Kalia, Bada Mandia, Mami, Kala Kerenga, Tara	Bhairavi
7	Lamtaput	Bada Mandia, Sana Mandia, Keranga, Dushara, Mami, Tara, Ladoo Mandia, Dumuri	

Concluding Remarks

The overall operational landholding among the millet farmers of Koraput district stands at 3.7 acres. On an average, encroached land and shared in land per farmers is calculated at 1.5 and 1.9 acres respectively. The millet farmers not only produce millet. In addition to millet, they cultivate paddy, pulses, vegetables, oil seeds, and cash crops. Ragi, suan, Kangu, Janha and kodo are different types of millets cultivated by the farmers. A comparative picture about number farmers cultivating different crops during post project situation compared to pre project situation suggests same proportion of farmers are cultivating paddy during pre and post project salutation For all other crops, there is positive variation in the number of farmers. Out of seven reporting blocks, in four reporting blocks, there is less than 1 percent negative variation in land utilisation for paddy crop. With respect to pulses, vegetables and oilseeds, there is marginal increase in land utilisation pattern compared to the same during pre-project situation. However, land area under cash crops has tended to decrease. Overall, there is about 4.7 percent increase in land area under ragi cultivation during post project situation. Method of millet cultivation comprises of mono cropping, mixed cropping and intercropping. The prevalence of different methods of cultivation of different millets by the millet farmers are comparatively shown during pre and post project period. For ragi crop, it is found that mono cropping practice is the dominant method of cultivation during pre-project as well as post project situations. There is declining importance of broadcasting and increasing importance of other type of agronomic practices like SMI, LT and LS methods. It is further evident that agronomic practices of ragi is mainly SMI based followed LT methods

during pre-project as well as post project situations. The OMM project intervention has systematically encouraged millet farmers to undertake a greater number of weeding on the millet fields. As a result of this, more than two-time weeding has positively increased for all types of millets. On an average for the whole district production of argi per framer and per acre is found at 1.4 and 1.7 quintal respectively. Despite continuance of traditional varieties, ragi farmers in selected areas also undertake ragi cultivation by introducing improved varieties. The improved ragi varieties reported in the district include Chilika, Bhairavi, GPU-66, and ML-365.



Chapter-V: Assessment of Household Millet Consumption Pattern in the Project Area

One of the key objectives of OMM is to promote household millet consumption at least by 25 percent so as to enhance household level nutritional security and to create a demand for millets by the households.¹² In this chapter, an attempt has been made to analyse household consumption pattern of millets on the basis of household survey data obtained from 2325 households in all of the programme districts. The consumption pattern examines seasonality of mean household consumption pattern, preferred timing of the day for the consumption of millets, extent of dependence of millet households on market for purchasing millets, average quantity of millet purchased per millet household and source of purchase of millets.

5.1 Seasonality of Household Millet Consumption

The seasonality of household millet consumption pattern is analysed on the basis of proportion of households in the project area consume millets during different seasons in a year. The different seasons are categorized as Winter seasons, Rainy seasons and summer seasons. As per table 5.1, it is found that in all blocks of the district, all of the households covered in the study consume millets during summer season. In other two seasons overall about 80 percent of the households consume millets. Millet consumption during winter and rainy seasons is slightly lower in Boriguma and Similiguda blocks.

Table 5.1: No. of households consuming millets during pre-project period

Sl.	Blocks	No. of households consuming Millets					
		Pre- project period			Post-project period		
		Winter season	Rainy season	Summer season	Winter season	Rainy season	Summer season
1	Boipariguda	44	43	80	44	43	80
2	Boriguma	39	40	79	40	40	79
3	Kundra	78	78	78	78	78	78
4	Similiguda	40	41	78	41	41	78
5	Dashmantapur	78	78	78	78	78	78
6	Nandapur	78	78	78	78	78	78
7	Lamtaput	80	80	80	80	80	80
	All Blocks	437	438	551	439	438	551
		% of households					
1	Boipariguda	55.0	53.8	100.0	55.0	53.8	100.0
2	Boriguma	49.4	50.6	100.0	50.6	50.6	100.0
3	Kundra	100.0	100.0	100.0	100.0	100.0	100.0
4	Similiguda	51.3	52.6	100.0	52.6	52.6	100.0
5	Dashmantapur	100.0	100.0	100.0	100.0	100.0	100.0
6	Nandapur	100.0	100.0	100.0	100.0	100.0	100.0
7	Lamtaput	100.0	100.0	100.0	100.0	100.0	100.0
	All Blocks	79.3	79.5	100.0	79.7	79.5	100.0

¹² OMM Guidelines, 25.11.2016.

5.2 Mean Consumption Pattern

The mean consumption pattern is analysed taking into account mean household consumption of millets per day among the household members. Further these two indicators are disaggregated by winter, rainy and summer seasons. As per the analysis made in table 5.2, it is depicted that overall millet consumption per household during Summer, winter and rainy seasons is found at 0.557, 0.685 and 0.538 Kg respectively. On the basis of qualitative information obtained from respondents it is found that the quantity of millet consumption per household during post project period is reduced because they have received more PDS rice during last two three years. In the last two three years Odisha has witnessed few cyclones and heavy rainfalls. Besides, rural households have also received relief materials for covid related crisis in the country. Over and above, due to increased real income at household level in the rural areas there is good deal of diversified food pattern. All these factors have contributed reduced average consumption of millets during the post project period.

Table-5.2: Seasonality in average household consumption of millets

Sl.	Blocks	Millet Consumption per household per day (Kg)					
		Pre- project period			Post-project period		
		Summer season	Winter season	Rainy season	Summer season	Winter season	Rainy season
1	Boipariguda	0.376	0.943	0.224	0.281	0.534	0.138
2	Boriguma	0.334	1.318	0.291	0.304	0.525	0.126
3	Kundra	0.763	0.565	0.663	0.765	0.603	0.690
4	Similiguda	0.425	1.074	0.274	0.323	0.537	0.137
5	Dashmantapur	0.671	0.524	0.588	0.676	0.573	0.603
6	Nandapur	0.736	0.528	0.633	0.740	0.577	0.663
7	Lamtaput	0.604	0.466	0.545	0.684	0.571	0.626
	All Blocks	0.557	0.685	0.509	0.538	0.567	0.501

5.3 Household Dependence on Market for Millets

Despite own production of millets, most often millet farmer households depend on market to meet the household consumption requirement. This implies their own production is insufficient to meet their domestic requirements or self-consumption for which they purchase millets from the market. As per table 5.4, it is observed that during pre-project situation, about 55.8 percent of the households were depending on market for purchasing millets which has come down to 21.3 percent during post project period. The average quantity of millet purchased from market by each of the reporting households was 0.28 quintal per annum which has sufficiently gone up to 1.93 quintal during post project situation. Such a remarkable rise in the quantity of millet purchased from market is attributed to strong millet consumption habits during post project period.

Table-5.4: No of households purchasing millets from outside despite own production

Sl.	Districts	No. of households' purchase millet for household use					Average quantity of millet purchased for household use (Quintal)		
		Pre-project period	% of HHs	Post-Project period	% of HHs	Total Households surveyed	Pre-projec	Post- Projec	% Deviation

							t period	t period	
1	Boipariguda	1	1.3	38	47.5	80	0.2	1.88	840.0
2	Boriguma	1	1.3	35	44.3	79	0.25	1.9	660.0
3	Kundra	78	97.5		0.0	80	0.29	2	589.7
4	Similiguda	1	1.3	38	47.5	80	0.3	1.78	493.3
5	Dashmantapur	77	96.3	1	1.3	80	0.28	2	614.3
6	Nandapur	77	96.3		0.0	80	0.28	1.99	610.7
7	Lamtaput	77	96.3	7	8.8	80	0.29	2	589.7
	All Blocks	312	55.8	119	21.3	559	0.28	1.93	589.3

As per table 5.5, It is found that during pre-project period, major source of purchasing millets were local market and bartar. However, during post project period owing to mainstreaming of PDS, households are found purchasing millets from PDS.

Table-5.5: Source for purchasing (procuring) by households

Sl.	Source for purchasing millets (% of households)					
	Pre-Project Period			Post- Project Period		
	Source	Koraput	All districts	Source	Koraput	All districts
1	Local Market	0.3	4.6	Local Market	3.9	9.8
2	Wage good	0	1.5	PDS	91.7	86.2
3	Barter	0.3	3	Barter	0	0.6
4	Received as gift from fellow relatives	0	0.4	Local market & PDS	0.4	0.8
5	Local market & PDS	3.2	4.7	Local Market & Wage good	3.9	1.8
6	Local Market & Wage good	95.2	83.3	PDS & Barter	0	0.7
7	Local Market and Barter	0.6	2			
8	PDS and wage good	0.3	0.2			
9	Wage good and barter	0	0.1			
	Total	100	100	Total	100	100

Concluding Remarks

All the households covered in the study consume millets during summer season. In other two seasons overall about 80 percent of the households consume millets. Millet consumption during winter and rainy seasons is slightly lower in Boriguma and Similiguda blocks. Overall millet consumption per household during Summer, winter and rainy seasons is found at 0.557, 0.685 and 0.538 Kg respectively. During pre-project situation, about 55.8 percent of the households were depending on market for purchasing millets which has come down to 21.3 percent during post project period. The average quantity of millet purchased from market by each of the reporting households was 0.28 quintal per annum which has sufficiently gone up to 1.93 quintal during post project situation. During pre-project period, major source of purchasing millets were local market and bartar. However, during post project period owing to mainstreaming of PDS, households are found purchasing millets from PDS.

Chapter-VI: Processing and Marketing of millets in the Project Area

With the objective of assessing millet farmers' behaviour with regard to processing and marketing of millets, present chapter is attempted. Processing and marketing relate to the post-harvest management practices of millet farmers. The first section of this chapter deals with millet processing and the subsequent section deals with marketing behaviour of millet farmers. While analysing processing behaviour only post project situation is considered as the data pertaining to this area are obtained through FGD. However, for analysing marketing situation, a comparative analysis of pre and post project situation is undertaken for assessing the type of change in millet marketing system. Processing and marketing behaviour is separately analysed for the varieties of millets reported in the study.

6.1 Primary Processing of Millets

The type of first-hand processing of the produced millets by the farmers' themselves is conceptually known as primary processing. From the previous analysis it is well known that millet farmers ultimately use their produced millet for the purpose of self-consumption and sales of marketable surplus. Thus, broadly there are two types of processing activities separately carried out by the millet farmers. This implies for self-consumption; they do undertake one type of processing and for marketing purposes they do undertake different types of processing. Table 6.1 analyses the processing activities undertaken by the households for self-consumption of millets. The different food items prepared for millets are also discussed separately for all the district. The processing activities mainly comprise of converting ragi to flour and de-husking in the case of other millets. With respect to ragi flour making, majority of households depend on machine for which they cover a minimum distance of 2 Kms. and maximum distance of 12 Kms. On the other hand, for other types of millets, de-husking of millet is required which is done through traditional means by all households. However, the household's dependent on traditional processing uses locally available traditional instruments like "dhinki", made up of wooden logs, and "chakki", made up of two round stone plates. Dhinki is used for dehusking and chakki is used for grinding. Both these instruments are operated manually.

Table-6.1: Processing of millets for Self-Consumption

Sl.	Type of millets reported	Type of food items prepared by millet households	Reported Primary Processing activities	Access to Primary Processing Methods	Average distance covered for machine processing
1	Ragi	Soup, Porridge, pan cake, mixture, Khir, Pakodi, ladu, sarabat, halwa	Ragi to ragi flour	About 20 percent of HHs doing ragi flour manually at home	Those 80 percent cover a distance of 2 - 12 kms to access mills
2	Suan (also called gurji)	Khir, Upma	De-husking for saun rice	All HHs do dehusking manually through traditional means like dhenki .	Nil distance
3	Janha	Muan (Ladu of puffed Janha)	Dehusking and roasting		

So far as processing of marketable surplus is concerned, traditionally millet farmers were categorising millets particularly ragi under two categories as with and without husk. Accordingly, there was price differentiation and obviously they were selling with husked millets at lower price and without husked millets at a higher price. Soon after the introduction of Mandies under OMM, millet farmers are processing their millets as per Mandi standards. They are sun-drying dehusked millets for maintaining required moisture. Very commonly, they sell millets with husk at a lower price. The middlemen undertake value addition activities by making millets husk free. Further middlemen also do sorting and grading of millets according to quality. Now as a result of OMM intervention and training to millet farmers, slowly they have started value addition activities for the marketable surplus of millets.

6.2 Marketing of Millets

The marketable surplus of millets is sold through different channels. As per millet farmers' survey data, it is found that local middlemen, local haat, local money lender, input supplier and barter are different market channels through which surplus millet is sold by the farmers. Barter is a type of market channel, when surplus millet is exchanged for other commodities needed by the millet farmers.

6.2.1 Marketing Channels for ragi

As it can be seen from the following table 6.2, during pre-project period local middlemen was the predominant channel which has been shifted in favour of Mandi during post project period. During pre-project situation, around 95.8 percent of surplus ragi surplus were sold through middlemen and now, during post project period, as maximum as 76 percent of surplus ragi are sold through Mandis. This is a remarkable achievement of OMM. Selling of surplus ragi at local haat was also a solid channel during pre-project period which is found negligible during post project period.

Table-6.2: Marketing of Ragi by different Marketing Channels

Districts	Marketing of Ragi by farmers in different market channels (% of overall quantity) during pre-project period					
	Govt. procurement	Middlemen	Local Haat	local Money Lender	Input supplier	Barter
Koraput	-	95.8	4.2	0.0	0.0	0.0
All districts	-	79.8	18.3	0.7	0.0	1.1
	Marketing of Ragi by farmers in different market channels (% of overall quantity) during post-project period					
Koraput	76.0	15.3	3.0	2.1	3.7	0.0
All districts	81.0	15.9	1.3	0.7	1.2	0.0

6.2.2 Marketing Channels for Suan

As it can be seen from the following table 6.3, during pre-project period local middlemen was the predominant channel which is still evident during post project period. During pre-project situation around 99.3 percent of surplus suan were sold to middlemen and now, during post project period also, about 97 percent are sold through this channel. Like middlemen, the importance of local haat to offload surplus suan still continues in the project area. About 2.8 percent of surplus suan are sold through local haats during pre-project as well as post project period.

Table-6.3: Marketing of Suan by different Marketing Channels

Districts	Marketing of Suan by farmers in different market channels (% of overall quantity) during pre-project period					
	Govt. procurement	Middlemen	Local Haat	local Money Lender	Input supplier	Barter
Koraput	-	99.3	0.7	0.0	0.0	0.0
All districts	-	83.6	15.4	0.9	0.0	0.0
Marketing of Suan by farmers in different market channels (% of overall quantity) during post-project period						
Koraput	-	97	2.8	0.1	0.0	0.0
All districts	-	83.7	15.7	0.7	0.0	0.0

6.2.4 Marketing Channels for Janha

As it can be seen from the following table 6.5, during pre-project period local middlemen and local haat were the predominant channels for selling surplus janha by the farmers. These two channels absorbed jointly absorbed the entire marketable surplus of janha in the project area. During pre-project situation middlemen was the predominant channel for selling the surplus suan by the suan farmers. However, during post project situation, 100 percent suan are sold through local haats. It is found that during post project situation, there is also good deal of awareness of the non-millet producing households particularly among consumers regarding the benefits of millet consumption. Taking it advantageously, millet farmers are selling their surplus suan in the local haats.

Table-6.5: Marketing of Janha by different Marketing Channels

Districts	Marketing of Janha by farmers in different market channels (% of overall quantity) during pre-project period					
	Govt. procurement	Middlemen	Local Haat	local Money Lender	Input supplier	Barter
Koraput	-	100.0	0.0	0.0	0.0	0.0
All districts	-	62.1	37.9	0.0	0.0	0.0
Marketing of Janha by farmers in different market channels (% of overall quantity) during post-project period						
Koraput	-	0	100.0	0.0	0.0	0.0
All districts	-	16.5	8.2	75.3	0.0	0.0

Concluding Remarks

The processing activities mainly comprise of converting ragi to flour and de-husking in the case of other millets. With respect to ragi flour making, majority of households depend on machine for which they cover a minimum distance of 2 Kms. and maximum distance of 12 Kms. On the other hand, for other types of millets, de-husking of millet is required which is done through traditional means by all households. However, the household's dependent on traditional processing uses locally available traditional instruments. Soon after the introduction of Mandies under OMM, millet farmers are processing their millets as per Mandi standards. They are sun-drying dehusked millets for maintaining required moisture. Very commonly, they sell millets with husk at a lower price. The middlemen undertake value addition activities by making millets husk free. Further middlemen also do sorting and grading of millets according to quality. Now as a result of OMM intervention and training to millet

farmers, slowly they have started value addition activities for the marketable surplus of millets. During pre-project situation, around 95.8 percent of surplus ragi surplus were sold through middlemen and now, during post project period, as maximum as 76 percent of surplus ragi are sold through Mandis. This is a remarkable achievement of OMM. Selling of surplus ragi at local haat was also a solid channel during pre-project period which is found negligible during post project period. During pre-project situation around 99.3 percent of surplus suan were sold to middlemen and now, during post project period also, about 97 percent are sold through this channel. Like middlemen, the importance of local haat to offload surplus suan still continues in the project area. About 2.8 percent of surplus suan are sold through local haats during pre-project as well as post project period. During pre-project situation middlemen was the predominant channel for selling the surplus suan by the suan farmers. However, during post project situation, 100 percent suan are sold through local haats.



Chapter-VII: SWOT Analysis on the Functioning of Odisha Millet Mission in the District

With the objective of assessing the overall impact of OMM on production, consumption, processing and marketing of millets in the district, the study gathers additional information from the district level Agricultural Officers, Block level Agricultural Officers, District Coordinator (WASSAN), Facilitating Agency (FA), Cluster Resource Persons (CRPs), Community Based Organisations (CBOs). The CBOs and CRPs are appointed by the concerned FA of the block. CBOs and CRPs are appointed at the local level to carry forward the task of farmers mobilisation and motivation for millet cultivation. Besides, the functioning of OMM is also mandated to promote consumption, processing and marketing of millets, so, the Strength, Weakness, Opportunities and Threats associated with each facet of OMM implementation in the programme area is highlighted in this chapter. For this purpose, stakeholders' opinions gathered during the time of field survey are analysed.



		7.1 Strength of OMM			
Sl.	Stakeholders	Stakeholder' Opinions on the Strength of OMM in the district			
		Production	Consumption	Processing	Marketing
1	District level Agricultural Officers	<ul style="list-style-type: none"> → OMM has been instrumental in bringing more areas under millet cultivation. → More numbers farmers are also mobilised for millet cultivation. → Framers are provided with due training and hand holding support for better and scientific cultivation of millets. → Framers' training on Best possible agronomic practices is promoted under OMM. → Organic cultivation of millet is promoted. 	<ul style="list-style-type: none"> → Previously, in the tribal areas, there was also millet consumption habits among majority of households. But owing to insufficient production at their household level they were market dependent. → Due to self-sufficiency of millet production at household level, more number of household members are consuming millets more number of days in a year. 	<ul style="list-style-type: none"> → Millet de-huskers, flour mills provided at local level have reduced the drudgery of women for processing of millets. 	<ul style="list-style-type: none"> → Due to MSP for millets, farmers are quite encouraged for millet cultivation.
2	Block level Agricultural Officers	<ul style="list-style-type: none"> → Millet is a low investment crop for which tribal farmers with low investment capacity can better adapt to millet cultivation. → Tribals are mostly inhabited in dryland areas, so, millets are most suitable crops in these areas because of their drought resistant capacity and lower water intake. → Tribals are historically linked with millet cultivation. So, they 	<ul style="list-style-type: none"> → Considering the life style diseases, now a days there is better awareness among people that millet is a healthy and nutritious food. This has led to more millet consumption. → Due to diversification of food, people have increased preference for millets. → Govt has systematically emphasized the relevance and utility of millet 	<ul style="list-style-type: none"> → Now, people are used to modern methods of processing, previously it was labour intensive and cumbersome. So, OMM has also positively contributed to millet processing. 	<ul style="list-style-type: none"> → Previously, farmers were mainly selling millets to local middlemen, whereby they were exploited by price front. Now due to Govt. procurement of millets through mandi, there is better scope for

		are naturally advantageous to undertake millet cultivation.	consumption, for which more people are attracted for millet consumption.		farmers to get authentic value for their produced millets.
3	District level WASSAN Officials	<ul style="list-style-type: none"> → Due to OMM intervention, farmers have accepted millets as one of the best crops to be cultivated by them in their own lands. → Most suitable crop in the rainfed areas. → It is very much cost effective compared to paddy. 	<ul style="list-style-type: none"> → Millet is a cheap source of nutrition at household level. OMM promoted awareness programmes have influenced millet consumption in the project area. → Now, millets are distributed through PDS network for which millet consumption has increased. → Similarly, ICDS has also incorporated millet meals for pre school children at AWCs, which is expected to increase millet consumption of children at household level. 	<ul style="list-style-type: none"> → Locally availability of quality processing, there is time saving by covering reduced distance for millet processing. 	<ul style="list-style-type: none"> → OMM is in the process of creating Farmers Producers Companies and other Producers Groups. This is expected to contribute to better aggregation of millets produced by the small and marginal farmers.
4	Facilitating Agencies	<ul style="list-style-type: none"> → Adequate training and handholding support are instrumental in bringing about proactive attitude of millet farmers towards continuance of millet cultivation. → Modern method of cultivation as provided under OMM is expected for further increase in millet productivity in the project area. → Govt incentive scheme has encouraged more number of 	<ul style="list-style-type: none"> → Millet consumption is very much important for adolescent girls, pregnant women and youth. Due to Covid pandemic, majority of people do also believe that millet consumption helps to boost immunity. → The food festivals and exhibitions have showcased millet based food and recipes at different district, block and state level . This has 	<ul style="list-style-type: none"> → Easy processing has contributed to value addition of millets. 	<ul style="list-style-type: none"> → Gradation of millets as introduced by the FAs in the OMM project areas have enabled farmers to get differential prices for different qualities of millets produced by them.

		farmers with increased area of millet cultivation in the project area.	contributed to increased millet consumption.		
5	CBOs	<ul style="list-style-type: none"> → Millet framers under OMM are adequately trained for producing organic fertilizers in their own capacities. This is cheap and highly efficient compared to organic fertilizers. Farmers have been able to minimise costs for which they will be interested to go for organic cultivation of millets. → The Custom Hiring Centres run by the CBOs have become very much helpful to arrange modern agricultural instruments to the farmers for which they have been able to cultivate millets efficiently. This is expected to contribute more to millet production in time to come. → The management skills and other skill development programmes as provided to millet farmers have strengthened millet farmer's' confidence for millet production. 	<ul style="list-style-type: none"> → Previously, there were few traditional millet recipes widely used by the consumers. Now due to diversified millet recipes, there is good scope of millet consumption. → Some of the affluent class and urbanised people have started thinking about the increased merits of organic branded foods. As millets are mostly organic in nature, thus there is good acceptability of millet as staple foods even among the urban high-end consumers 	<ul style="list-style-type: none"> → De-husking and flour mills run and managed by the CBOs has not only reduced the drudgery of local people but also contributed to value added millets available for local consumption. 	<ul style="list-style-type: none"> → Due to Govt. procurement, farmers have been able to get a justifiable share of consumers' price which was previously not possible as a sizable proportion of consumer price of the product was misappropriated by the middlemen.

6	CRPs	<p>→ The modern methods and equipments for agronomic practices, cultivation practices and weeding practices as provided under the OMM, have contributed to better millet production and productivity.</p> <p>→ The handholding and regular monitoring of the Agricultural department officials to millets farmers have increased the confidence level of millet farmers and they are quite optimistic to increase miller production in future also.</p>	<p>→ CRPs are also engaged in promoting diversified millet recipes at household level which is augmenting household millet consumption in the project area.</p>	<p>→ There are local level evidences that millets powders are found as essential ingredients of “Chhatua Powder”.</p>	<p>→ Due to the upsurge of millet consumption even among the non-millet producing households has significantly contributed to the upward market demand for millets.</p>
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7.2 Weakness of OMM

Sl.	Stakeholders	Stakeholder’ Opinions on the Weakness of OMM in the district			
		Production	Consumption	Processing	Marketing
1	District level Agricultural Officers	<p>→ Change in the mindset of farmers is a time-consuming process. They are taking their own time from diverting to millets from other crops.</p> <p>→ Further continuance of the OMM supported awareness programme would leverage the adoption of millets as an important dry land crop in the project area.</p>	<p>→ There is still lack of awareness among the masses regarding the health benefits of millet consumption.</p> <p>→ Millet should be included in the Food Security Act, of the Govt. of India, so that millet consumption would be further increased.</p>	<p>→ Millet processing machineries are not available in all village, so for the purpose of processing, households spend a sizable chunk of their time by undertaking travel to the nearby processing centres.</p>	<p>→ Govt. procurement of millets is yet to be full-fledged. Once it gets done, there are good chances of improvement of millet production and consumption.</p>

2	Block level Agricultural Officers	→ Millet farming is a traditional farming practice. Adoption of modern methods of cultivation is yet to be full-fledged.	→ By nature, millets are light foods, so, most often people engaged in hard manual works, accord priority to heavy foods rather than millets.	→ Most of the people are yet to be trained on the required specialised processing of millets.	→ Govt. procurement of ragi is still limited and yet to be strengthened.
3	District level WASSAN Officials	<p>→ Procurements targets currently available is very much limited to ragi only and other non ragi millets are completely excluded from the procurements. Had there been coverage of non ragi millets in the procurement process, perhaps more number of millet farmers might have adopted non ragi millets.</p> <p>→ The district level project Management Unit (DPMU) might have contributed to more millet production. As the DPMU of OMM is yet to be functional at the district level, perhaps the millet production is limited.</p>	<p>→ Lack of sufficient training on tasty millet recipes compels people to use traditional millet recipes, so, the users get bored most often by repeatedly consuming the same traditional millet-based recipes.</p> <p>→ Millet recipes although introduced under ICDS and PDS, still it is optional, so consumption improvement is not getting broad-based.</p>	→ Govt. through OMM project intervention is yet to promote access and usage of millet processing units at every village.	→ Besides, non ragi millets are yet to be included in the ambit of Govt. procurement through the fixation of MSP.
4	Facilitating Agencies	→ The delay in the receipt of incentives and inputs as provided to millet farmers, very often limits the full-scale acceptability of the OMM farmers.	→ Since decades, there is social discouragement that millet recipes are poor man's food, which stands on the way of increasing millet consumption.	→ Age old food habits may take time to get changed in favour of millet consumption drastically.	→ There is imperative need to promote export of millets from India.

5	CBOs	<p>→ Presently, there is limited implementation of the procurement policy for millet crops. If the procurement policy is expanded, there may be further scope for promoting millets in the project area.</p> <p>→ There is limited progress of Custom Hiring Centres as supported under OMM. The full-scale non-functionality limits to the desirable level of millet production in the project area.</p>	<p>→ There should be training on the preparation of dry foods from different types of millets. Rural women are acquainted only with the preparation of traditional recipes.</p>	<p>→ Electricity facility is not found in all of the villages. Sometimes, despite availability of electricity facility, people find it difficult to pay electricity bills every month.</p> <p>→ Resultingly, even if millet processing units are found, it becomes very difficult to make regular functioning of millet processing machineries.</p>	<p>→ Farmers complain that there is payment delay by the Govt, when they sell their millets through mandis.</p>
6	CRPs	<p>→ Use of certified seeds is practiced by limited number of millets. This is attributed to non-availability of required certified seeds in timely manner. Perhaps use of certified seeds by the millets farmers can enhance millet production in the project area.</p>	<p>→ Most of the rural people consume ragi millet as porridge (Jau) only, which is not tasty. Sufficient training and awareness on the preparation of alternative recipes would further increase millet consumption.</p>	<p>→ Trained manpower to operate millet processing machines is also limiting factor for machine-based processing of millets in the project villages.</p>	<p>→ Owing to higher cost of cultivation, the MSP of millets are still considered lower by the millet farmers.</p> <p>→ Besides, there are delays in the procurement of millets under Mandi system. Framers say that soon after harvest, Mandi system should become effective, so that, there will quick cash inflow to the farmers bank A/Cs.</p>

7.3 Opportunities of OMM

Sl.	Stakeholders	Stakeholder' Opinions on the Opportunities of OMM in the district			
		Production	Consumption	Processing	Marketing
1	District level Agricultural Officers	→ The net income from millet cultivation per acre of land is higher relative to other crops. So, there is good prospect of undertaking millet cultivation and substituting other crops by millets.	→ Millet is very much nutritious and hygienic food.	→ Ragi threshers and peelers supplied to SHGs will strengthen millet processing. → Pulverisers are likely to be provided through OMM will strengthen processing activities.	→ There is increased scope of marketing of millets domestically as well as internationally.
2	Block level Agricultural Officers	→ It requires less water and drought resistant. Even in the very unfavourable marginal lands, millet crops can be grown.	→ It can be easily accessed in any type of marketing places starting village Haats upto supermarkets.	→ Millet farmers to some extent have adopted modern methods of millet cultivation and processing. This is due to the sincere efforts of OMM.	→ Millet procurement with MSP support is gradually mainstreamed and there is also systematic attempts to cover all millets under MSP.
3	District level WASSAN Officials	→ It is climate resilient and having solid promise in rainfed agricultural scenarios.	→ Multiple millet-based recipes are possible and households have slowly learned the preparation of multiple millet-based recipes owing to systematic intervention of OMM in providing demonstrations of different millet-based recipes.	→ Millet farmers are gradually acquiring good deal of knowledge on millet processing and further value addition.	→ Few of the Food retailers have already started branding of millets, so as to cater to the needs of brand conscious urban middle class buyers and high-end buyers.

4	Facilitating Agencies	<p>→ Millet can be grown organically, and the concept of organic foods is trending in recent years particularly among the urban middle class people.</p>	<p>→ Millet can be consumed along with many other foods. → It can be a wholesome meal even without combining with other foods. → Its consumption can be any meal of the day or all the meals of the day. → Millet is very much a flexible food.</p>	<p>→ Millet processing units although not established in all of the villages, but, there is good access to the processing units at least at the GP level.</p>	<p>→ Govt. has started millet-based tiffin centres with the support of SHGs, and there is good demand for the items supplied through this millet cafes.</p>
5	CBOs	<p>→ Millet crops can be grown even in the sloppy terrains and hilly areas.</p>	<p>→ Millet is proven immunity booster food and during the time of ongoing Covid-19 pandemic, millet consumption has increased relevance.</p>	<p>→ Millet processing and value addition can enhance the value chain activity of millets and even the supply chain can be increased to the export market.</p>	<p>→ There is good chance of promoting skills for millet-based value addition activities as well as strengthening the supply chain management of millet activities.</p>
6	CRPs	<p>→ All categories of farmers can easily adopt millet cultivation, because of the simplicity of its cultivation process without entailing much of the sophisticated knowledge.</p>	<p>→ The outreach of millet consumption could be further reinforced by further promoting millets in the MDMs and AWCS.</p>	<p>→ There is plan to undertake systematic intervention for the promotion of millet processing in all of the OMM intervention villages.</p>	<p>→ Considering that more number of households and household members are adopting millets as staple foods, there is good chance of marketing of millets in the immediate future.</p>

7.4 Threat of OMM

Sl.	Stakeholders	Stakeholder' Opinions on the Threats of OMM in the district			
		Production	Consumption	Processing	Marketing
1	District level Agricultural Officers	→ Farmers will adopt to millet cultivation only in high land areas where paddy and cultivation of other crops are risky. In that way, there can't be any major diversion of paddy lands for millet cultivation in Odisha.	→ Millet can't be exclusively consumed by itself. Under current socio-economic situations, millet can't be exclusively considered as the staple food.	→ Market needs finest quality flours without presence of any husk in the flour. But in the case of ragi flour, there is every possibility of fibres and starches in the flour. From marketing point of view, it is to some extent difficult.	→ Millet farmers in the absence of MSP are likely to sell to middlemen which is very much exploitative in nature and farmers become bound to undergo distress sales of millets.
2	Block level Agricultural Officers	→ It is traditionally believed by the farmers that millet cultivation is a subsistence-oriented farming practice and it is very hard for the farmers to believe about the commercial viability of millet farming.	→ As millet are light foods and quickly digests, the hard-working rural people may find it costlier and inconvenient to substitute rice like heavy food for millet.	→ There is large scale wastage in the processing of millets.	→ Although, there is govt. procurement for ragi, for non ragi millets, such mechanism is yet to be established which is a limitation for millet farmers for proper marketing of their produce.
3	District level WASSAN Officials	→ Millet cultivation can't be possible in all land categories, which is very much a limiting factor for aggressive outreach of millet cultivation.	→ Although quality wise millets are very good, but, most often people are detached from millet as taste wise, millets are not very good.	→ There is absence of processing facilities at village level.	→ Marketing of millets is viewed to be a constraint owing to limited processing facilities of millets.
4	Facilitating Agencies	→ Farmers feel it difficult to consider millet cultivation as principal	→ Despite promotion of so many varieties of millet base recipes, but majority	→ Considering limited demand, private investment in millet	→ In the case of non ragi millets, there is very much limited marketable surplus, for which

		cultivation of any cropping season. Rather it is supplementary cultivation as perceived by the farmers.	of people consider ragi porridge as the main recipe, which can't be substituted by any other recipe.	processing sector is found limited.	it is becoming difficult to strengthen proper marketing channels for millets. Resultingly, middlemen purchase is found to be the very much established channels for non ragi millets.
5	CBOs	→ Paddy cultivation, over time has influenced the socio, religious and cultural practices of farmers' households, which might hinder the sustained adoption of millet farming.	→ Even if there is large scale adoption of millets as staple food, the supply of millet is limited.	→ Limited mechanised processing facilities at village level discourage millet processors to go for necessary value addition particularly for millets requiring dehusking. It is the case of suan, kangu and kodo millets.	
6	CRPs	→ Most often the millet farming is considered inferior compared to the prestige value attached to other crops cultivation particularly paddy cultivation.	→ Large scale adoption of millet as staple food may lead to scarcity of millets and consequently higher price which may confuse households to consume millets.		

Chapter-VIII: Key Findings and Way Forward

8.1 Key Findings

8.1.1 OMM outreach in Koraput District

Average annual land area used for ragi cultivation is reduced by 10.20 percent in 2010s compared to 2000s in Koraput district. However, diversion of ragi lands for other crops in Koraput district is found lower compared to the state figures. In the case of small millets, in 2010s, there is positive increase in land area under small millet cultivation. There is also positive improvement in the proportionate share of Koraput district in the total quantity of land under ragi and small millets cultivation in the state. The yield rate of ragi as well as small millets in Koraput district stands lower compared to the all-Odisha average picture during 2000s and 2010s, albeit positive increase in 2010s over 2000s in Koraput district. The yield rate of ragi in Koraput district in 2010s has increased by 24.29 percent compared to 2000s. During the corresponding period, the yield rate of small millets has increased by 21.82 percent. There is improvement in yield index for ragi as well as small millets in 2010s compared to 2000s. The average annual ragi production in Koraput district increased by 11.29 percent in 2010s compared to 2000s. Koraput district has a sizable share in the overall production of ragi and small millets in the state. Compared to the situation prevailing in 2000s, the percentage share of the district in the overall state's ragi and small millets production has tended to increase in 2010s. By the end of Kharif 2019-20, OMM has covered seven blocks in Koraput district. Cumulatively, in all these blocks, there is outreach of OMM in 204 GPs, 1197 villages, 19007 farmers and 7318.91 hectares of land area under millet cultivation.

8.1.2 Socio Economic Characteristics of Millet Farmers

About 88 percent of the farmers have joined into OMM in 2017-18 year, followed by 8.8 percent in 2018-19 and the remaining 3.2 percent in 2019-20. Out of the total registered millet farmers of the district, 58.9 percent of millet households are ST households followed by OC households (34.9 %) and SC households (6.3%). Proportionately, there are a greater number of non-ST category households in Dashmantamatapur and Similiguda blocks. The mean age of millet farmers is overall found at 44.9 years. About 69.4 percent of millet farmers of Koraput district are males and the remaining 30.6 percent are females. Incidence of female millet farmers is comparatively higher at Lamtaput block followed by Boriguma and Boipariguda blocks. Majority of millet farmers of Koraput district are illiterates followed primary level of education. Proportionately, 95.9 percent of millet farmers are Hindus and the remaining 4.1 percent are Christians. Majority of millet farmers of the district are small farmers followed by marginal farmers. The proportionate share of small farmers, medium farmers, marginal farmers and large farmers are found at 44.9, 14.5, 35.1 and 5.5 percent respectively. Marginally higher proportion of millet farmers of the district have semi-pucca houses followed kuchha houses and pucca houses. The average family size is found at 4.6 persons. The average family size at Boipariguda, Lamtaput and Kundra blocks is found at 5.1, 4.9 and 4.7 respectively. In these three blocks, the average family size is relatively higher. The overall sex ratio among the millet households of the district is found balanced.

8.1.3 Behaviour of Millet Production in the district

The overall operational landholding among the millet farmers of Koraput district stands at 3.7 acres. On an average, encroached land and shared in land per farmers is calculated at 1.5 and 1.9 acres respectively. The millet farmers not only produce millet. In addition to millet, they cultivate paddy, pulses, vegetables, oil seeds, and cash crops. Ragi, suan, Kangu, Janha and kodo are different types of millets cultivated by the farmers. A comparative picture about number farmers cultivating different crops during post project situation compared to pre project situation suggests same proportion of farmers are cultivating paddy during pre and post project salutation For all other crops, there is positive variation in the number of farmers. Out of seven reporting blocks, in four reporting blocks, there is less than 1 percent negative variation in land utilisation for paddy crop. With respect to pulses, vegetables and oilseeds, there is marginal increase in land utilisation pattern compared to the same during pre-project situation. However, land area under cash crops has tended to decrease. Overall, there is about 4.7 percent increase in land area under ragi cultivation during post project situation. Method of millet cultivation comprises of mono cropping, mixed cropping and intercropping. The prevalence of different methods of cultivation of different millets by the millet farmers are comparatively shown during pre and post project period. For ragi crop, it is found that mono cropping practice is the dominant method of cultivation during pre-project as well as post project situations. There is declining importance of broadcasting and increasing importance of other type of agronomic practices like SMI, LT and LS methods. It is further evident that agronomic practices of ragi is mainly SMI based followed LT methods during pre-project as well as post project situations. The OMM project intervention has systematically encouraged millet farmers to undertake a greater number of weeding on the millet fields. As a result of this, more than two-time weeding has positively increased for all types of millets. On an average for the whole district production of argi per framer and per acre is found at 1.4 and 1.7 quintal respectively. Despite continuance of traditional varieties, ragi farmers in selected areas also undertake ragi cultivation by introducing improved varieties. The improved ragi varieties reported in the district include Chilika, Bhairavi, GPU-66, and ML-365.

8.1.4 Behaviour of Millet Consumption in the District

All the households covered in the study consume millets during summer season. In other two seasons overall about 80 percent of the households consume millets. Millet consumption during winter and rainy seasons is slightly lower in Boriguma and Similiguda blocks. Overall millet consumption per household during Summer, winter and rainy seasons is found at 0.557, 0.685 and 0.538 Kg respectively. During pre-project situation, about 55.8 percent of the households were depending on market for purchasing millets which has come down to 21.3 percent during post project period. The average quantity of millet purchased from market by each of the reporting households was 0.28 quintal per annum which has sufficiently gone up to 1.93 quintal during post project situation. During pre-project period, major source of purchasing millets were local market and bartar. However, during post project period owing to mainstreaming of PDS, households are found purchasing millets from PDS.

8.1.5 Behaviour of Millet Processing and Marketing

The processing activities mainly comprise of converting ragi to flour and de-husking in the case of other millets. With respect to ragi flour making, majority of households depend on machine for which they cover a minimum distance of 2 Kms. and maximum distance of 12 Kms. On the other hand, for other types of millets, de-husking of millet is required which is done through traditional means by all

households. However, the household's dependent on traditional processing uses locally available traditional instruments. Soon after the introduction of Mandies under OMM, millet farmers are processing their millets as per Mandi standards. They are sun-drying dehusked millets for maintaining required moisture. Very commonly, they sell millets with husk at a lower price. The middlemen undertake value addition activities by making millets husk free. Further middlemen also do sorting and grading of millets according to quality. Now as a result of OMM intervention and training to millet farmers, slowly they have started value addition activities for the marketable surplus of millets. During pre-project situation, around 95.8 percent of surplus ragi surplus were sold through middlemen and now, during post project period, as maximum as 76 percent of surplus ragi are sold through Mandis. This is a remarkable achievement of OMM. Selling of surplus ragi at local haat was also a solid channel during pre-project period which is found negligible during post project period. During pre-project situation around 99.3 percent of surplus suan were sold to middlemen and now, during post project period also, about 97 percent are sold through this channel. Like middlemen, the importance of local haat to offload surplus suan still continues in the project area. About 2.8 percent of surplus suan are sold through local haats during pre-project as well as post project period. During pre-project situation middlemen was the predominant channel for selling the surplus suan by the suan farmers. However, during post project situation, 100 percent suan are sold through local haats.

8.2 Way Forward

- Due to prevalence of MSP and procurement of kharif ragi through Mandi system, the millet farmers have well accepted ragi as a major millet crop in the OMM project areas. Farmers have also expressed their interest to cultivate ragi during Rabi season. It is suggested by the farmers as well as grassroot level OMM officials that procurement of ragi during Rabi season should be introduced so that ragi farmers will be interested to under rabi cultivation of ragi.
- Besides, there are farmer level suggestion for introducing MSP for other millets like Suan, kangu, janha and kodo millets. Due to non-prevalence of MSP for these millets, farmers are not giving sufficient attention for undertaking cultivation of non ragi millets.
- Govt. of India has recently focussed on promotion of Farmer Producers Companies (FPC) for increasing farmers income through FPC channels. There seems to be sufficient space for organising small holder millet farmers into FPCs. Besides, promoting millet producers' collectives at block and district level is expected to contribute to strengthening the economics of millet farmers. In some of the OMM areas, early efforts for promoting millet based FPOs have already been attempted and the benefits of such producers' collectives are expected very shortly. It is suggested that millet based FPOs should be organized in all of the OMM districts. Mainstreaming of FPO activity in the project area will provide sustainability of the programme, even after completion of the project.
- Despite emphasis of OMM for millet processing at GP level, it is not yet fully strengthened for which except ragi, for non ragi millets people undertake manual processing. Even in case of ragi also, a sizable chunk of households is undertaking manual processing of millets. Efforts should be made to strengthen millet processing units at GP level.
- Due to OMM intervention, there has been improved millet production and consumption in the OMM project area. Based on findings of the study, there is good scope for further improving PCPDC of millets OMM project areas. Further, there should be consumption improvement in non-OMM areas also. It is viewed that there should be continuous research for improving millet production and consumption in the state.