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

Kalahandi District




Submitted to-

Submitted By-

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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.

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

[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 Acdemy, 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/

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 hypoglycemic 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/NWDPRA / 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,

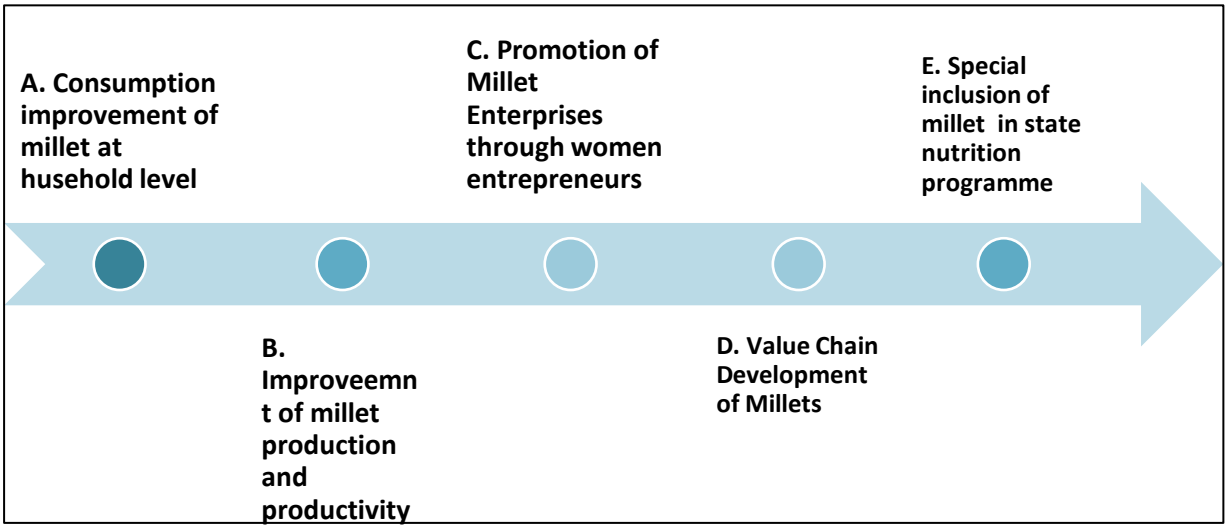
[9] Department of Agriculture & Cooperation, (2014), "National Mission for Sustainable Agriculture (NMSA): Operational Guidelines", Ministry of Agriculture, Government of India

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 progrmme 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 Guidelines[10], 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 Kalahandi 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 Kalahandi district in the overall ragi areaof first phase OMM stands at 6.5 percent. There ae four blocks covered under first phase of OMM intervention in the district. Maximum coverage of land area for OMM ragi cultivation is noticed at Th. Rampur block and minimum at Bhawanipatana 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**		
Bhwanipatna	2.02	32.2	70**1566**	104.22	7.2	6.5
Lanjigarh	45.93	131.33	201.8	379.06	26.3	
Narla	18.23	168	119.4	305.63	21.2	
Th.rampur	38.65	195.4	418.4	652.45	45.3	
Sub total	**104.83**	**526.93**	**809.6**	**1441.36**	100.0	
All Districts	**3161.03**	**7625.93**	**11288.8**	**22075.8**		**100.0**

Source: Computed from WASSAN Official data

With respect non – ragi millets, out of the total land area covered at the state level, percentage share of Kalahandi district is about 29.6 percent. Further, within the district, Lanjigarh is having highest share in the overall non ragi millet cultivated area followed by Th. Rampur, Bhawanipatna and Narala blocks.

[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-millets-mission.html

Table- 1.3: Coverage of Non ragi Millets under first phase OMM Project Intervention (land Area in Hectares) in Kalhandi 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		
Bhwanipatna	0	173.6	77.4	251	21.89	29.6
Lanjigarh	64.55	145.4	216.6	426.55	37.19	
Narla	49.9	100.4	28	178.3	15.55	
Th.rampur	0	128.2	162.8	291	25.37	
Sub total	**114.45**	**547.6**	**484.8**	**1146.85**	100.00	
All districts	**114.45**	**1880.8**	**1873.71**	**3868.96**		100.0

Source: Computed from WASSAN Official data

Within the four blocks covered under the first phase OMM intervention in the district, there are about 6406 millet farmers which accounts 10.2 percent share of the overall farmer outreach of OMM in the entire state. Maximum proportion of millet farmers are registered in Lanjigarh block followed by Th. Rampur, Narla and Bhawanipatna blocks.

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

Sl.	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		
1	Bhwanipatna	7	310	411	728	11.4	10.2
2	Lanjigarh	269	743	1307	2319	36.2	
3	Narla	242	549	519	1310	20.4	
4	Th.rampur	28	749	1272	2049	32.0	
	Sub total	**546**	**2351**	**3509**	**6406**	100.0	
	All districts	**8636**	**21972**	**32394**	**63002**		100.0

Source: Computed from WASSAN Official data

1.6 Terms of Reference of the Study

Nabakrushna 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.

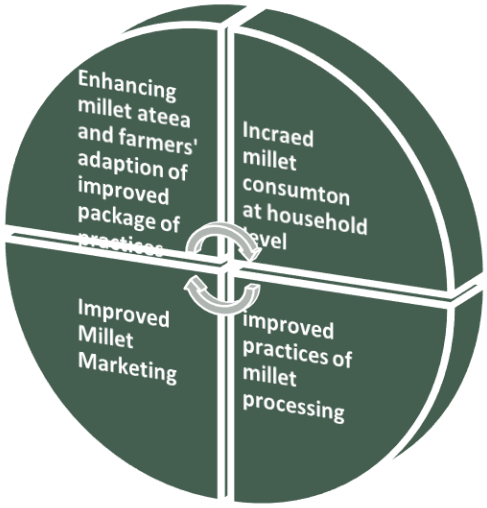
1.7 Objectives

- → 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

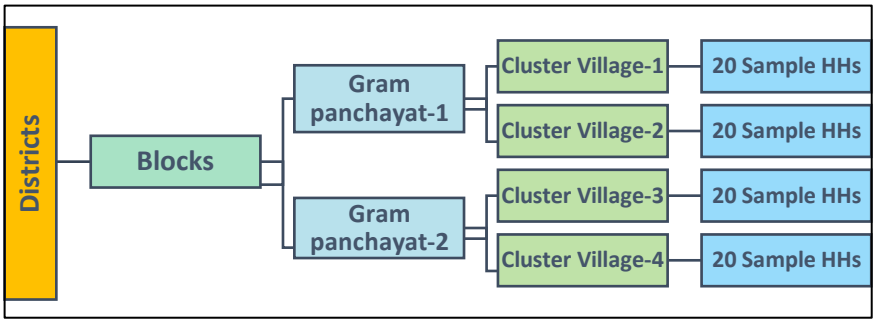
1.8.1 Study Approach

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 28 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 at district level stands at 320. 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.	Blocks	Gram Panchayats	Villages	No. of households covered in the study
1	Bhawanipatna	Borda, Gurujang	Phapsi & Goikela, Karlapita & Pastiguda	80
2	Lanjigarh	Kankutra, Lanji	Dakriguda & Goicharcha, Paikborhi & Dialbahali	79
3	Narla	Kurmela, Raksi	Bamak & Kirlibeda, Gokhra & Budhipadar	80
4	Thuamul Rampur	Gopalpur, Gunupur	Dakatola & Kumdabahal, Medkatra & Pastiguda	81
			Total	**320**

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 : First Phase Implementation of Odisha Millets Mission : Kalahandi 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 Kalahandi district is outlined in this chapter. The pattern of millet production is discussed in the light of changes taking place over time. 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 Brief Statistical Profile of the district

The district accounts for 5.09 percent of the state's territory and shares 3.76 percent of the state's population. The density of population of the district is 199 per sq. kms., as against 270 persons per sq.km of the state. It has 2253 villages (including 137 un-inhabited villages) covering 13 blocks, under two Subdivisions. As per 2011 census, Schedule Caste and Schedule Tribe population constitute 18.17 and 28.50 percent of the total population of the district respectively. [12] Kalahandi is a part of the KBK (Kalahandi, Bolangir and Koraput) region of the State, that has been considered as one of the most backward regions of the country. Higher incidence of poverty, frequent droughts, distress migration of vast chunk of labour force are some of the age-old characteristics of this region. Kalahandi has suffered over a long period of time from serious droughts, floods and other natural calamities. Deforestation and the collapse of the traditional tank irrigation system have affected the total productivity of the district. Though, the district receives a good amount of rainfall, the rainwater is not harvested properly.[13] A snap shot of socio-economic profile of Kalahandi district is presented in tale-2.1.

Table-2.1: Brief Statistical profile of Kalahandi District

Sl.	Particulars	Value	Sl.	Particulars	Value
1	Population (In Lakh)	15.7	20	**Land Use Pattern (Area in '000 ha), 2014-15**	
2	Male (In Lakh)	7.8		Forest	101.2
3	Female (In Lakh)	7.9		Land put to Non-agricultural use	46.4
4	Scheduled Caste (In Lakh)	2.9		Barren and Non-Cultivable Land	34.5
5	Scheduled Tribe (In Lakh)	4.5		Permanent Pasture and Other Agricultural Land	25.1

[12] District Planning and Monitoring Unit (2017): "District Statistical Handbook, Kalhandi-2015"

[13] Poverty and Human Development Monitoring Agency (PHDMA) (2012): "District Human Development Report, Kalahandi", Planning and Coordination Department, Govt. of Odisha.

6	Others (In Lakh)	8.4		Net Area Sown	244.4
7	Household (In Lakh)	4.0		Cultivable Waste Land	25.5
8	Average HH Size	3.9		Old Fallow	30.2
9	Sex Ratio	1003		Current Fallows	70.9
10	**Total Worker (In Lakh)**	7.5		Miscellaneous Trees and Groves	2.2
11	Main Worker (In Lakh)	3.8		Total Area under Survey	580.4
12	Marginal Worker (In Lakh)	3.7	21	**Agriculture, 2014-15**	
13	Non-Worker (In Lakh)	8.2		Average Fertilizer Consumption (kg/ha)	54.5
14	Work Participation Rate (WPR, %)	47.7		Irrigation, Kharif ('000 ha)	146.9
15	Cultivator as % of Total Worker	19.3		Irrigation, Rabi ('000 ha)	111.3
16	Agricultural Labourers as % of Total Worker	58.1	22	Proportion of Villages Electrified (as on March 2014)	100.0
17	Literacy Rate (%)	59.2	23	Credit Deposit Ratio (as on December 2015)	68.1
18	Total Geographical Area (sq.km)	7920	24	No. of Aanganwadi Centres, 2014-15	2185
19	No. of Job Card Issued (cumulative, March 2015)	301865		HH provided employment as % of demand, MGNREGS, cumulative 2014-15	81.9

Source: *District Statistical Hand Book, Kalahandi, 2015*
Note: MGNREGS is Mahatma Gandhi National Rural Employment Guarantee Scheme

2.2 Millet Cultivation in Kalahandi District

The land area annually diverted for ragi and small millet cultivation in Kalahandi district compared to all Odisha situation during 2000s and 2010s is shown in table 2.2. Compared to 2000s, there is shrinkage of ragi area in Kalahandi district to the extent of 68.81 in 2010s. The corresponding fall at all Odisha level is only 21.70 percent. This amounts to say that the ragi farmers of Kalahandi district are faster in adopting non-ragi crops than all Odisha situation. Similarly, in the case of small millets, there is also shrinkage of land area under small millets in 2010s compared to 2000s. However, such shrinkage at Kalahandi district is found marginally lower compared to all Odisha level. Due to higher land diversion of land from ragi to non ragi crops, the percentage share of ragi lands to all lands in the state has decreased from 3.61 percent in 2000s to 1.44 percent in 2010s. With respect to small millets, Kalahandi district accounting 2.85 percent of the overall small millet area of the state in 2000s has slightly improved to 2.98 percent in 2010s.

Table-2.2: Area under ragi and small millets cultivation in Kalahandi district compared to all Odisha

Sl.	Regions	Decadal variation in the land area under annual ragi and Small Millets cultivation in Kalahandi district compared to all Odisha (Land area in 000 hectares)					
		Ragi			Small Millets		
		2000s	2010s	Variation in 2010s over 2000s	2000s	2010s	Variation in 2010s over 2000s
1	Kalahandi	6.83	2.13	-68.81	0.75	0.71	-5.33
2	All Odisha	189.07	148.05	-21.70	26.33	23.80	-9.61
	Kalahandi district as % to all Odisha	3.61	1.44		2.85	2.98	

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

The yield rate of ragi as well as small millets in Kalhandi district has increased in 2010s compared to the immediate past decade 2000s. In case of ragi, the increased yield rate in Kalahndi district is also higher compared to the overall situation prevailing in the state. However, for small millets the decadal variation in yield rate is positive but lower than the state level picture. With respect to yield index as depicted in table 2.3, in 2000s Kalahandi district was unfavourable compared to overall situation as prevailing in the state. But the situation of the district has improved during 2010s and the district has been able to have a yield index of ragi at 123.47 compared to 100 points for the state. With respect to small millets, the district stands in advantageous position in both decades.

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

Sl.	Regions	Decadal Variation in average annual yield Rate of ragi and small millets in Kalahandi district compared to all Odisha (Yield Rate in Kg/ Hectare)					
		Ragi			Small Millets		
		2000s	2010s	Variation in 2010s over 2000s	2000s	2010s	Variation in 2010s over 2000s
1	Kalahandi	753.33	1102.25	46.32	521.56	548.50	5.17
2	All Odisha	791.20	892.70	12.83	453.60	505.00	11.33
	Yield index of the district (All Odisha = 100)	95.21	123.47		114.98	108.61	

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 better yield rate of ragi in 2010s, and as area under ragi cultivation is reduced, resultingly there is reduced level of ragi production in the district. Compared to 2000s, there is more than 50 percent fall in the annual production of ragi in the district, however at the state level, there is only 12.18 percent fall in the annual production of argi during 2010s compared to 2000s. Kalahandi district accounts 1.81 percent of the overall ragi production and 3.31 percent of small millet production in the state during 2010s. The decadal variation of the production volume of ragi and small millets is analysed in table 2.4.

Table-2.4 : Ragi & Small Millets Production in Kalahandi district compared to all Odisha

Sl.	Regions	Decadal Variation in Volume of Ragi and small millets Production in Kalahandi district compared to All Odisha (Production in 000 MT/ Hectare)					
		Ragi			Small Millets		
		2000s	2010s	Variation in 2010s over 2000s	2000s	2010s	Variation in 2010s over 2000s
1	Kalahandi	5.11	2.38	-53.42	0.38	0.40	5.26
2	All Odisha	149.39	131.19	-12.18	11.71	12.07	3.07
	Kalahandi district as % to all Odisha	3.42	1.81		3.25	3.31	

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 Kalahandi District

By the end of Kharif 2019-20, OMM has covered four blocks in Kalahandi district. Cumulatively, in all these blocks, there is outreach of OMM in 137 GPs, 524 villages, 5801 farmers and 2435.07 hectares of land area under millet cultivation. The details of progress of OMM in Kalahandi district is shown in the table 2.5 given below.

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

Sl.	Time Period	Coverage of OMM in Kalahandi district				
		Blocks	No. of GPs	No. of Villages/ Hamlets	No. of farmers	Land Area (Hectares)
1	Kharif 2017-18	Narla	6	20	154	62.72
		Lanjigarh			126	42.2
		Sub Total	6	20	280	104.92
2	Rabi 2017-18	Bhawanipatna	4	4	7	5
		Lanjigarh	4	3	8	8
		Narla	6	11	14	11.5
		Th. rampur	1	3	7	10
		Sub Total	15	21	36	34.5
3	Kharif 2018-19	Bhawanipatna	9	28	397	204.6
		Lanjigarh	8	63	743	278.2
		Narla (Ragi and Gurji)	36	98	561	268.4
		Th. Rampur (Ragi)	8	44	270	110.6
		Sub Total	61	233	1971	861.8
4	Rabi 2018- 19	Bhawanipatna	3	4	5	1.2
5	Kharif 2019-20	Bhawanipatna	8	38	408	323.29
		Lanjigarh	9	90	1308	399.32
		Narla	25	68	520	147.94
		Th. rampur	10	50	1273	562.1
		Sub Total	55	250	3514	1433.85
		Total	137	524	5801	2435.07

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

Concluding Remarks

Ragi farmers of Kalahandi district are faster in adopting non-ragi crops than all Odisha situations. Similarly, in the case of small millets, there is also shrinkage of land area under small millets in 2010s compared to 2000s. However, such shrinkage at Kalahandi district is found marginally lower compared to all Odisha level. Due to higher land diversion of land from ragi to non ragi crops, the percentage share of ragi lands to all lands in the state has decreased from 3.61 percent in 2000s to 1.44 percent in 2010s. With respect to small millets, Kalahandi district accounting 2.85 percent of the overall small millet area of the state in 2000s has slightly improved to 2.98 percent in 2010s. The yield rate of ragi as well as small millets in Kalhandi district has increased in 2010s compared to the immediate past decade 2000s. In case of ragi, the increased yield rate in Kalahndi district is also higher compared to the overall situation prevailing in the state. However, for small millets the decadal variation in yield rate is positive but lower than the state level picture. With respect to yield index in 2000s Kalahandi district was unfavourable compared to overall situation as prevailing in the state. But the situation of the district has improved during 2010s and the district has been able to have a yield index of ragi at 123.47 compared to 100 points for the state. Despite better yield rate of ragi in 2010s, and as area under ragi cultivation is reduced, resultingly there is reduced level of ragi production in the district. Compared to 2000s, there is more than 50 percent fall in the annual production of ragi in the district, however at the state level, there is only 12.18 percent fall in the annual production of argi during 2010s compared to 2000s. Kalahandi district accounts 1.81 percent of the overall ragi production and 3.31 percent of small millet production in the state during 2010s. There is outreach of OMM in 137 GPs, 524 villages, 5801 farmers and 2435.07 hectares of land area under millet cultivation. The details of progress of OMM in Kalahandi district

Chapter-III: Socio Economic Characteristics of Millet Farmers of Kalahandi 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 320 millet households spread across four blocks Bhawanipatna, Lanjigarh, Narla, and Th. Rampur blocks in Kalahandi 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 Social Category, and Mean age of millet farmers

Classification of millet farmers on the basis of social category reveals that majority of millet farmers, are STs followed by OCs and SCs. Maximum proportion of millet farmers to the extent of 80.2 percent are STs. However, the incidence of STs are found higher in all blocks. The mean age of millet farmers is overall found at 46.7 years. This implies that experienced farmers are found to have been registered as millet farmers under OMM.

Table 3.1: No. of Farmers by social Category and Mean Age Group

Sl.	Blocks	No. of millet farmers				% of households			
		SC	ST	OC	Total	SC	ST	OC	Total
1	Bhawanipatna	21	28	31	80	26.3	35.0	38.8	100.0
2	Lanjigarh	15	37	27	79	19.0	46.8	34.2	100.0
3	Narla	2	29	49	80	2.5	36.3	61.3	100.0
4	Th. Rampur	8	65	8	81	9.9	80.2	9.9	100.0
	All Blocks	**46**	**159**	**115**	**320**	14.4	49.7	35.9	100.0
		Mean Age of millet farmers by social category							
		SC		**ST**		**OC**		**Total**	
1	Bhawanipatna	49.6		49.8		52.5		50.8	
2	Lanjigarh	46.4		41.5		44.9		43.6	
3	Narla	53.5		43.2		45.7		45.0	
4	Th. Rampur	51.0		46.7		47.8		47.2	
	All Blocks	**49.0**		**45.4**		**47.5**		**46.7**	
		Standard Deviation							
1	Bhawanipatna	10.3		9.0		11.0		10.1	
2	Lanjigarh	13.5		12.1		10.4		11.9	
3	Narla	7.8		9.3		12.9		11.7	
4	Th. Rampur	10.4		10.6		11.8		10.6	
	All Blocks	**11.2**		**10.8**		**12.1**		**11.4**	

3.2 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 79.1 percent of millet farmers of Kalhandi district are males and the remaining 20.9 percent are females. Incidence of female millet farmers is comparatively higher at Lanjigarh block followed by Th. Rampur block. Lowest incidence of female millet farmers are found in Bhawanipatna block of the district.

Table 3.2: No. of Framers by sex category

Sl.	Blocks	No. of millet farmers			% of millet farmers		
		Male	Female	Total	Male	Female	Total
1	Bhawanipatna	77	3	80	96.3	3.8	100.0
2	Lanjigarh	50	29	79	63.3	36.7	100.0
3	Narla	65	15	80	81.3	18.8	100.0
4	Th. Rampur	61	20	81	75.3	24.7	100.0
	All Blocks	**253**	**67**	**320**	**79.1**	**20.9**	**100.0**

3.3 Educational Background

The educational background of millet farmers as indicated in table 3.3 reveals that majority of millet farmers of Kalhandi district are illiterates followed by upper primary level of education. In percentage terms, out of the total registered millet farmers, 47.2 percent are illiterates followed by upper primary level (19.1%), primary standard (16.9%), upto HSC (13.1%) and above HSC (3.8%).

Table -3.3: Millet Farmers' Educational Background

Sl.	Blocks	No. of farmers					
		Illiterate	Primary	Upper Primary	Upto HSC	Above HSC	Total
1	Bhawanipatna	30	18	13	12	7	80
2	Lanjigarh	35	19	22	3		79
3	Narla	49	8	5	17	1	80
4	Th. Rampur	37	9	21	10	4	81
	All Blocks	**151**	**54**	**61**	**42**	**12**	**320**
		% of farmers					
1	Bhawanipatna	37.5	22.5	16.3	15.0	8.8	100.0
2	Lanjigarh	44.3	24.1	27.8	3.8	0.0	100.0
3	Narla	61.3	10.0	6.3	21.3	1.3	100.0
4	Th. Rampur	45.7	11.1	25.9	12.3	4.9	100.0
	All Blocks	47.2	16.9	19.1	13.1	3.8	100.0

3.4 Religion

Religion wise all of the sampled out millet farmers covered in the study are Hindus by religion. This pattern is evidenced in all of the four OMM blocks.

Table-3.4: Household religion of millet farmers

Sl.	Blocks	No of sample farmers	Total Farmers	% Share
1	Bhawanipatna	80.0	80.0	100.0
2	Lanjigarh	79.0	79.0	100.0
3	Narla	80.0	80.0	100.0
4	Th. Rampur	81.0	81.0	100.0
	All Blocks	**320.0**	**320.0**	**100.0**

3.5 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 3.5, it is found that majority of millet farmers of the district are small farmers followed by medium farmers. The proportionate share of small farmers, medium farmers, marginal farmers and large farmers are found at 56.3, 22.8, 2.5 and 18.4 percent respectively. The pattern is similarly noticed in all of the blocks covered under OMM except Lanjigarh and Th Rampur blocks. In these two blocks, higher incidence of small farmers are followed by marginal farmers rather than medium farmers. Small farmers and marginal farmers jointly account more than 80 percent in Lanjigarh and Th. Rampur blocks.

Table-3.5: Farmer Category

Sl.	Blocks	No. of farmers				
		MF	SF	Med. Farmers	Large Farmers	Total
1	Bhawanipatna	4.0	42.0	29.0	5.0	80.0
2	Lanjigarh	17.0	51.0	10.0	1.0	79.0
3	Narla	5.0	54.0	19.0	2.0	80.0
4	Th. Rampur	33.0	33.0	15.0		81.0
	All Blocks	**59.0**	**180.0**	**73.0**	**8.0**	**320.0**
		% of framers				
1	Bhawanipatna	5.0	52.5	36.3	6.3	100.0
2	Lanjigarh	21.5	64.6	12.7	1.3	100.0
3	Narla	6.3	67.5	23.8	2.5	100.0
4	Th. Rampur	40.7	40.7	18.5	0.0	100.0
	All Blocks	18.4	56.3	22.8	2.5	100.0

3.6 House Structure

The housing structure of millet farmers as analysed in table 3.6 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 Th Rampur block followed by Lanjigarh block.

Table-3.6: House Structure

Sl.	Blocks	No. of millet farmers				% of millet farmers			
		Pucca	Semi Pucca	Kutcha	Total	Pucca	Semi Pucca	Kutcha	Total
1	Bhawanipatna	29	29	22	80	36.3	36.3	27.5	100.0
2	Lanjigarh	25	29	25	79	31.6	36.7	31.6	100.0
3	Narla	6	68	6	80	7.5	85.0	7.5	100.0
4	Th. Rampur	10	42	29	81	12.3	51.9	35.8	100.0
	All Blocks	70	168	82	320	21.9	52.5	25.6	100.0

3.7 Household Structure

A household structure comprises of male as well as female members. As it can be seen from table 3.7, overall, there are 2.3 male and 2.1 female members per millet farmers' household in the district. The

average family size is found at 4.3 persons. The overall sex ratio among the millet households of the district is found at 913 females per 1000 males. There is balanced sex ratio at Narla and Th Rampur blocks.

Table-3.7: Household Size by Average male and female numbers

Sl.	Blocks	Average Household Size			Sex Ratio
		Males	Females	Total	
1	Bhawanipatna	2.4	2.0	4.3	833
2	Lanjigarh	2.3	2.0	4.2	870
3	Narla	2.1	2.1	4.1	1000
4	Th. Rampur	2.3	2.3	4.5	1000
	All Blocks	**2.3**	**2.1**	**4.3**	913

3.8 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 76.3 percent of the farmers have joined into OMM in 2017-18 year, followed by 20.0 percent in 2018-19 and the remaining 3.8 percent in 2019-20. More than 90 percent of millet farmers of Bhawanipatna and Lanjigarh blocks have joined into the first phase of OMM in the initial 2017-18 only.

Table-3.8: Year of joining into OMM

Sl.	Blocks	No. of millet farmers			
		2017-18	2018-19	2019-20	All Years
1	Bhawanipatna	75	2	3	80
2	Lanjigarh	73	5	1	79
3	Narla	50	30		80
4	Th. Rampur	46	27	8	81
	All Blocks	**244**	**64**	**12**	**320**
		% of millet farmers			
1	Bhawanipatna	93.8	2.5	3.8	100.0
2	Lanjigarh	92.4	6.3	1.3	100.0
3	Narla	62.5	37.5	0.0	100.0
4	Th. Rampur	56.8	33.3	9.9	100.0
	All Blocks	76.3	20.0	3.8	100.0

Concluding Remarks

Overall 76.3 percent of the farmers have joined into OMM in 2017-18 year, followed by 20.0 percent in 2018-19 and the remaining 3.8 percent in 2019-20. More than 90 percent of millet farmers of Bhawanipatna and Lanjigarh blocks have joined into the first phase of OMM in the initial 2017-18 only. Maximum proportion of millet farmers to the extent of 80.2 percent are STs. However, the incidence of STs are found higher in all blocks. The mean age of millet farmers is overall found at 46.7 years. Overall, about 79.1 percent of millet farmers of Kalhandi district are males and the remaining 20.9 percent are females. Incidence of female millet farmers is comparatively higher at Lanjigarh block followed by Th. Rampur block. Out of the total registered millet farmers, 47.2 percent are illiterates followed by upper

primary level (19.1%), primary standard (16.9%), upto HSC (13.1%) and above HSC (3.8%). Religion wise all of the sampled out millet farmers covered in the study are Hindus by religion. Majority of millet farmers of the district are small farmers followed by medium farmers. The proportionate share of small farmers, medium farmers, marginal farmers and large farmers are found at 56.3, 22.8, 2.5 and 18.4 percent respectively. 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 Th Rampur block followed by Lanjigarh block. There are 2.3 male and 2.1 female members per millet farmers' household in the district. The average family size is found at 4.3 persons. The overall sex ratio among the millet households of the district is found at 913 females per 1000 males.

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 of own land, encroached land and shared in land. The overall operational landholding among the millet farmers of Kalahandi district is calculated at 8.1 acres. Out of the total operational land holding, there is own land of 3.5 acres, encroached land of 2.6 acres and shared in land of 2.0 acres.

Table-4.1: Millet Framers' Operational land holding

Sl.	Blocks	Operational land holding / Farmer (Acres)			
		Owned Land	Encroached land	Shared in Land (Acres)	Operational Land holding (Acres)
1	Bhawanipatna	4.4	4.0	2.4	10.8
2	Lanjigarh	2.6	2.9	2.0	7.5
3	Narla	3.7	2.6	1.9	8.2
4	Th. Rampur	3.0	1.8	0.9	5.7
	All Blocks	**3.5**	**2.6**	**2.0**	8.1

4.2 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. It is found that there is highest positive increase in the number of farmers for Janha and ragi farmers during post project period compared to pre project period. There is highest negative variation in the number of kangu farmers followed by oilseeds and pulses farmers.

Table-4.2: 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)				
			Bhawanipatna	Langigarh	Narla	Th. Rampur	All Districts
1	Paddy	Before Project	78	76	77	79	310
		After Project	78	77	78	80	313

		% Variation	0.0	1.3	1.3	1.3	1.0
2	Pulses	Before Project	49	69	25	28	171
		After Project	49	69	24	27	169
		% Variation	0.0	0.0	-4.0	-3.6	-1.2
3	Vegetables	Before Project	6	41	6	14	67
		After Project	7	40	4	18	69
		% Variation	16.7	-2.4	-33.3	28.6	3.0
4	Oil seeds	Before Project	42	14	2	25	83
		After Project	41	14	1	25	81
		% Variation	-2.4	0.0	-50.0	0.0	-2.4
5	Cash Crops	Before Project	33	6	46	6	91
		After Project	32	6	47	7	92
		% Variation	-3.0	0.0	2.2	16.7	1.1
6	Ragi	Before Project	50	79	50	77	256
		After Project	58	79	69	80	286
		% Variation	16.0	0.0	38.0	3.9	11.7
7	Suan	Before Project	29		8	21	58
		After Project	32		7	23	62
		% Variation	10.3		-12.5	9.5	6.9
8	Kangu	Before Project				8	8
		After Project				7	7
		% Variation				-12.5	-12.5
9	Janha	Before Project			2	11	13
		After Project			4	11	15
		% Variation			100.0	0.0	15.4
10	Kodo	Before Project	14	14	1	9	38
		After Project	14	14	2	9	39
		% Variation	0.0	0.0	100.0	0.0	2.6

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 4.3. It is found that overall paddy area of the sampled-out farmers is reduced by 1.7 percent. Similarly, there is also negative changes in vegetable area by 4.1 percent and oil seeds area by 0.6 percent. However, for all types of millets, there are positive changes in the land area under cultivation. Thus, farmers have diverted vegetable areas for millet cultivation. Besides, some of the uncultivated areas are also brought under millet cultivation. This may be stated that, as a result of OMM intervention in the district, as some of the uncultivated areas are brought into millet cultivation, so, obviously, the cropping intensity in the OMM project area of the district has tended to increase.

Table-4.3: Area under crop in post project period compared to pre project period among the sample farmers (Land area in Acres)

Sl.	Districts	Time Period	Overall agricultural practices of sample farmers (Land area used for crop cultivation in Acres))				
			Bhawanipatna	Langigarh	Narla	Th. Rampur	All districts
1	Paddy	Before Project	166.9	118.7	178.3	116.7	580.6
		After Project	163.9	120.2	168.3	118.2	570.6
		% Variation	-1.8	1.3	-5.6	1.3	-1.7

2	Pulses	Before Project	12.4	33.9	12.4	29.9	88.5
		After Project	48.8	39.8	26.0	15.9	130.4
		% Variation	293.1	17.4	110.2	-46.9	47.3
3	Vegetables	Before Project	2.6	19.1	5.2	6.1	33.0
		After Project	4.6	18.6	2.7	5.7	31.6
		% Variation	76.9	-2.4	-48.1	-6.6	-4.1
4	Oil seeds	Before Project	46.6	15.2	1.5	18.8	82.1
		After Project	46.6	15.2	1.0	18.8	81.6
		% Variation	0.0	0.0	-33.3	0.0	-0.6
5	Cash Crops	Before Project	44.5	10.5	76.4	2.5	133.9
		After Project	53.0	10.5	74.6	3.0	141.1
		% Variation	19.1	0.0	-2.4	20.0	5.4
6	Ragi	Before Project	43.0	66.9	43.0	70.2	223.0
		After Project	54.7	78.1	74.2	72.2	279.1
		% Variation	27.2	16.8	72.6	2.9	25.2
7	Suan	Before Project	26.5		12.5	19.7	58.7
		After Project	29.5		13.0	18.8	61.3
		% Variation	11.3		4.0	-4.7	4.4
9	Janha	Before Project			1.0	6.4	7.4
		After Project			3.5	6.4	9.9
		% Variation			250.0	0.0	34.0
10	Kodo	Before Project	21.0	10.3	2.0	6.3	39.6
		After Project	21.0	12.5	2.5	6.3	42.3
		% Variation	0.0	21.4	25.0	0.0	6.8

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 all types of millets, it is commonly noticed that mono cropping practices has improved during post project period. Similarly, mixed cropping and intercropping practices has declined during post project period.

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	Bhawanipatana	81.5	18.5	0.0	100.0	93.4	6.6	0.0	100.0
		Lanjigarh	45.6	51.9	2.5	100.0	100.0	0.0	0.0	100.0
		Narla	72.9	27.1	0.0	100.0	95.9	4.1	0.0	100.0
		Th. Rampur	74.0	23.4	2.6	100.0	100.0	0.0	0.0	100.0

		All districts	66.7	31.8	1.6	100.0	97.6	2.4	0.0	100.0
2	Suan	Bhawanipatana	69.2	30.8	0.0	100.0	92.9	7.1	0.0	100.0
		Lanjigarh								
		Narla	57.1	42.9	0.0	100.0	83.3	0.0	16.7	100.0
		Th. Rampur	57.1	38.1	4.8	100.0	100.0	0.0	0.0	100.0
		All districts	63.0	35.2	1.9	100.0	94.6	3.6	1.8	100.0
3	Kangu	Bhawanipatana								
		Lanjigarh								
		Narla					50.0	50.0	0.0	100.0
		Th. Rampur								
		All districts					50.0	50.0	0.0	100.0
4	Janha	Bhawanipatana								
		Lanjigarh								
		Narla					50.0	50.0	0.0	100.0
		Th. Rampur					100.0	0.0	0.0	100.0
		All districts					86.7	13.3	0.0	100.0
5	Kodo	Bhawanipatana	88.9	11.1	0.0	100.0	100.0	0.0	0.0	100.0
		Lanjigarh	28.6	71.4	0.0	100.0	100.0	0.0	0.0	100.0
		Narla	100.0	0.0	0.0	100.0	100.0	0.0	0.0	100.0
		Th. Rampur	100.0	0.0	0.0	100.0	100.0	0.0	0.0	100.0
		All districts	76.0	24.0	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 for all types of millets almost in all of the project blocks of the district, farmers have shifted from traditional broadcasting method of cultivation and adopted other improved methods of cultivation. It is further observed that there is substantial improvement of LT method particularly for ragi and kodo millets, which are found to be the two major millets of the district. During interaction with Community Resource Persons (CRPs)[14] it was elicited that CRPs are providing continuous hand holding support to millet farmers for scientific method of cultivation rather than traditional broadcasting method. Besides, there is also Govt. subsidy to farmers for adopting modern methods of cultivation. This has encouraged farmers for better adoption of SMI cultivation.

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	Bhawanipatana	1.9	13.0	1.9	83.3	100.0	78.7	13.1	4.9	3.3	100.0
		Lanjigarh	0.0	1.3	0.0	98.7	100.0	73.4	25.3	0.0	1.3	100.0
		Narla	0.0	17.0	0.0	83.0	100.0	69.7	27.6	0.0	2.6	100.0
		Th. Rampur	0.0	0.0	0.0	100.0	100.0	67.5	22.5	10.0	0.0	100.0

[14] CRPs are the frontline workers appointed by the project to provide handholding support to millet farmers at grass root or community level.

		All districts	0.4	6.2	0.4	93.0	100.0	72.0	22.6	3.7	1.7	100.0
2	Suan	Bhawanipatana	0.0	0.0	3.8	96.2	100.0	13.8	24.1	6.9	55.2	100.0
		Lanjigarh										
		Narla	12.5	12.5	0.0	75.0	100.0	20.0	80.0	0.0	0.0	100.0
		Th. Rampur	4.8	0.0	0.0	95.2	100.0	0.0	4.5	63.6	31.8	100.0
		All districts	3.6	1.8	1.8	92.7	100.0	8.9	21.4	28.6	41.1	100.0
3	Kangu	Bhawanipatana										
		Lanjigarh										
		Narla						50.0	50.0	0.0	0.0	100.0
		Th. Rampur										
		All districts						50.0	50.0	0.0	0.0	100.0
4	Janha	Bhawanipatana										
		Lanjigarh										
		Narla	0.0	0.0	0.0	100.0	100.0	0.0	100.0	0.0	0.0	100.0
		Th. Rampur	0.0	0.0	9.1	90.9	100.0	9.1	0.0	90.9	0.0	100.0
		All districts	0.0	0.0	7.7	92.3	100.0	6.7	26.7	66.7	0.0	100.0
5	Kodo	Bhawanipatana	0.0	0.0	22.2	77.8	100.0	20.0	13.3	13.3	53.3	100.0
		Lanjigarh	0.0	0.0	0.0	100.0	100.0	0.0	14.3	71.4	14.3	100.0
		Narla	0.0	0.0	0.0	100.0	100.0	100.0	0.0	0.0	0.0	100.0
		Th. Rampur	0.0	0.0	5.9	94.1	100.0	0.0	5.9	94.1	0.0	100.0
		All districts	0.0	0.0	10.0	90.0	100.0	8.5	10.6	59.6	21.3	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, ragi farmers during pre-project period, were mostly undertaking two times weeding which is changed in favour of more than two times weeding during post project period. Similarly, for other millets also number of times of weeding by the farmers has increased during 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	Bhawanipatana	0.0	100.0	0.0	100.0	0.0	0.0	100.0	100.0
		Lanjigarh	0.0	100.0	0.0	100.0	0.0	0.0	100.0	100.0
		Narla	8.3	91.7	0.0	100.0	3.6	3.6	92.9	100.0
		Th. Rampur	0.0	100.0	0.0	100.0	0.0	0.0	100.0	100.0
		All districts	1.9	98.1	0.0	100.0	0.9	0.9	98.2	100.0
2	Suan	Bhawanipatana	0.0	20.0	80.0	100.0	0.0	92.9	7.1	100.0
		Lanjigarh								
		Narla	12.5	25.0	62.5	100.0	0.0	100.0	0.0	100.0
		Th. Rampur	0.0	63.6	36.4	100.0	52.4	38.1	9.5	100.0

		All districts	1.8	38.2	60.0	100.0	20.4	72.2	7.4	100.0
3	Kangu	Bhawanipatana								
		Lanjigarh								
		Narla					0.0	100.0	0.0	100.0
		Th. Rampur								
		All districts					0.0	100.0	0.0	100.0
4	Janha	Bhawanipatana								
		Lanjigarh								
		Narla	0.0	100.0	0.0	100.0	0.0	75.0	25.0	100.0
		Th. Rampur	0.0	90.0	10.0	100.0	9.1	27.3	63.6	100.0
		All districts	0.0	91.7	8.3	100.0	6.7	40.0	53.3	100.0
5	Kodo	Bhawanipatana	0.0	33.3	66.7	100.0	26.7	73.3	0.0	100.0
		Lanjigarh	0.0	35.7	64.3	100.0	0.0	76.9	23.1	100.0
		Narla	0.0	0.0	100.0	100.0	0.0	0.0	100.0	100.0
		Th. Rampur	0.0	0.0	100.0	100.0	0.0	30.8	69.2	100.0
		All districts	0.0	22.0	78.0	100.0	9.5	59.5	31.0	100.0

4.4 Economics of Millet Production 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. It is found that production of ragi production per farmer in Kalahandi district has increased from 2.1 quintals per farmer to 5.6 quintals per acre during post project period. Similarly, ragi production per acre has tended to increase from 4.9 quintals during pre-project situation to 5.7 quintals. This amounts to say that OMM has positively contributed to farmer productivity as well as land productivity of millets in the intervention area.

Table-4.6: **Behaviour of millet production in Kalahandi District (Pre-project)**

Sl.	**Particulars**	**Ragi**	**Suan/Gurji**	**Kangu**	**Janha**	**Kodo**	**All millets**
1	No. of farmer involved in millet cultivation	256	58	8	13	40	375
2	Area under millet cultivation (Acres)	223	59	4	7	42	335
3	Production /Farmer (Quintal)	2.1	1.7	0.9	1.29	1.2	1.9
4	Production /Acre (Quintal)	4.9	1.7	1.67	2.28	1.1	2.1
5	Total Sales Proceeds/Framer (Rs.)	2430	1442	6270	2430	3841	2533
6	Total Sales Proceeds/ Acre (Rs.)	2789	2065	3825	2431	3643	2835
7	Total Sales Proceeds/ Quintal of marketable surplus (Rs.)	1650	2040	7116	4299	3496	1737
8	Total Cost /Farmer (Rs.)	1620	1361	1334	1347	1306	1394
9	Total Cost/ Acre (Rs.)	1860	1562	1531	1547	1500	1600
10	Total Cost/ Quintal of marketable surplus (Rs.)	1263	1092	2510	1546	1581	1206

11	Net Income / Framer (Rs.)	810	81	4936	1083	2535	1139
12	Net Income / Framer (Rs.)	929	503	2294	884	2143	1235
13	Net income / Quintal of marketable surplus	387	948	4606	2753	1915	531

Table- 4.7: Behaviour of millet production in Kalahandi district (post-project period)

Sl.	Particulars	Ragi	Suan/Gurji	Kangu	Janha	Kodo	All millets
1	No. of farmer involved in millet cultivation	286	62	7	15	40	410
2	Area under millet cultivation (Acres)	279	61	3	10	43	397
3	Production /Farmer (Quintal)	5.6	2.4	1.66	1.84	1.2	4.5
4	Production /Acre (Quintal)	5.7	2.4	3.52	2.8	1.1	4.6
5	Total Sales Proceeds/Framer (Rs.)	16481	2691	6427	4071	4999	13276
6	Total Sales Proceeds/ Acre (Rs.)	16888	5144	7253	6273	6645	13713
7	Total Sales Proceeds/ Quintal of marketable surplus (Rs.)	2960	5204	15385	9553	6125	3403
8	Total Cost /Framer (Rs.)	3102	2606	2554	2580	2502	2668
9	Total Cost/ Acre (Rs.)	3179	2670	2617	2644	2564	2735
10	Total Cost/ Quintal of marketable surplus (Rs.)	684	1397	2319	1716	1929	772
11	Net Income / Framer (Rs.)	13379	85	3873	1491	2497	10608
12	Net Income / Framer (Rs.)	13709	2474	4636	3629	4081	10978
13	Net income / Quintal of marketable surplus(Rs.)	2276	3807	13066	7837	4196	2631

Table- 4.8: Behaviour of millet production in the first phase OMM intervention in Odisha (29 Blocks) 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 /Framer (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 / Framer (Rs.)	-860	-410	4994	835	1147	-501
12	Net Income / Framer (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 in Odisha (29 Blocks) 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 /Framer (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 / Framer (Rs.)	12174	-1825	1699	-28	-394	10759
12	Net Income / Framer (Rs.)	13042	-485	-1669	334	676	11790
13	Net income / Quintal of marketable surplus (Rs.)	1973	2109	-3210	4155	1881	2264

4.5 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. However, as it is revealed in the following table, millet farmers of Kalahandi district are yet to introduce improved varieties of ragi.

Table-4.11: Reported varieties of ragi seeds used in the OMM areas of Kalahandi district

Sl.	Blocks	Varieties of seeds used by ragi farmers	
		Traditional Varieties	Improved varieties
1	Bhawanipatna	Jhupa, Dushara, Miki	Nil
2	Lanjigarh	Telenga, Dushara, Bada Mandia, Bhodo, Miki, Lal Suru	Nil
3	Th. Rampur	Telenga, Dushara, Bada Mandia,	Nil
4	Narla	Lal Suru, Dushara, Telenga, Budha	Nil

Concluding Remarks

The overall operational landholding among the millet farmers of Kalahandi district is calculated at 8.1 acres. Out of the total operational land holding, there is own land of 3.5 acres, encroached land of 2.6 acres and shared in land of 2.0 acres. 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. There is highest positive increase in the number of farmers for Janha and ragi farmers during post project period compared to pre project period. There is highest negative variation in the number of kangu farmers followed by oilseeds and pulses farmers. Farmers have diverted vegetable areas for millet cultivation. Besides, some of the uncultivated areas are also brought under millet cultivation. As a result of OMM intervention in the district, as some of the uncultivated areas are brought into millet cultivation, so, the cropping intensity in the OMM project area of the district has tended to increase. It is commonly noticed that mono cropping practices has improved during post project period. Similarly, mixed cropping and intercropping practices has declined during post project period. it is evident that for all types of millets almost in all of the project blocks of the district, farmers have shifted from traditional broadcasting method of cultivation and adopted other improved methods of cultivation. It is further observed that there is substantial improvement of LT method particularly for ragi and kodo millets, which are found to be the two major millets of the district. Ragi farmers during pre-project period, were mostly undertaking two times weeding which is changed in favour of more than two times weeding during post project period. Similarly, for other millets also number of times of weeding by the farmers has increased during post project period. Ragi production per acre has tended to increase from 4.9 quintals during pre-project situation to 5.7 quintals. This amounts to say that OMM has positively contributed to farmer productivity as well as land productivity of millets in the intervention area. It is found that millet farmers of Kalahandi district are yet to introduce improved varieties of ragi.

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.[15] In this chapter, an attempt has been made to analyse household consumption pattern of millets on the basis of household survey data obtained from 320 millets households in all of programme blocks of Kalahandi district. 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 number of households purchasing millets during summer season stands higher in comparison to other seasons during pre-project as well as post project period. Overall, at district level, about 98.8 percent of the millet farmer households consume millets during summer season in post project period, which was 88.8 percent during pre-project period.

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	Bhawanipatna	44	60	73	48	64	78
2	Lanjigarh	54	59	78	54	59	78
3	Th. Rampur	35	47	56	54	69	80
4	Narla	75	76	77	78	78	80
	All Blocks	**208**	**242**	**284**	**234**	**270**	**316**
		% of households					
1	Bhawanipatna	55.0	75.0	91.3	60.0	80.0	97.5
2	Lanjigarh	68.4	74.7	98.7	68.4	74.7	98.7
3	Th. Rampur	43.8	58.8	70.0	67.5	86.3	100.0
4	Narla	92.6	93.8	95.1	96.3	96.3	98.8
	All Blocks	65.0	75.6	88.8	73.1	84.4	98.8

5.2 Mean Consumption Pattern

The mean consumption pattern is analysed on the basis of average daily consumption of millet per household during summer, winter rainy seasons. As per the calculations made in table 5.2, it is found that average daily household consumption of millets is almost equal during summer and winter seasons during post project period. However, during pre-project period overall it was higher during summer seasons. 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

[15] OMM Guidelines, 25.11.2016.

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		
		Winter season	Rainy season	Summer season	Winter season	Rainy season	Summer season
1	Bhawanipatna	0.342	0.271	0.400	0.477	0.323	0.358
2	Lanjigarh	0.594	0.346	0.415	0.448	0.298	0.335
3	Th. Rampur	0.307	0.291	0.556	0.311	0.277	0.427
4	Narla	0.343	0.381	0.451	0.356	0.382	0.441
	All Blocks	**0.402**	**0.328**	**0.449**	**0.392**	**0.323**	**0.391**

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. As per table 5.4, it is evident that number of households purchasing millets for domestic consumption stood at 2.2 percent during pre-project period which is 15.3 percent during post project period. Owing to higher consumption habit of millets at household level, more number of households despite own production depend on market for purchasing millets during post project period. Increased millet consumption habit is also reflected in more amount of millet purchased by the households during post project period. It is found that on an average each household purchases 1.98 quintals of millets from market during post project period which was 0.18 quintals during pre-project period.

Table-5.3: Household Market dependence for millets

Sl.	Blocks	No. of households surveyed	No. of households purchasing millets from market				Amount of millet purchased from market / household (Quintal)	
			Pre-project period	%	Post Project period	%	Pre-project period	Post Project period
1	Bhawanipatna	80	5	6.3	20	25.0	0.25	1.96
2	Lanjigarh	79		0.0	20	25.3	0.10	1.99
3	Th. Rampur	80	1	1.3	1	1.3	0.10	1.98
4	Narla	81	1	1.2	8	9.9	0.25	1.99
	All Blocks	**320**	**7**	**2.2**	**49**	**15.3**	**0.18**	**1.98**

5.4 Source for purchasing millets

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

	Source for purchasing millets (% of households)					
	Pre-Project Period			Post- Project Period		
Sl.	Source	Kalahandi	All districts	Source	Kalahandi	All districts
1	Local Market	54.5	4.6	Local Market	49.4	9.8
2	Wage good	0	1.5	PDS	44.7	86.2
3	Barter	36.4	3	Barter	0	0.6
4	Received as gift from fellow relatives	0	0.4	Local market & PDS	2.4	0.8
5	Local market & PDS	9.1	4.7	Local Market & Wage good	0	1.8
6	Local Market & Wage good	0	83.3	PDS & Barter	3.5	0.7
7	Local Market and Barter	0	2			
8	PDS and wage good	0	0.2			
9	Wage good and barter	0	0.1			
	Total	100	100	Total	100	100

Concluding Remarks

Number of households purchasing millets during summer season stands higher in comparison to other seasons during pre-project as well as post project period. Overall, at district level, about 98.8 percent of the millet farmer households consume millets during summer season in post project period, which was 88.8 percent during pre-project period. Average daily household consumption of millets is almost equal during summer and winter seasons during post project period. However, during pre-project period overall it was higher during summer seasons. Perhaps, due to more production of millets, a greater number of millets are also consumed during winter season. Number of households purchasing millets for domestic consumption stood at 2.2 percent during pre-project period which is 15.3 percent during post project period. Owing to higher consumption habit of millets at household level, a greater number of households despite own production depend on market for purchasing millets during post project period. Increased millet consumption habit is also reflected in more amount of millet purchased by the households during post project period. It is found that on an average each household purchases 1.98 quintals of millets from market during post project period which was 0.18 quintals during pre-project period. 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 debussing manually through traditional means like dhenki .	Nil distance
3	Kangu	khichdi	De-husking for kangu rice		
4	Janha	Muan (Ladu of puffed Janha)	Dehusking and rosting		
	Kodo (also called Kosla)	khir	De-husking for kodo rice		

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 79.8 percent of surplus ragi surplus were sold through middlemen and now, during post project period, as maxim as 81 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

Sl.	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
1	Kalahandi	-	44.9	52.0	1.1	0.0	2.0
2	**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					
3	Kalahandi	96.3	3.6	0.2	0.0	0.0	0.0
4	**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 83.6 percent of surplus suan were sold to middlemen and now, during post project period also, about 83.7 percent are sold through this channel. Like middlemen, the importance of local haat to offload surplus suan still continues in the project area. About 15.5 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

Sl.	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
1	Kalahandi	-	44.6	51.8	3.5	0.0	0.0
2	**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					
3	Kalahandi	-	55.4	44.7	0.0	0.0	0.0
4	**All districts**	**-**	83.7	15.7	0.7	0.0	0.0

6.2.3 Marketing Channels for Kangu

As it can be seen from the following table 6.4, during pre-project period local middlemen was the predominant channel and as high as 97.5 percent of surplus kangu was sold through this channel and only about 2.5 percent were sold through local haats. However, during post project period, there is a declining share of local middlemen and consequently selling through local haats and input suppliers has become prominent.

Table-6.4: Marketing of Kangu by different Marketing Channels

Sl.	Districts	Marketing of Kangu by farmers in different market channels (% of overall quantity) during pre-project period					
		Govt. procurement	Middlemen	Local Haat	local Money Lender	Input supplier	Barter
1	Kalahandi	-	100.0	0.0	0.0	0.0	0.0
2	**All districts**	**-**	97.5	2.5	0.0	0.0	0.0
		Marketing of Kangu by farmers in different market channels (% of overall quantity) during post-project period					
3	Kalahandi	-	100.0	0.0	0.0	0.0	0.0
4	**All districts**	**-**	39.4	22.1	38.5	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. Proportionately about 39.0 percent of the surplus were sold through middlemen and the remaining surplus through local haat. Duirng post project period, there is a further increasing share of local middlemen and local haat in Kalhandi district, although at state level it is increasing. consequently, selling through local money lender has emerged as a prominent channel. As high as 75.3 percent of surplus janha is sold through local money lenders during post project period.

Table-6.5: Marketing of Janha by different Marketing Channels

Sl.	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
1	Kalahandi	-	39.0	61.0	0.0	0.0	0.0
2	**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					
3	Kalahandi	-	53.4	46.6	0.0	0.0	0.0
4	**All districts**	**-**	16.5	8.2	75.3	0.0	0.0

6.2.5 Marketing Channels for Kodo

As it can be seen from the following table 6.6, during pre-project period local middlemen followed by local haat and barter were the most prominent channels for selling surplus kodo millets by the farmers. However, the predominant channel was the local middlemen and about 58.9 percent of the surplus Kodo millet of the district were sold through this channel only. The importance of local middlemen still continues as a predominant channel even during post project period. It is further evident that the importance of barter is slightly lowered in favour of local haats during post project situation.

Table-6.6: Marketing of Other millets (Kodo) by different Marketing Channels

Sl.	Districts	Marketing of other millets (Kodo) by farmers in different market channels (% of overall quantity) during pre-project period					
		Govt. procurement	Middlemen	Local Haat	local Money Lender	Input supplier	Barter
1	Kalahandi	-	58.5	24.2	0.0	0.0	17.3
2	**All districts**	**-**	75.9	12.6	0.0	0.0	11.4
		Marketing of other millets (Kodo) by farmers in different market channels (% of overall quantity) during post-project period					
3	Kalahandi	-	49.1	36.7	0.0	0.0	14.2
4	**All districts**	**-**	74.4	19.1	0.0	0.0	6.5

Concluding Remarks

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. 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 sort 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 period local middlemen was the predominant channel which has been shifted in favour of Mandi during post project period. During pre-project situation, around 79.8 percent of surplus ragi surplus were sold through middlemen and now, during post project period, as maxim as 81 percent of surplus ragi are sold through Mandis. This is a remarkable achievement of OMM. During pre-project situation around 83.6 percent of surplus suan were sold to middlemen and now, during post project period also, about 83.7 percent are sold through this channel. Like middlemen, the importance of local haat to offload surplus suan still continues in the project area. About 15.5 percent of surplus suan are sold through local haats during pre-project as well as post project period. During pre-project period local middlemen was the predominant channel and as high as 97.5 percent of surplus kangu was sold through this channel and only about 2.5 percent were sold through local haats. However, during post project period, there is a declining share of local middlemen and consequently selling through local haats and input suppliers has become prominent. During pre project situation, proportionately about 39.0 percent of the surplus were sold through middlemen and the remaining surplus through local haat. Duirng post project period, there is a further increasing share of local middlemen and local haat in Kalhandi district, although at state level it is increasing. consequently, selling through local money lender has emerged as a prominent channel. As high as 75.3 percent of surplus janha is sold through local money lenders during post project period. With respect to kodo millets, the importance of local middlemen still continues as a predominant channel even during post project period.

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	→ OMM has been instrumental in bringing more areas under millet cultivation. → More numbers farmers are also mobilised for millet cultivation. → Framer 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.	→ 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.	→ Millet de-huskers, flour mills provided at local level have reduced the drudgery of women for processing of millets.	→ Due to MSP for millets, farmers are quite encouraged for millet cultivation.
2	Block level Agricultural Officers	→ 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	→ 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	→ 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.	→ 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	→ 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.	→ 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.	→ Locally availability of quality processing, there is time saving by covering reduced distance for millet processing.	→ 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	→ 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	→ 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	→ Easy processing has contributed to value addition of millets.	→ 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	→ 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.	→ 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	→ 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.	→ 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	→ 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. → 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.	→ CRPs are also engaged in promoting diversified millet recipes at household level which is augmenting household millet consumption in the project area.	→ There are local level evidences that millets powders are found as essential ingredients of "Chhatua Powder".	→ Due to the upsurge of millet consumption even among the non-millet producing households has significantly contributed to the upward market demand for millets.

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	→ Change in the mindset of farmers is a time-consuming process. They are taking their own time from diverting to millets from other crops. → Further continuance of the OMM supported awareness programme would leverage the adoption of millets as an important dry land crop in the project area.	→ There is still lack of awareness among the masses regarding the health benefits of millet consumption. → Millet should be included in the Food Security Act, of the Govt. of India, so that millet consumption would be further increased.	→ 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.	→ 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.

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	→ 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. → 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.	→ 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. → Millet recipes although introduced under ICDS and PDS, still it is optional, so consumption improvement is not getting broad-based.	→ 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	→ Presently, there is limited implementation of the	→ There should be training on the preparation of	→ Electricity facility is not found in all of the	→ Farmers complain that there is payment delay

		procurement policy for millet crops. If the procurement policy is expanded, there may be further scope for promoting millets in the project area. → 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.	dry foods from different types of millets. Rural women are acquainted only with the preparation of traditional recipes.	villages. Sometimes, despite availability of electricity facility, people find it difficult to pay electricity bills every month. → Resultingly, even if millet processing units are found, it becomes very difficult to make regular functioning of millet processing machineries.	by the Govt, when they sell their millets through mandis.
6	CRPs	→ 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.	→ 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.	→ Trained manpower to operate millet processing machines is also limiting factor for machine-based processing of millets in the project villages.	→ Owing to higher cost of cultivation, the MSP of millets are still considered lower by the millet farmers. → 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.

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	→ 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

			demonstrations of different millet-based recipes.		class buyers and high-end buyers.
4	Facilitating Agencies	→ Millet can be grown organically, and the concept of organic foods is trending in recent years particularly among the urban middle class people.	→ 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.	→ 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.	→ 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.
5	CBOs	→ Millet crops can be grown even in the sloppy terrains and hilly areas.	→ Millet is proven immunity booster food and during the time of ongoing Covid-19 pandemic, millet consumption has increased relevance.	→ 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.	→ There is good chance of promoting skills for millet-based value addition activities as well as strengthening the supply chain management of millet activities.
6	CRPs	→ All categories of farmers can easily adopt millet cultivation, because of the simplicity of its cultivation process without entailing much of the sophisticated knowledge.	→ The outreach of millet consumption could be further reinforced by further promoting millets in the MDMs and AWCS.	→ There is plan to undertake systematic intervention for the promotion of millet processing in all of the OMM intervention villages.	→ 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.

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

Ragi farmers of Kalahandi district are faster in adopting non-ragi crops than all Odisha situations. Similarly, in the case of small millets, there is also shrinkage of land area under small millets in 2010s compared to 2000s. However, such shrinkage at Kalahandi district is found marginally lower compared to all Odisha level. Due to higher land diversion of land from ragi to non ragi crops, the percentage share of ragi lands to all lands in the state has decreased from 3.61 percent in 2000s to 1.44 percent in 2010s. With respect to small millets, Kalahandi district accounting 2.85 percent of the overall small millet area of the state in 2000s has slightly improved to 2.98 percent in 2010s. The yield rate of ragi as well as small millets in Kalhandi district has increased in 2010s compared to the immediate past decade 2000s. In case of ragi, the increased yield rate in Kalahndi district is also higher compared to the overall situation prevailing in the state. However, for small millets the decadal variation in yield rate is positive but lower than the state level picture. With respect to yield index in 2000s Kalahandi district was unfavourable compared to overall situation as prevailing in the state. But the situation of the district has improved during 2010s and the district has been able to have a yield index of ragi at 123.47 compared to 100 points for the state. Despite better yield rate of ragi in 2010s, and as area under ragi cultivation is reduced, resultingly there is reduced level of ragi production in the district. Compared to 2000s, there is more than 50 percent fall in the annual production of ragi in the district, however at the state level, there is only 12.18 percent fall in the annual production of argi during 2010s compared to 2000s. Kalahandi district accounts 1.81 percent of the overall ragi production and 3.31 percent of small millet production in the state during 2010s. There is outreach of OMM in 137 GPs, 524 villages, 5801 farmers and 2435.07 hectares of land area under millet cultivation. The details of progress of OMM in Kalahandi district

8.1.2 Socio Economic Characteristics of millet farmers

Overall 76.3 percent of the farmers have joined into OMM in 2017-18 year, followed by 20.0 percent in 2018-19 and the remaining 3.8 percent in 2019-20. More than 90 percent of millet farmers of Bhawanipatna and Lanjigarh blocks have joined into the first phase of OMM in the initial 2017-18 only. Maximum proportion of millet farmers to the extent of 80.2 percent are STs. However, the incidence of STs are found higher in all blocks. The mean age of millet farmers is overall found at 46.7 years. Overall, about 79.1 percent of millet farmers of Kalhandi district are males and the remaining 20.9 percent are females. Incidence of female millet farmers is comparatively higher at Lanjigarh block followed by Th. Rampur block. Out of the total registered millet farmers, 47.2 percent are illiterates followed by upper primary level (19.1%), primary standard (16.9%), upto HSC (13.1%) and above HSC (3.8%). Religion wise all of the sampled out millet farmers covered in the study are Hindus by religion. Majority of millet farmers of the district are small farmers followed by medium farmers. The proportionate share of small farmers, medium farmers, marginal farmers and large farmers are found at 56.3, 22.8, 2.5 and 18.4 percent respectively. 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 Th Rampur block followed by Lanjigarh block. There are 2.3 male and 2.1 female members per millet farmers' household in the district. The average family size is

found at 4.3 persons. The overall sex ratio among the millet households of the district is found at 913 females per 1000 males.

8.1.3 Behaviour of Millet Production

The overall operational landholding among the millet farmers of Kalahandi district is calculated at 8.1 acres. Out of the total operational land holding, there is own land of 3.5 acres, encroached land of 2.6 acres and shared in land of 2.0 acres. 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. There is highest positive increase in the number of farmers for Janha and ragi farmers during post project period compared to pre project period. There is highest negative variation in the number of kangu farmers followed by oilseeds and pulses farmers. Farmers have diverted vegetable areas for millet cultivation. Besides, some of the uncultivated areas are also brought under millet cultivation. As a result of OMM intervention in the district, as some of the uncultivated areas are brought into millet cultivation, so, the cropping intensity in the OMM project area of the district has tended to increase. It is commonly noticed that mono cropping practices has improved during post project period. Similarly, mixed cropping and intercropping practices has declined during post project period. it is evident that for all types of millets almost in all of the project blocks of the district, farmers have shifted from traditional broadcasting method of cultivation and adopted other improved methods of cultivation. It is further observed that there is substantial improvement of LT method particularly for ragi and kodo millets, which are found to be the two major millets of the district. Ragi farmers during pre-project period, were mostly undertaking two times weeding which is changed in favour of more than two times weeding during post project period. Similarly, for other millets also number of times of weeding by the farmers has increased during post project period. Ragi production per acre has tended to increase from 4.9 quintals during pre-project situation to 5.7 quintals. This amounts to say that OMM has positively contributed to farmer productivity as well as land productivity of millets in the intervention area. It is found that millet farmers of Kalahandi district are yet to introduce improved varieties of ragi.

8.1.4 Behaviour of Millet Consumption

Number of households purchasing millets during summer season stands higher in comparison to other seasons during pre-project as well as post project period. Overall, at district level, about 98.8 percent of the millet farmer households consume millets during summer season in post project period, which was 88.8 percent during pre-project period. Average daily household consumption of millets is almost equal during summer and winter seasons during post project period. However, during pre-project period overall it was higher during summer seasons. Perhaps, due to more production of millets, a greater number of millets are also consumed during winter season. Number of households purchasing millets for domestic consumption stood at 2.2 percent during pre-project period which is 15.3 percent during post project period. Owing to higher consumption habit of millets at household level, a greater number of households despite own production depend on market for purchasing millets during post project period. Increased millet consumption habit is also reflected in more amount of millet purchased by the households during post project period. It is found that on an average each household purchases 1.98 quintals of millets from market during post project period which was 0.18 quintals during pre-project period. 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 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. 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 sort 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 period local middlemen was the predominant channel which has been shifted in favour of Mandi during post project period. During pre-project situation, around 79.8 percent of surplus ragi surplus were sold through middlemen and now, during post project period, as maxim as 81 percent of surplus ragi are sold through Mandis. This is a remarkable achievement of OMM. During pre-project situation around 83.6 percent of surplus suan were sold to middlemen and now, during post project period also, about 83.7 percent are sold through this channel. Like middlemen, the importance of local haat to offload surplus suan still continues in the project area. About 15.5 percent of surplus suan are sold through local haats during pre-project as well as post project period. During pre-project period local middlemen was the predominant channel and as high as 97.5 percent of surplus kangu was sold through this channel and only about 2.5 percent were sold through local haats. However, during post project period, there is a declining share of local middlemen and consequently selling through local haats and input suppliers has become prominent. During pre-project situation, proportionately about 39.0 percent of the surplus were sold through middlemen and the remaining surplus through local haat. Duirng post project period, there is a further increasing share of local middlemen and local haat in Kalhandi district, although at state level it is increasing. consequently, selling through local money lender has emerged as a prominent channel. As high as 75.3 percent of surplus janha is sold through local money lenders during post project period. With respect to kodo millets, the importance of local middlemen still continues as a predominant channel even during post project period.

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.