

# Value Chain Analysis of Finger Millet (Mandia/Ragi) in Project Villages of Bargarh District of Odisha

An Initiative in Creating Sustainable Livelihoods for Small and Marginal Farmers through  
Agriculture Interventions in Bargarh and Sambalpur Districts of Odisha



MAHASHAKTI FOUNDATION



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# 1. Value Chain Analysis of Finger Millet (Mandia/Ragi) in Project Villages of Bargarh District of Odisha

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After analyzing the agro-climatic condition, the cropping pattern, and the market potential and feasibility of various crops, the project has identified two crops viz. Chilli and Millet to promote the commercial cultivation and enhance the income of the farmers through i) establishing a Chilli cluster at Jamankira block of Sambalpur and Bhatli Block of Bargarh District, and ii) implement a special program for the promotion of Millets in Bhatli and Ambabhona Block of Bargarh District. Thus, an attempt was made in the study to conduct a detailed value chain analysis of these two selected products (Chilli and Millet) in the project area. Data collected as part of this value chain analysis are analyzed and presented in this report. This chapter presents the value chain analysis of Millet conducted in the Bhatli Block of Bargarh District of Odisha.

## Product Name: Millet



## 1.1 A Brief Introduction to the Product

The United Nations General Assembly has declared 2023 as the “International Year of Millets”. India has the largest diversity of Millets as well as Millet products in the world. The term “Millet” usually denotes small-grained cereals. Millets are one of the oldest cultivated grains in India. It is considered a staple food in most of the Indian states. Millet is a drought-tolerant and climate-resilient crop. The Millet group covers finger Millet, Little Millet, Kudo Millet, Fotal Millet, Barnyard Millet, and Proso Millet. Millets, particularly the finger Millets, are called differently in respective local languages of different states in India as Mandua in Hindi, Nagli, Nachni in Marathi, Ragi in Kannada, Ragulu, Chodi in Telugu, Keppei, Kelvaragu in Tamil, Marwa in Bengali,



Nagli, Bavto in Gujarati, Mandia in Odisha, and Mandhuka, Mandhal in Punjabi. Tall grasses, tufted stems, each with four spikes, the important variations observed in Millets are in ear-head shape and plant pigmentation. The seed coat is generally brown. Most of the Millets grown in India are of short duration taking three to four months from sowing to harvesting. Millet is one of the hardiest crops suited for dry farming. It can grow under conditions of low rainfall. It can be cultivated as a dry crop as well as under irrigation.

Millets are cultivated across the state of Odisha. These have been the vital component of Odisha’s dry farming system, serving the state’s poor and food-insecure people. Traditionally cultivated, Millets are the major sources of sustenance for lakhs of tribals and other traditional forest dwellers living in southern and western parts of Odisha. Over 170 varieties of Millets are cultivated in the hilly and forested areas in the state. Some of the prominent minor Millets largely cultivated in Odisha include finger Millet (Ragi/Mandika), little Millet (Suan/Gurji), sorghum (Jawari), and spiked Millet (Bajra) among others. Out of different Millets, Finger Millet (Mandia) and little Millet (Suan/Gurji) cover most of the area in the state of Odisha. Finger Millet (Mandia) is the major crop covering more than 80% of the area.

**Note: Hereinafter, finger Millet (Mandia/Ragi) is referred to as Millet in the report. Since finger Millet (Mandia/Ragi) is mostly cultivated in the project geographies, the project aims to promote the cultivation of finger Millets.**



Millets are part of the traditional staple diet and crop systems in Odisha supplementing the nutritional needs of the communities, especially in the rainfed regions. Millets have been providing the necessary diet diversity and nutritional security for generations in the drought-prone uplands in districts inhabited by tribal communities. However, the conscious pursuit of an agricultural policy since the 1960s to meet national food security with paddy



and wheat has led to a decline in Millet production and consumption in the state. Millets were not the focus crops in the food security framework of the green revolution. Over the last 10 years, the area under Millet (Ragi) cultivation, production, and productivity have significantly declined in Odisha. The area under Millet (Ragi) crop is further showing a declining trend due to the diversion of traditionally Ragi growing areas to cotton, maize vegetables & pulses. Although Millets were included for distribution through Public Distribution System (PDS) system in the National Food Security Act (NFSA) 2013 and

more recently recommended by Niti Aayog and the National Food Security Mission (NFSM), implementation of the same had met with marginal success due to a lack of an integrated approach to the supply chain.

The nutrient-rich Millets that were fast fading away from the agricultural landscape are now making a comeback in Odisha with the setting-up of the Millet Mission by the Government of Odisha (GoO). Of late, the Millet Mission has been working towards reviving the Millet crop in the state, which is now getting the much-needed attention across the State because of its high nutritional value.

Millet plays a pivotal role in preventing and curing several health issues. The nutritional value of Millet caters to the healthiness of human society. Millet has an incredibly nutrient-rich composition. Millet is a rich source of fiber,

protein, and minerals like magnesium, phosphorus, iron, calcium, zinc, and potassium. The cereal has low-fat content and contains mainly unsaturated fat. It is easy to digest and does not contain gluten. Finger Millet is considered one of the most nutritious



cereals which helps in keeping weight in control, maintaining bone health, lowering blood cholesterol, controlling anemia, and for diabetics because of lower glycemic response i.e lower ability to increase blood sugar level. Millet

is rich in amino acids which are vital in the normal functioning of the body and are essential for repairing body tissues. If consumed regularly, Millet could help in keeping malnutrition, degenerative diseases, and premature aging at bay. Green Millet is recommended for conditions of blood pressure, liver disorders, asthma, lactating mother, and heart weakness. Its high intake could increase the quantity of oxalic acid in the body. Therefore, it is not advised for patients having kidney stones. Finger Millet can be value-added to prepare cakes, Roti, Dosa, porridge, Upma, Pitha, Halwa, and biscuits from the powder of Ragi.

Millets are not only healthy, but they also have a unique taste. The urban population does not care about their dietary patterns and becomes prey to unhealthy foods like fast foods and junk foods which make them unhealthy in course of time. The primary reason for the decline of Millet absorption in the urban market is the lack of awareness among the people about its nutritional benefits and stiff competition from its competitors like cereals. Changes in times and policies, the intervention of other edibles, and lack of awareness brought it down in consumers' perceptions. The acceptance of Millet did not increase due to rapid modernization.

## 1.2 Purpose & Objectives of Value Chain Study

The purpose behind conducting the value-chain analysis is to help the project to strengthen the existing value chain of Millet by integrating more and more farmers into the same. The study findings would enable the project with the required information to develop a strategy and roadmap for the promotion of Millet clusters through appropriate institutional arrangements, market linkages, and capacity-building strategies so that the income of the local farmers in the project areas can be enhanced. It would help the project devising interventions to overcome bottlenecks and constraints in the production process and marketing system of the value chain of Millet.

More importantly, the study findings would help the project to diagnose points of ineffectiveness for corrective actions and would help to garner a deep understanding of each step that adds or subtracts value for developing the value chain of Millets. It would enable the project to develop a value chain framework that enhances the cost efficiency of farmers by upgrading their position within a viable value chain by increasing the production and marketing efficiency of the local farmers so that they can gain maximum value by incurring the least possible cost.

Keeping in mind the above, the objectives set for conducting the value chain analysis are to:

- i) Analyze the trends in the area under cultivation, production, and productivity of Millets at state, national and international levels;
- ii) Assess the capacity of primary producers of Millets in the intervention area and suggest primary measures to enhance the productivity and maximize the returns for the producers at the bottom of the value chain;
- iii) Depict a clear picture of the value chain of Millets in the project areas with specific input from primary producers in the intervention area through interaction with Value Chain actors and facilitating & supporting organizations working towards the realization of better value for the primary producers;
- iv) Assess the credit, technology, and infrastructure requirement for the value chain development of Millet;
- v) Identify, understand and document the market structure of Millet including the role of and relationship between different stakeholders/drivers in the value chain of Millet from producer to consumer in selected markets within the district and state;
- vi) Analyze the spread of price across the stakeholders in the value chain from the primary producer to the consumer within the district and state;

- vii) Provide a larger picture of a trade by primarily interacting with producers, middlemen, small traders, input suppliers, retailers, and supporting organizations working to enhance the potential of the sub-sector;
- viii) Identify major bottlenecks and constraints in the Millet value chain and ways to strengthen the chain to minimize price volatility and improve productivity; and
- ix) Recommend measures for the project to develop and strengthen the value chain of Millets.

## 1.3 Area, Production, and Productivity

### 1.3.1 Indian Scenario

Finger Millet or Eleusine coracana, also known as African Millet or ragi, is widely grown in Africa and Asia. It is originally native to the Ethiopian Highlands though it was introduced in India a long time ago. Its adaptability to the higher elevations makes it suitable to grow even at a height of more than 2,000 meters. Finger Millets in India are produced throughout the length and breadth of the country. According to FAO estimates, India produces more than 30 percent of the total global Millet followed by African countries such as Nigeria, Ethiopia, etc. This crop is cultivated in almost all the states of the country, Karnataka being the leader of all.

States	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	State Share (%)	CAGR
Karnataka	733.00	680.00	645.00	671.00	708.00	705.00	598.00	778.00	527.25	641.00	63.82	-1.48
Tamil Nadu	75.70	82.81	70.31	118.70	104.43	89.99	61.36	86.51	78.60	84.54	8.42	1.23
Uttarakhand	128.10	125.00	124.62	112.15	112.84	107.43	107.00	103.00	92.00	84.00	8.36	-4.58
Maharashtra	120.00	130.00	125.00	126.00	112.00	92.00	92.70	93.00	80.30	82.22	8.19	-4.11
Odisha	65.85	55.01	57.17	56.63	51.48	45.69	46.97	42.59	36.66	35.89	3.57	-6.52
Andhra Pradesh	39.07	40.00	39.00	41.90	33.00	32.00	32.00	35.00	32.00	34.00	3.38	-1.53
Jharkhand	9.00	11.97	12.56	11.87	13.91	14.33	22.69	19.01	14.03	14.58	1.45	5.51
Gujarat	20.00	16.00	14.00	14.00	20.00	19.00	19.00	12.00	11.99	11.61	1.16	-5.86
Chattisgarh	8.70	7.70	8.20	6.00	6.70	6.90	6.30	4.83	7.70	5.73	0.57	-4.53
West Bengal	11.70	8.42	10.00	10.11	10.13	11.00	9.92	12.00	3.27	2.85	0.28	-14.52
Bihar	9.00	7.74	7.94	7.03	6.68	6.93	4.78	4.21	2.88	2.76	0.27	-12.31
Telangana	2.93	2.00	2.00	2.02	2.00	1.00	1.00	1.00	1.00	2.00	0.20	-4.15
Himachal Pradesh	2.30	2.43	2.77	2.00	1.94	1.88	2.23	1.82	1.72	1.76	0.18	-2.93
D & N Haveli	1.29	1.21	1.04	1.01	1.03	0.85	0.86	0.85	0.92	0.90	0.09	-3.92
Nagaland	0.30	0.31	0.31	0.32	0.32	0.33	0.33	0.34	0.35	0.35	0.03	1.73
Kerala	0.30	0.25	0.10	0.08	0.08	0.06	0.03	0.09	0.22	0.21	0.02	-3.89
Pondicherry	0.02	0.02	0.03	0.04	0.04	0.00	0.05	0.05	0.04	0.06	0.01	12.98
Goa	0.20	0.15	0.05	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	-100.00
Jammu & Kashmir	0.00	0.00	7.52	8.73	8.77	0.00	8.30	0.00	0.00	0.00	0.00	
Madhya Pradesh	0.40	0.30	0.40	0.40	11.00	1.00	2.60	0.00	0.00	0.00	0.00	-100.00
Sikkim	3.00	4.46	3.00	3.63	3.69	2.85	0.00	0.00	0.00	0.00	0.00	-100.00
Uttar Pradesh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
<b>All India</b>	<b>1230.86</b>	<b>1175.78</b>	<b>1131.02</b>	<b>1193.64</b>	<b>1208.06</b>	<b>1138.25</b>	<b>1016.11</b>	<b>1194.29</b>	<b>890.94</b>	<b>1004.46</b>	<b>100</b>	<b>-2.23</b>

As per the available data, it is clear that the top six Millet producing states of the country are covering almost 95.7% of the area under this crop as evident from Table 1. Among all the states in the country, Odisha occupies the 5<sup>th</sup> position in terms of the quantum of the area brought under Millet cultivation, though it is only 3.6% of the total



Millet crop area in 2019-20 in India. But, over the last ten years, Odisha recorded a net decline in the area under Millet cultivation the State. The Compounded Annual Growth Rate (CAGR) is as high as -6.52, which means that there is a significant decline in the area under Millet cultivation. Only 4 states in India have positive CAGR, overall at the country level, the CAGR is -2.23 which also shows a decline in the area at the national level under the cultivation of Millet. There is a decline of 2.23% of the average area under production of Millet on year to year basis.

Table 2 below depicts the picture of Millet production in the country. The top 6 states in the country contribute to around 97.8% of total production. Karnataka is the leading state both under a covered area (63.82%) and production (66.33%).

States	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	State Share (%)	CAGR
Karnataka	1497.00	1272.00	975.00	1180.29	1298.00	1188.00	858.97	1286.03	677.52	1164.06	66.33	-2.76
Tamil Nadu	171.10	224.86	138.31	362.34	349.63	271.15	114.43	321.30	256.00	274.50	15.64	5.39
Uttarakhand	170.50	174.00	173.50	153.90	155.73	150.57	160.00	140.80	109.85	120.12	6.84	-3.82
Maharashtra	117.00	138.00	139.00	142.00	119.00	93.00	111.10	106.49	93.48	87.24	4.97	-3.21
Andhra Pradesh	47.00	37.07	42.00	43.03	34.00	34.00	35.00	44.70	43.14	44.88	2.56	-0.51
Odisha	46.63	30.91	44.03	45.84	38.02	28.33	33.13	32.67	25.30	26.24	1.49	-6.19
Jharkhand	4.70	7.92	10.58	8.71	11.65	9.24	20.03	18.48	11.29	12.76	0.73	11.73
Gujarat	14.00	13.00	14.00	14.00	16.00	15.00	27.00	10.75	9.64	10.01	0.57	-3.66
West Bengal	13.80	8.24	12.00	11.07	11.09	12.50	10.99	13.56	2.93	4.17	0.24	-12.44
Telangana	3.00	2.93	3.00	2.97	2.00	1.00	1.00	1.14	0.98	3.16	0.18	0.59
Bihar	7.20	9.39	9.37	7.14	9.84	9.89	3.46	4.19	3.09	2.19	0.12	-12.37
Himachal Pradesh	2.10	2.80	2.51	1.97	1.91	1.93	2.12	1.92	1.82	2.06	0.12	-0.24
D & N Haveli	2.12	1.20	1.07	1.04	1.06	1.62	1.46	1.45	1.32	1.49	0.08	-3.88
Chattisgarh	2.40	1.90	2.30	1.60	1.80	1.30	1.50	1.21	1.65	1.45	0.08	-5.45
Nagaland	0.28	0.29	0.29	0.30	0.30	0.32	0.32	0.33	0.34	0.34	0.02	2.18
Kerala	0.20	0.27	0.11	0.10	0.08	0.08	0.04	0.11	0.27	0.26	0.01	3.00
Pondicherry	0.05	0.06	0.07	0.08	0.09	0.00	0.07	0.13	0.10	0.14	0.01	12.05
Goa	0.10	0.14	0.05	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	-100.00
Jammu & Kashmir	0.00	0.00	3.72	2.86	4.15	0.00	3.60	0.00	0.00	0.00	0.00	
Madhya Pradesh	0.10	0.10	0.10	0.20	3.00	1.00	0.90	0.00	0.00	0.00	0.00	-100.00
Sikkim	2.90	4.16	3.40	3.49	3.55	2.97	0.00	0.00	0.00	0.00	0.00	-100.00
Uttar Pradesh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
<b>All India</b>	<b>2102.18</b>	<b>1929.24</b>	<b>1574.41</b>	<b>1982.94</b>	<b>2060.91</b>	<b>1821.89</b>	<b>1385.11</b>	<b>1985.24</b>	<b>1238.70</b>	<b>1755.06</b>	<b>100</b>	<b>-1.99</b>

It is evident from the calculation of CAGR for production above that at the country level there is an increase of 1.99% in average production on year on year basis. In Odisha, the production of Millet is also going down at a faster rate with the CAGR at -6.19.

### 1.3.2 The scenario in Odisha State

Table 3 below presents the status of Millet crop area, yield, and production in the last 10 years in Odisha, furnished by the Department of Economics and Statistics, Government of Odisha. It is evident from the table that over the years the total area brought under Millet cultivation in the state shows a declining trend (CAGR -4.90). Likewise, the production (CAGR -0.58) and productivity (CAGR -5.46) show a steady decline in the last 10 years.

<b>Table 3 Status of Millet production, productivity, and area under Millet production in Odisha</b>			
Year	Odisha		
	Sum of Area ('000 Hec)	Sum of Yield (Kg/Ha)	Sum of Production ('000mts)
2009-10	185.26	938	173.86
2010-11	179.48	821	147.39
2011-12	169.22	895	151.42
2012-13	172.99	863	149.21
2013-14	165.80	867	143.74
2014-15	158.27	868	137.36
2015-16	147.29	867	127.65
2016-17	138.34	874	120.92
2017-18	114.35	880	100.58
2018-19	117.88	890	104.92
<b>CAGR</b>	<b>-4.90</b>	<b>-0.58</b>	<b>-5.46</b>

### 1.3.3 The scenario in the Project Intervention District

According to the data furnished by the Department of Economics and Statistics, Millet was cultivated in only 170 hectares of land areas in Bargarh district in the year 2018-19. During 9 years before 2018-19, Millet cultivation was not evident in the district. Although Millet was cultivated by farmers for 2 to 3 decades, the cultivation of Millet has been gradually stopped due to the diversion of traditionally Ragi growing areas to cotton, maize vegetables & pulses. Only after the introduction of the Millets Mission, the cultivation of Millet was again resumed by some farmers in the district from the year 2018-19.

<b>Table 4 Status of Millet production, productivity, and area under Millet production in Bargarh District</b>			
Year	Bargarh		
	Sum of Area ('000 Hec)	Sum of Yield (Kg/Ha)	Sum of Production ('000mts)
2009-10	0	0	0.00
2010-11	0	0	0.00
2011-12	0	0	0.00
2012-13	0	0	0.00
2013-14	0	0	0.00
2014-15	0	0	0.00
2015-16	0	0	0.00
2016-17	0	0	0.00
2017-18	0	0	0.00
2018-19	0.17	765	0.13

Table 4 shows that 130 tonnes of Millets were produced from 170 hectares of land areas which gives a yield rate of only 765kg per hectare.

## 1.4 Study Methodology

The value chain analysis study was conducted applying the qualitative research method. Qualitative data collection techniques like Focus Group Discussion (FGDs) and Key Informant Interviews (KIIs) were conducted for collecting data from various key informants and stakeholders. In consultation with the Mahashakti Foundation, one sample cluster located in the Bhatli Block of Bargarh District was selected and covered in the study for conducting the value

chain analysis of Millet. The study team visited a total of three villages located in the cluster. In each of the three villages, FGD with 10 to 15 farmers was conducted. Overall, 3 FGDs were conducted with the farmers in the project areas, who were either engaged in Millet cultivation or had the interest to resume cultivating Millet.



**Table 5 FGDs conducted with Millet farmers in the project geographies**

District	Block	Cluster Type	Village Name	No. of FGDs
Bargarh	Bhatli	Millet	Kasipali	1
			Chor Grindola	1
			Kanheimunda	1
			<b>Total</b>	<b>3</b>

Apart from FGDs, the study conducted one-to-one interviews with other important stakeholders and key informants involved in Millet production, value addition, and marketing of the product. The various stakeholders and key informants interviewed in the study include seed sellers, input wholesalers, and functionaries from District Millet Mission, Odisha Rural Development & Marketing Society (ORMAS), Department of Horticulture, Tribal Development Cooperative Corporation (TDCC), and Producer Companies based in both inside and outside the project blocks. The study team purposefully visited one of the project blocks of Odisha Millet Mission namely Bijepur in Bargarh district to get an in-depth understanding of the value chain of Millet. In total, 8 KIIs were conducted to get detailed information for the value chain analysis of Millet.





**Table 6 In-depth interviews conducted with key informants and stakeholders**

District	Sl. No.	Study Participants	No. of Kils
Baragarh	1	Deputy CEO, ORMAS	1
	2	Scheme Officer, Millet Mission, Bargarh	1
	3	Asst. Director of Horticulture	1
	4	CEO, Chirasabuja Producers Company Ltd, Bijepur	1
	5	Fertilizer Wholesaler	1
	6	Pesticides Wholesaler	1
	7	Seed Wholesaler	1
	8	Petty Seed Seller, Urduna (interviewed at Bichuan weekly Haat)	1
	<b>Total</b>		<b>8</b>

## 1.5 Crop Varieties and Methods of Millet Cultivation (Package of Practices – PoPs)

Finger Millet is a Millet crop under cereals. Finger Millet grain comprises 72.32% carbohydrates, 11.9% protein, 1.2% fat, 2.24% minerals, 0.33% calcium, 3.99% potassium, and 16mg of Vitamin A. It is a beneficial food for diabetic patients due to the presence of vitamin B. Finger Millet contains Metafexim Hydrochloride which helps in higher insulin secretions thus leading to a cure of the disease. Vitamin A content helps in curing night blindness. Therefore, finger Millet is more beneficial as compared to rice. There are various types of dishes made out of finger Millet like Kheer, Upma, Roti and Biscuits, etc. It contained a high amount of fibers, which helps in decreasing the cholesterol level of the body and thus lessens the heart stroke rate.

Finger Millet is a major food of tribal people. This crop is intensively cultivated in the interior tribal districts of Odisha. But it can be cultivated in the coastal districts and gives twice the yield as compared to interior districts. Finger Millet has a high drought resistance capacity. Finger Millet can be cultivated all around the year like rice. Finger Millet has more drought resistance capacity than rice. Therefore, the Government of Odisha has launched the Millet Mission program in each district to give importance to the finger Millet cultivation and the nutritional benefits it provides.



Finger Millet is provided under the national food security mission to ration card holders at the rate of rupees 1 per kg. Bargarh district is also enlisted under this mission and by this farmers are also able to sell finger, Millet. The methods of finger Millet cultivation are described below.

### 1.5.1 Soil Requirement for Millets

The crop is widely adaptable from mean sea level to foothills and can be grown in a wide range of soils. The crop can tolerate a certain degree of alkalinity. The best soil is loamy, sandy, and alluvial soil with good drainage. They will not withstand water-logged soils or extreme drought.

### 1.5.2 Seed Variety

Several high-yielding varieties have been evolved and released for cultivation. The popular varieties of seeds in Odisha are VL Mandua 376 (VL 376), VL Mandua 352 (VL352), Arjuna (OEB-526), OEB 10, OUAT 2, BM 9-1, OEB 532, and Bhairavi.

### 1.5.3 Field Preparation

Timely ploughing is advantageous for moisture conservation. In the months of April-May, one dip ploughing with the moldboard plough is recommended for the Kharif crop, followed by ploughing with a wooden plough twice. For the Rabi crop, field preparation is done during September-October and for Zaid/Summer crop, it is done in January and February. The field preparation is required to:

- Eliminate and control undesirable plants like crop volunteers and weeds to reduce competition with the established main crop.
- Provide favorable conditions for sowing.
- Maintenance of fertility and productivity over the long term by preserving the soil organic matter and avoiding erosion.
- Facilitating mixing of fertilizers, lime, or agrochemical products into the soil.

Timely field preparation facilitates timely sowing which ensures higher yield. Land preparation ensures that all the crop residues, crop volunteers, and weeds are completely buried. For the rainy season crop, with the onset of rain in May-June, the field is ploughed once or twice to obtain a good tilt. Harrowing of soil is invariably followed after each ploughing to reduce the clod size. Moisture is a critical element in good seedbed preparation and essential for the successful establishment of the crop.

### 1.5.4 Preparation of Land for Nursery

- Good seeds and land preparation help in better germination, minimizing weed problems, and effective soil moisture conservation.
- Good ploughing of the land is required to bring it to a fine tilt.
- For raising seedlings to plant one acre of the main field, a one-tenth acre of the nursery is required near a water source where water does not stagnate.

- And the mix of 30 kg of superphosphate and 500 kg of FYM or compost is required to spread evenly on the nursery area.

### 1.5.5 Pre-treatment of the Seed with Fungicide

Azospirillum 400 gm and Phospobacteria 400 gm or Azophos 800 gm is required for the treatment of seed.

### 1.5.6 Soil and Moisture Conservation Practices

- Summer ploughing or ploughing after the harvest of the previous crop is required to improve the soil quality.
- Ploughing can be done across the slope also.

### 1.5.7 Seed Treatment

- Seed should be treated with pseudomonas Flurescence@ 10gm/kg seed followed by 600 gram of Azospirillum Culture.

### 1.5.8 Treatment of Nursery Bed with Insecticide

- Phorate 10G 180 gram or Carbofuran 3 G 600 gram to be mixed with 2 kg of moist sand and is required to be spread on the beds.

### 1.5.9 Sowing Time

For Kharif, a suitable time for sowing is June to July, for Rabi, it is October to November. Generally, the crop is grown during the Kharif season. In certain areas, the crop is grown during Rabi and Zaid/Summer season under irrigated conditions.

### 1.5.10 Sowing and Covering the Beds

- Shallow rills are to be made not deeper than one cm on the beds by passing the fingers vertically over them.
- Broadcast the treated seeds evenly on the beds.
- Cover the seeds by leveling out the hand lightly over the soil.
- Sprinkle 200kg of powered FYM over the beds evenly to cover the seeds which are exposed and compact the surface lightly.

### 1.5.11 Water Management

- Millet is generally grown in the Kharif season under rain-fed conditions. If there is any longer dry spell, then irrigation would be required depending on soil type, weather condition, and duration of the variety.
- For light soil, irrigation is required in 6 to 8 days, and for heavy soil, once in 12-15 days.
- One inlet is required for each nursery unit.

- Water to enter through the inlet and cover all the channels around the beds.
- Allow the water in the channels to rise so that the raised beds are wet.
- Adjust the frequency of irrigation according to the soil type.

### 1.5.12 Pulling out the Seedlings for Planting

- Seedlings are pulled out on the 17<sup>th</sup> to 20<sup>th</sup> day of sowing for planting.

### 1.5.13 Preparation of the Main Field

- **Ploughing of the main field:** Ploughing twice is required.
- **Application of FYM or Compost:** Spread 5 tons of FYM or compost evenly on the unploughed field about one month before sowing/transplantation and then plough and incorporate it into the soil.
- **Application of Fertilizers:** The application of fertilizers should be done based on recommendations based on soil testing.
- **Forming Beds and Channels:** Provide suitable irrigation channels.

### 1.5.14 Management of Main Field

#### 1.5.14.1 Methods of Sowing and Transplanting the Seedlings

There are three types of methods used in Millet cultivation:

- **LS:** It is line sowing. Farmers sow the seeds line by line giving a spacing of 22.5 cm between rows and 10 cm between the plants and a depth of 3-4 cm.
- **LT:** It is the Line Transplant method. Transplanting is done under irrigated conditions. Farmers transplant the seedlings in a line.
- **SMI:** It is a System of Millet Intensification (SMI) method. It is adopted for better yield.
  - Let water into the bed, level the bed if it is not leveled.
  - Plant two seedlings per hole.
  - Plant the seedlings at the depth of 3 cm.
  - Plant 17th to 20th days old seedlings.
  - Root dipping with Azospirillum. Prepare slurry with 400 gm per acre of Azospirillum and 400 gm of Phospobacteria or 800 gm of Azophos per acre in 20 liters of water and dip the root portion of the seedlings in the solution for 15-30 minutes and then transplant.

#### 1.5.14.2 Weed Control

- It is essential to control the weeds in the initial stages of plant growth and development.
- Apply PE Oxyfluofen 20 gm with 200 liters of water using sprayers followed by one hand weeding.
- Apply the herbicide when there is sufficient moisture in the soil or irrigate immediately after the application of the herbicide.
- If pre-emergence herbicide is not applied, the weeding is required twice on the 10th and 20th day after planting.

### 1.5.14.3 Hoeing and Hand Weeding

- Hoe and hand weed on the 15<sup>th</sup> day of planting in light soils and 17<sup>th</sup> day of planting in heavy soils and subsequently on the 30<sup>th</sup> and 32<sup>nd</sup> days respectively.
- Allow the weed to dry for 2 or 3 days after hand weeding before irrigation. But do not adapt hoeing and hand weeding before herbicide is applied.

### 1.5.14.4 Water Management

- Irrigate the field on the first day, e.g. on the 5<sup>th</sup> and then on the 18<sup>th</sup> day and so on as per the requirement of the plants.

### 1.5.14.5 Manure and Fertilizer Application

- Millet responds well to fertilizer application, especially to N and P.
- 15:8:8 kg of N:P: K is applied per acre.
- With the judicious application of FYM, inorganic fertilizer efficiency is enhanced.

### 1.5.14.6 Disease Management

#### a) Symptoms

- Severe cases of infected crops give a blasted or burnt appearance.
- Severe cases of lodging of the crop (after ear emergence).
- The Neck Region of the panicle develops a black color and shrivels completely.
- Nodes become black and break up.

#### b) Management of disease

- Spray fungicides Carbendazim 200 gm per acre.
- First, spray immediately after noticing the symptoms.
- Second and third sprays at the flowering stage at 15 days intervals to control neck and finger infections.

#### c) Symptoms

- The initial symptom of mottle streak disease appears around 45 days in funnel leaves as small sparse chlorotic specks.
- Later the specks coalesce leading to short specks.
- Yellowing of plants in severe infection.
- Failures of ear head emergence with sparse grains are noticed during initial and later infection.

#### d) Management of disease

- Uproot infected plants.
- Spray any one of the insecticides like Monocrotophos 36 WSC 300 ml per acre or Methyl demeton 25EC 200 ml per acre on noticing symptoms and repeat twice if necessary at 20 days intervals for control of insect vectors.



#### 1.5.14.7 Insect Pests and their Control

Milletts attract several pests of which armyworm, cutworm, stem borer, leaf aphid, grasshoppers, grey weevils, shoot fly, and ear caterpillars are major ones.

### 1.5.15 Harvesting

#### 1.5.15.1 Decide When to Harvest

- When the ear head on the main shoot turns brown, the crop is ready for harvesting.
- The crop matures in about 95- 110 days in case of early varieties and 115 to 125 days in case of medium and late-duration varieties depending on the regions and varieties.

#### 1.5.15.2 Harvesting the Crop

- The ear heads are harvested with ordinary sickles and straw is cut close to the ground.
- Cut all ear heads which have turned brown.
- Dry, thrash, and clean the grains by winnowing and storing the grains in gunnies.

#### 1.5.15.3 Threshing

- Green ear heads if harvested will contaminate the seeds with immature seeds and interfere in cleaning, drying, and grading. Dry ear heads until the seed moisture content are 15% and separate manually by threshing with a bamboo stick or machine thresher.

#### 1.5.15.4 Pre-cleaning and Drying

- Threshed seeds should be pre-cleaned before sun-drying, and seeds must be dried to 12% before grading.

#### 1.5.15.5 Protection from Storage Pests

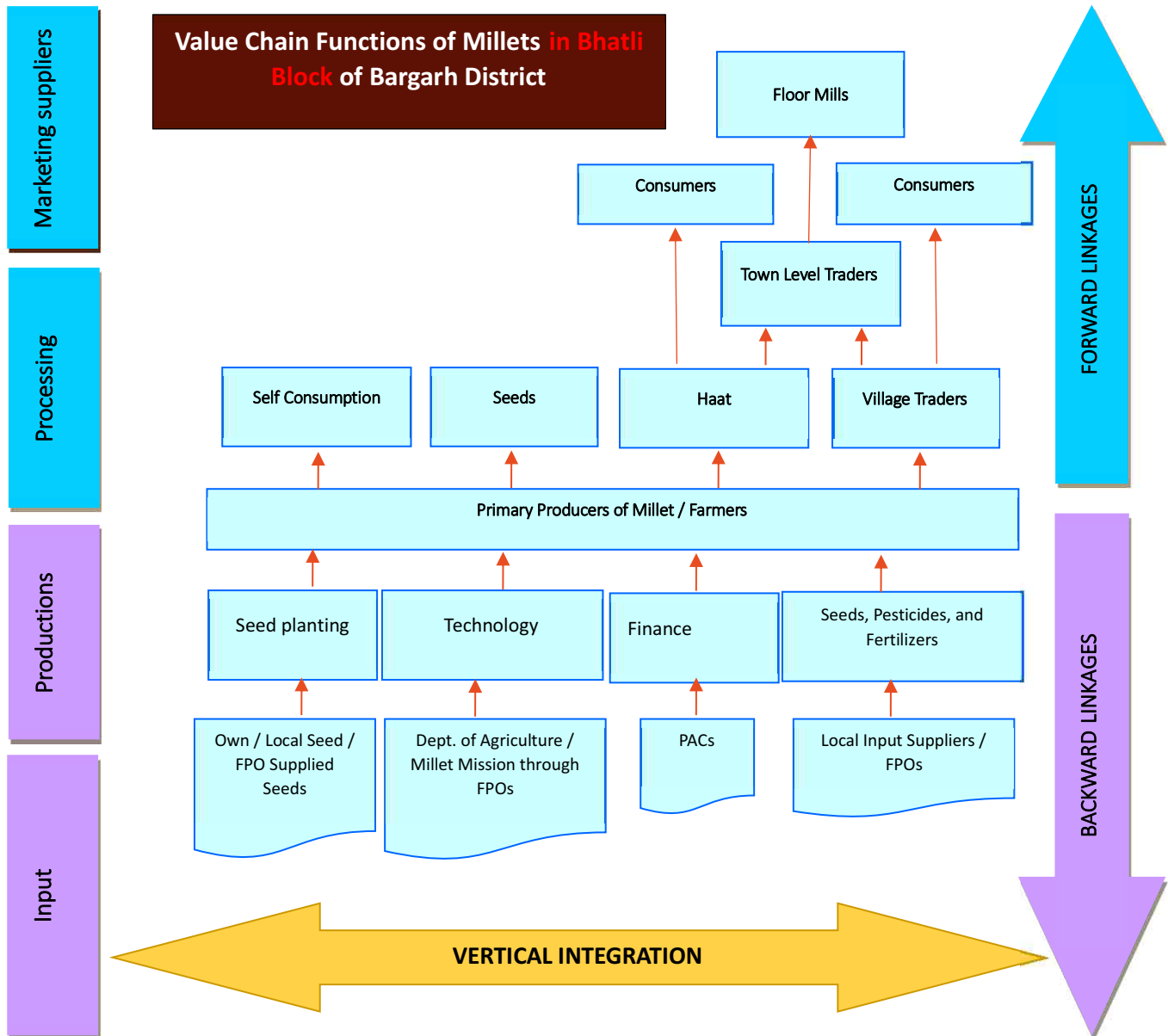
- **Grain purpose:** Dry the seeds adequately to reduce the moisture level to 10%.
- **Seed purpose:** Add one kg of Activated kaolin or Malathion 5% for every 1000 kg of seed. Pack in gunny bags or polythene-lined gunny bags for storage.
- **Yield:** It is possible to harvest 10-12 quintals per acre of grain under well-managed conditions.

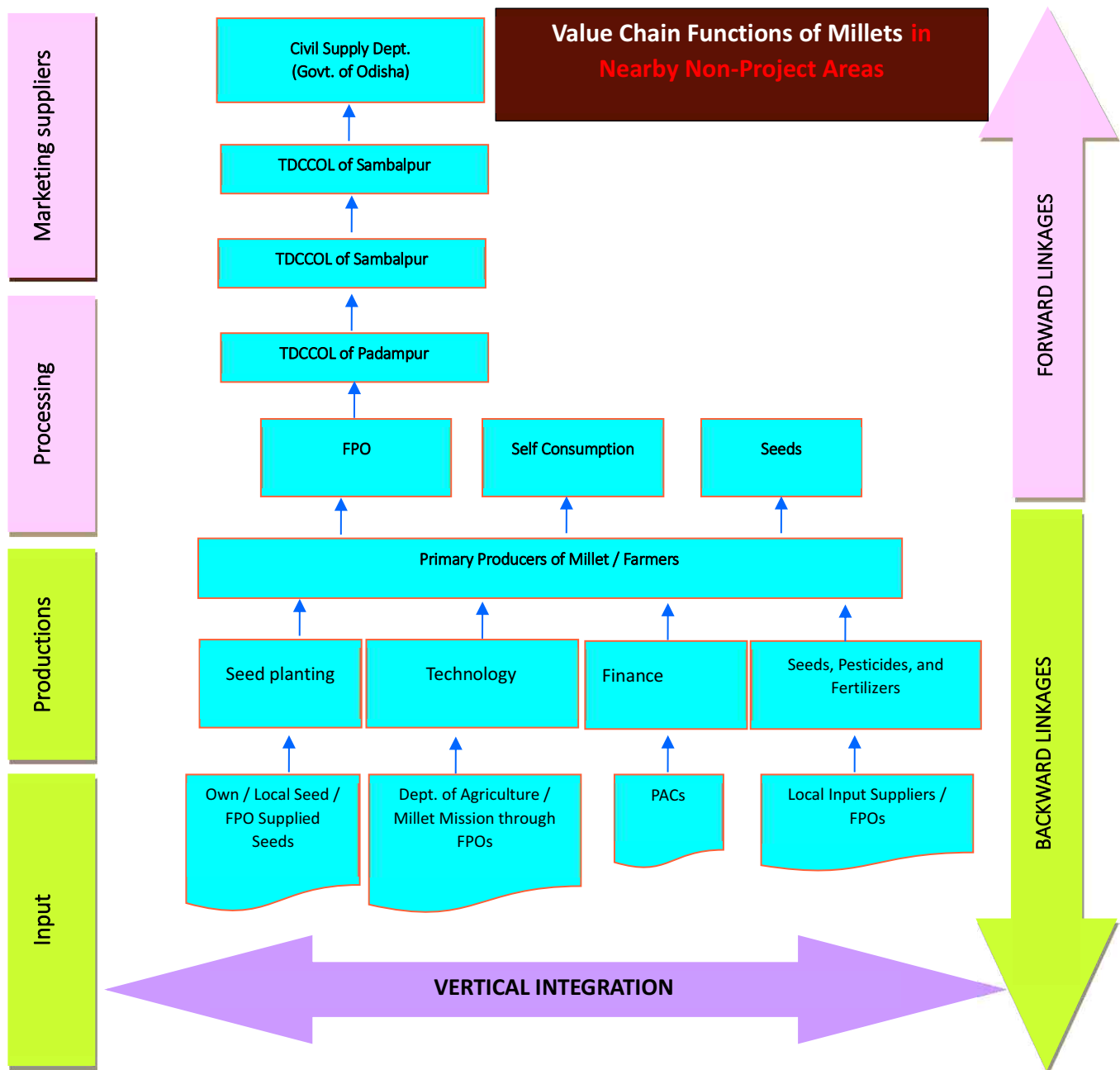
## 1.6 The Millet Market System

Millet marketing, storage, branding, product diversification, and processing have remained an area of concern in the Bhatli Block. The production has been low as the majority of the farmers are giving priority to paddy as well as other vegetable cultivation. The farmers are in an under-motivated kind of situation, but they are willing to come forward and take Millet cultivation as they had been doing it on small scale over the last many years.

### 1.6.1 Core Value Chain Functions

The major functions involved in the Millet sub-sector are input supply, production, and local processing at the farmer's level; storage, and domestic trading; and processing and manufacturing for value addition at the processors level. In a value chain, the actors include value chain operators and operational service providers together. Those functionaries who are directly involved in transactions or directly support the actors involved in transactions are the value chain actors. The core structure of the value chain for Millet is presented below.





### 1.6.2 Input Suppliers

**Seeds and Fertilisers:** Only a few farmers in the project villages of the Bhatli block were found to be cultivating Millet. They mostly cultivated Millets for the consumption purpose of their family members. Those who cultivated Millets, they did mixed cropping with other crops such as Cow-pee, Arhar, Groundnut, etc.

A few years ago, the farmers in the village were doing Millet farming but they stopped cultivating because of various factors like lack of awareness of its nutritional value and growing market demand for Millets; low productivity due to adopting traditional methods of farming; the problem of getting quality inputs like seeds and fertilizers and high cost of these inputs; non-availability of the market for selling Millets and low market price. Many farmers keep their

own Millet seeds which are invariably a mixture of local cultivars. They need to select uniform ears and preserve them as seeds for the next season. Some procure local variety from their fellow farmers. They buy fertilizers from local fertilizer shops located in their village or nearby village. Some farmers use cow-dung manure in their fields. They use fewer chemical fertilizers in Millet cultivation than other agricultural products. Farmers are mainly dependent on these input suppliers for the procurement of seeds, fertilizers, and pesticides. A list of input suppliers collected by the study team in the Bargarh district is presented in the table below.

**Table 7 List of district-level input suppliers in Bargarh district**

Bargarh district		
Sl. No.	Agency Name	Deals In
1	Bhulaxmi Seeds	Seeds only
2	Susivita Trading	Seeds, Fertilizers
3	Prakash Store	Seeds only
4	Sairam Fertilizers and Pesticides	Pesticides and Fertilizers
5	Venketeswar Agency	Seeds and Fertilizers
6	Sairam Traders	Seeds and Fertilizers
7	Jatin Fertilizers	Fertilizers and Pesticides
8	Choudhary Fertilizers	Seeds, Fertilizers, and Pesticides
9	Suriya Pesticides and Fertilizers	Pesticides and Fertilizers
10	Maheswari Seeds and Fertilizers	Seeds and Fertilizers
11	Dash Enterprises	Seeds, Fertilizers, and Pesticides
12	Janasahayak	Seeds, Fertilizers, and Pesticides
13	Indian Seeds Sales Center	Seeds, Fertilizers, and Pesticides

**Extension Services, Training, and Disease Control:** The farmers lack knowledge of appropriate agronomic practices for better yield. They adopt traditional methods learned from their forefathers while cultivating Millet using their seeds or locally available seeds which do not give a high yield. Thus they need exposure visit to nearby Millet growing areas like Bijepur and other four Blocks in Padampur Sub Division in Bargarh district which are the intervention area of Millet Mission. Information on different scientific practices to increase Millet production, crop suitability to the area, the nutritional value of the crop, growing market demand for Millets, etc. will motivate the farmers to scale up Millet farming.

### 1.6.3 Productions from the Market Perspective

**Collective Marketing Practices and Low Bargaining Power :** Millets are being cultivated on subsistence in the project villages. Marketing of the product was considered the main constraint for scaling up the production . The farmers lack bargaining power. Thus initiative should be taken to increase the collective bargaining power of the primary producers starting from inputs procurement to marketing of their produce. Market linkages need to be established at the local and regional levels. To do so, self-help groups, producers' groups (PG), Farmers' Producer's Companies, and enterprises are to be formed to institutionalize the market operations. They would organize small and marginal farmers and help them overcome the production and marketing challenges.

**Practice on Post-harvest Handling:** Post-harvest operations, such as threshing, drying, cleaning, packaging, storage, processing, and transportation are very important but they lack knowledge on the same. This comprises the second half of activities following pre-harvest operations. Traditional methods were usually applied to decorticate Millet



grains partially or completely before further processing and consumption. Therefore, these are crucial in the value chain for Millet production. The farmers do not use any mechanized methods for harvesting Millets.

**Cultivation Practices and Planned Production:** In the study area, cultivation of Millets by farmers is done mainly for their household consumption and not on a commercial basis as they prefer cultivating paddy, vegetables, and other cereals. Seldom do they sell the extra produce apart from their family's requirement to the local traders (vendors come to their doorsteps in cycle/bikes from the nearby area and sell Millet in non-cultivation area/town/weekly haat) in case of urgent need of money. Millet's cultivation is called poor man's crops, so the young farmers were not interested in Millet's farming. There was no planning to scale up cultivation in the study area. But farmers in five blocks of Padampur sub-divisions are doing Millet cultivation on a commercial basis after Farmers Producers Companies are formed and handholding and marketing support are given to the farmers through FPC. Thus a planning strategy may be developed with farmers' clusters to meet the demand of the regional and national markets.

#### 1.6.4 Primary Processing and Storage

**Lack of primary processing:** One of the major challenges in the Millet value chain is quality processing. There is no standardized and efficient processing technology. Some of the major challenges in the processing of Millets are the size of the grains, presence of unhulled grains, cultivation practices, lack of efficient technology at the community level, high processing cost, the low shelf life of the processed products and grits due to pest infestation and rancidity, etc. Lack of regular supply of Millet from the farmers as the majority of the farmers prefers cultivating paddy, vegetable, and other cereals in the project areas. Thus, steps should be taken for Millet processing and fine-tuning the present processing methods to improve the quantity and quality of output.

Since the processing of Millets is a difficult task, particularly, the processing in a traditional way involves drudgery in women and consumes a lot of time (takes about an hour to process one kilo of Millet grains), Odisha Millet Mission provides a solar Pulverizer machine to farmers for processing of Millets in its five operational blocks of Bargarh district namely Bijepur, Paikmal, Padampur, Gaisilet, and Jharbandh. A pulverizer is used for grinding the Millet grains into powder form. The capacity of the Solar Pulverizer given to farmers is only 10 to 15 kg/hour, which can maximum cater to the processing need of a single farmer or a few farmers. The need of setting up of much higher capacity solar pulverizer machine is felt in the area to cater to a larger number of farmers in the area.

**Challenges in Millet processing:** The size of the Millet grain is very small, so it needs careful inspection at every stage of processing. There is no standard husk removal technology. Breakage of the kernel is a major issue also. There are no quality standards available for raw materials and final products. Worm and pest infection is a major challenge for chemical-free technology. There are no customized sieves for grading and better separation of material. There are many variations in the grain due to cultivation practices and microclimate.

**No collection and storage facility at the producer's level:** In the study area, there is no single collection center or aggregation point available at the farmers' level because they sell their products in the market at the price determined by the middlemen, local traders, and wholesalers. There is no common storage facility available at the village, GP, or Block level for which the primary producers cannot store their produce and sell as per the demand of the market to fetch the right price. But in the five intervention Blocks in the Bargarh district, the TDCC has a

storage facility after procurement of the Millets during the Kharif season through the Farmers Producers Companies.

During storage, either at the household, rural, or trader level, the commodities are attacked by several species of insect pests resulting in loss of quantity and nutritional quality.

### 1.6.5 Marketing

**Village/Weekly Hat and Local Trader:** While very few farmers in the project villages of Bhatli Block sell their produce, the farmers often sell their surplus Millets in local Haat and to local traders to meet their family requirements. The price of Millet varies from Rs. 20 to 25 per kg in the production season. The sellers based in villages also purchase products from the farmers and then sell them the weekly Hat keeping a profit margin. The local traders carry the produce in their by-cycles or two-wheelers and sell it to the people of those areas where Millets are not cultivated.

In other blocks (non-project areas) of the Bargarh district, the farmers under the support of District Millet Mission cultivate Millets for their self-consumption as well as commercial purpose. They prefer to sell their products through the Farmers Producers Organisations/Producers Groups in a hassle-free system and get the right price. Some farmers do not wait for the Mandi, which are opened at a particular time being fixed by the Government, and sell their Millets to the local traders. Some farmers, who do mixed cropping along with groundnut and other crops, sell their produce locally and not through the Mandi.

Name of the Product	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Millet (Bhatli area)	C	C				C	C	C	C		C	C
			T	T						T	T	

C: Cultivation; T: Trading

**Town-level Trader:** The town-level traders are operating from the nearest towns, blocks, and district headquarter s. They purchase the product from village traders as per their requirements and the demand of their local market. They also procure the Millets from the farmers. They sell Millets to the consumers directly in whole grain form. Some traders process the Millet into powder, do packaging, and sell it to the consumers. Some floor mills like Mahakali Floor Mill in Bhubaneswar also procure the Millets from the local traders or commission agents and sell the Millet powder after cleaning, processing and packaging.

**Government of Odisha through Mandis:** With the launching of the Millets Mission, the Government of Odisha is procuring Millets directly from farmers through Mandis in 15 districts of the State. Out of the 15 districts, Bargarh is one of them, where District Millet Mission started its operation in 2019-20 covering five blocks namely Bijepur, Paikmal, Padampur, Gaisilet, and Jharbandh. At present, the District Millet Mission in Bargarh district covers 88 GPs and 377 villages. The District Millet Mission is now planning to expand its operations shortly to another two blocks, i.e. Bhatli and Sohela, which would help the project dovetail with the support provided by the Mission .

Block	No. of GPs Covered	No. of Villages Covered
Bijepur	18	59
Gaisilet	19	102
Padampur	19	55
Paikmal	18	79
Jharbandh	14	82

Millets in the areas covered by the District Millet Mission are procured through Mandis during the Kharif season only. But the produce of the Rabi season is procured by the FPOs, which prevents farmers from distress by selling Millets at a low price. The status of Procurement Millets in the FY 2021-22 in the Bargarh district is presented in the table below.

Block	Name of Block Procurement Agency	Millet area coverage in Hector	Registration of Farmers (Digitalization)	Procurement target in Quintals	Procurement Achievement in Quintals
Padampur	Bimal F.P.C.L	242.20	422	1211	1200
Paikmal	Marjara Kesari F.P.C.L	612	1247	2671	2170
Jharbandh	Chandibhatta Organic Life Farming P.C.L	586	1168	2780	2314
Gaisilet	Bodasambar Dal and Vegetables F.P.C.L	517	817	2194	2120
Bijepur	Chirasabuja F.P.C.L	547	794	2587	2278
<b>Total</b>		<b>2,505</b>	<b>4,449</b>	<b>11,443</b>	<b>1,00,081</b>

Source: District Millet Mission, Bargarh

**Farmers Producers Organisation:** Farmers Producers Organizations are formed in five operation blocks in the Bargarh district under District Millet Mission for the last three years. Every block has an FPO run by an NGO in the area. Interested farmers register themselves with the following documents with the PACS/SHG/LAMPS or FPOs operating in the area.

- Registration form duly filled up with required information
- Land record
- Voter ID
- Photocopy of the front page of the passbook of any nationalized bank
- Aadhar card
- Contact Number

The standard fixed for procurement of Millets from the farmers is given in the table below.

Sl. No.	Parameters	Maximum limit (%)
1	Outside particles like soil, small stone, etc.	1.0%
2	Other food grains	1.0%

**Table 11 Standard fixed for procurement of Millets from the farmers**

Sl. No.	Parameters	Maximum limit (%)
3	Broken Millet	1.0%
4	Partly broken Millet	2.0%
5	Moisture	12.0%

Chirasabuja Farmers Producers Company (FPO) is operating in Bijepur under the Field Agency Mahasakti Foundation. During the year 2021-22, it has collected 22,087.87 quintals of Millets from 794 num farmers during the Kharif season against the target of 2587 quintals allotted by the Millet Mission @ 3377 per quintals. There are three Mandis at Katapali (18 km), Talpadar ( 12 km) and Oilpur(16 km). The farmers collect their produce from the field, clean it and pack it in the gunny bags given by the FPO and arrange transport to the Mandi. The FPO personnel checks the quality of the Millet, does weighing, and enters the details of the farmers after taking Bio-metric identification of the farmer. The farmers get the money transferred to/her bank account in DBT mode. Then the Millet packets are transported to Padampur Godown of TDCC. TDCCOL arranges transport and collects Millets from the Mandis and takes these to its godown at Padampur.

**Tribal Development Cooperative Corporation of Odisha Limited:** TDCCOL is a Government of Odisha agency under the Department of ST and SC Development, Minorities, and Backward Classes functioning since 1967. The main objective of the corporation is to procure Minor Forest Produces collected by the tribals at fair remunerative price and arrange the processing of procured commodities to add value. The FPOs procure the Millets from the farmers during the Kharif season and keep the packets in the designated Mandis. TDCCOL arrange transport after checking the quality from the Mandis and store the Millets in their Godowns. In Bargarh, TDCCOL stores the Millet in Padampur Godown. Millets procured from the farmers are transported to the Civil Supply Department of the Government of Odisha by TDCCOL.

**Procurement Agencies in Bargarh district:** The list of Millet's procurement agencies are given hereunder.

**Table 12 List of Millets Procurement Agencies in Bargarh District**

Sl. No.	Procurement Agencies	Address
1	Chirasabuja Producers Company Ltd.	Bijepur, Dist-Bargarh Mobile No 7-77119333
2	Borasambar Dal and Vegetables Farmers Producers Company	Gaisilet, Dist-Bargarh
3	Bimal Farmers Producers Company	Padampur, Dist-Bargarh
4	Marjara Kesari Farmers Producers Company	Paikmal, Dist-Bargarh
5	Chandibhatta Life Organic Farmers Producers Company	Jharbandh, Dist-Bargarh
6	Tribal Development Cooperative Corporation of Odisha Limited	Head Office-Bhubaneswar, Branch office- Near VSS Stadium, Sambalpur

## 1.7 Policy, Rules, Regulations, and Business Environment

Realizing the nutrition value of Millets, of late, there has been increasing thrust and support being provided both by the Government of India and the Government of Odisha. Recently, the Indian Government notified Millets as nutritia-cereals in April 2018. Then to facilitate the movement of Millets, it revised guidelines for the movement of surplus Millets to other states. A provision for inter -state transportation of surplus Millets has been incorporated

via the Food Corporation of India (FCI) to cater for an advance demand placed by the consuming states before the states of procurement. On 20th December 2021, NITI Aayog also signed a Statement of Intent with the United Nations World Food Program (WFP) to support India in taking a global leader in knowledge exchange using the opportunity of 2023 as the International Year of Millets. It also aims at building resilient livelihoods for small-landholding farmers and adaptation capacities to climate change and transforming the food system.

## Odisha Millets Mission: A Special Programme for Promotion of Millets in Tribal Areas of Odisha

Odisha is the first state in India to launch the Special Programme for Promotion of Millets in Tribal Areas of Odisha (Odisha Millets Mission) by the Government of Odisha in 2017 to revive Millets on farms and plates. The four major focus areas of OMM are production, consumption (both urban and rural), processing, and marketing. The key focus is on reviving Millets in farms and putting them on plates. Starting in 7 tribal-dominated districts of Odisha, OMM has expanded its operation to 19 districts covering 142 blocks of the state, 1,564 GPs, 16,110 villages, and 1,10,448 farmers as of May 2022.



OMM launched its operation in Bargarh district in 2019-20. The Bargarh District Millet Mission covers 377 villages in 88 GPs of 5 blocks (namely Padampur, Paikmal, Jharbandh, Gaisilet, and Bijepur). The District Millet Mission is now planning to expand its operations shortly to another two blocks, i.e. Bhatli and Sohela, which would help the project dovetail with the support provided by the Mission.

### Objectives of OMM

- a) Promoting household level Consumption
- b) Setting up a decentralized Processing unit
- c) Improving Productivity of Millet Crops
- d) Promoting FPOs for marketing
- e) Inclusion of Millets in ICDS MDM and PDS

### Unit of the Implementation of OMM

Block is the unit of the program. Each block should cover at least 1000 Ha. in the 5 years. This area shall be taken up on a contiguous cluster basis. The minimum area per farmer is 0.2 Ha. per farmer. The maximum area per farmer is 2 Ha. The program expects to cover at least 1000 households in a block directly. The program shall cover 4000 households per block through production, consumption, processing, and FPO promotion activities.

### Components of OMM

#### *Promoting Household-level consumption*

- i) Building prestige in the consumption of Millets through organizing cooking competitions based on local culture and celebrations.
- ii) Exposure to various recipes through a process of training, food festivals, and campaigns.

- iii) Promotion of ready-to-eat foods with Millets such as Ladoos, Murukku, and bakery items through local enterprises.
- iv) Awareness building programs on nutritional values of Millets to different stakeholders, especially mother committees of women and child department programs and school-going children
- v) Convergence workshops with District/ Block level officials for inclusion of Millet in different supplementary nutrition programs by Govt.

### ***Setting up decentralized Processing facilities***

The absence of modern processing facilities is identified as one of the major bottlenecks in the revival of Millets. It is envisaged that promoting processing facilities helps in easy access to Millet grains. The processing facilities to be promoted in a Block include:

- i) At least one Processing Unit/enterprise per cluster of villages/ GPs that includes de-huller, de-stoner, pulverizer, etc.
- ii) At least one pulverizer (particularly for Ragi) per Gram Panchayat.
  - It is expected that successfully establishing such enterprises may kick start local enterprises and encourage household-level consumption. It is envisaged that with experience and increasing production within the Block, larger processing facilities will get established by private partners.

### ***Improving Productivity of Millet Crops***

Millets are cultivated in different farming situations from the low lands to Podu lands. There is substantial scope for increasing the productivity of Millets in these different situations. The action areas include:

- a) Establishing Diverse Seed Centres to enable easy access to quality seeds in time. The Seed Centres will be linked to the relevant Research Stations. The activities of the Seed Centres include
  - Selection, purifying, and multiplication of elite performing local varieties through participatory varietal trials.
  - Developing and specializing 'Seed Farmers' for multiplication, conservation, and spread of new varieties and organizing them with Seed Centres
  - Demonstrations of new/ improved/ purified seed varieties
  - Conservation and multiplication of indigenous varieties of seeds.
- b) Improved agronomic practices: In addition to the improved package of practices the following have shown potential.
  - Introducing System of Millet Intensification (SMI) based on suitability
  - Promotion of Line Transplanting/ Line sowing/ Inter-cropping with Millets
  - Bio Manure/ composting / in-situ practices for better crop nutrition.
  - Pest and disease management practices in the lines of NPM
  - Other organic/ agro-ecological practices as deemed necessary as per local needs
  - Support the farmers. The skilled person will be known as CRPs. Farmer to farmer learning is the key dissemination strategy.

### ***Custom Hiring Centres (Appropriate Farm Mechanization)***



Establishing custom hiring centers for implements, machines, and post-harvest operations (clean Millet harvests) at a cluster of Gram Panchayats. These include a range of useful equipment with drudgery reduction tools for suitable crop management based on the need of the community such as cycle weeders, sprayers, pump sets, irrigation equipment, threshers, bio manure preparation containers, sieves, fencing materials, etc.

### Community Resource Persons

Training of the identified progressive farmers or young local persons on different agronomic practices and other program thematic areas for implementation based on need and for imparting training and hand holding

### Promotion of Millets in urban and small towns

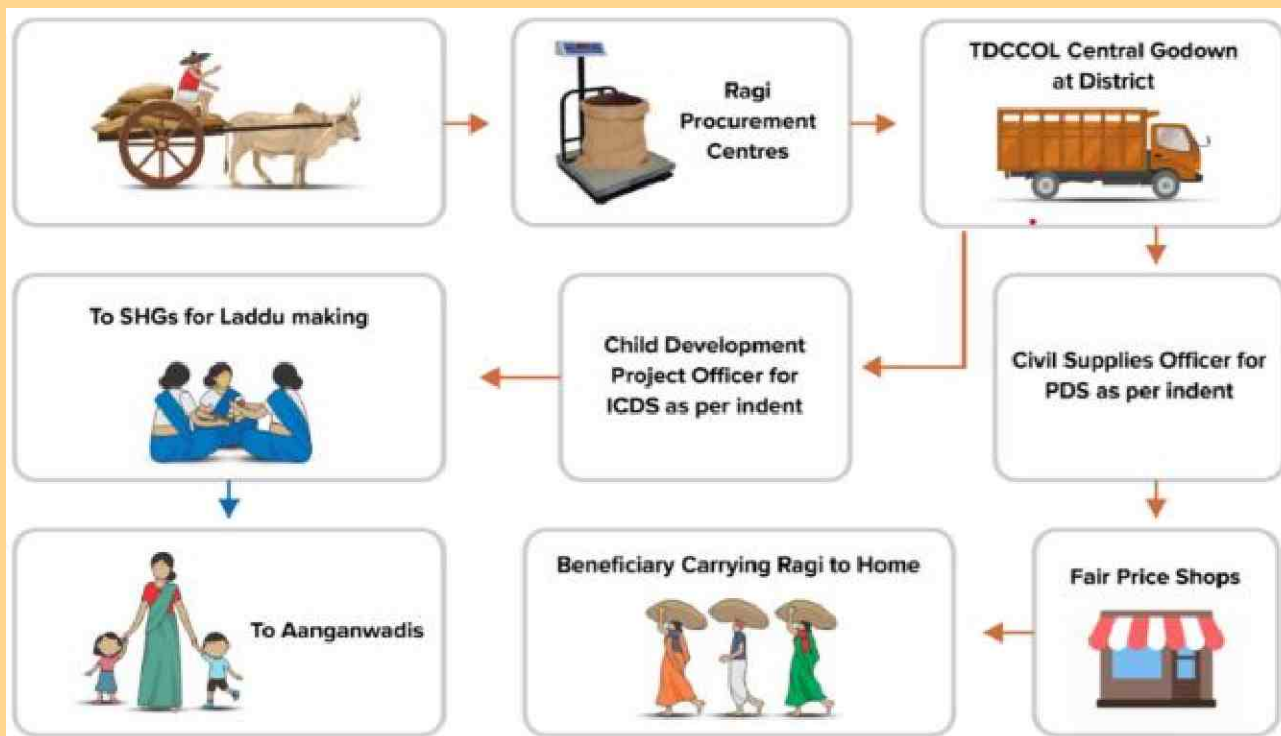
The program targets two types of markets i.e. Rural and Urban and strategies for better price realization are:

- i) Promotion and accessing of markets within the Block and district: this happens with help of promotional campaigns and outreach locally.
- ii) Promotion and linkages with markets in nearby towns/ cities and urban areas
- iii) Opening special outlets for farmers, promotional campaigns targeting small hoteliers, push -cart vendors, mobile outlets, retail outlets, etc are some of the strategies that will be adopted.

### Promotion and Establishment of Farmer Producer Organisations

Comprehensive revival of Millets in a Block requires service delivery. The community/ farmers' level institutional base varies from Block to Block. It is envisaged that FPOs are organized one per Block, keeping long-term sustainability and delivery of services in view

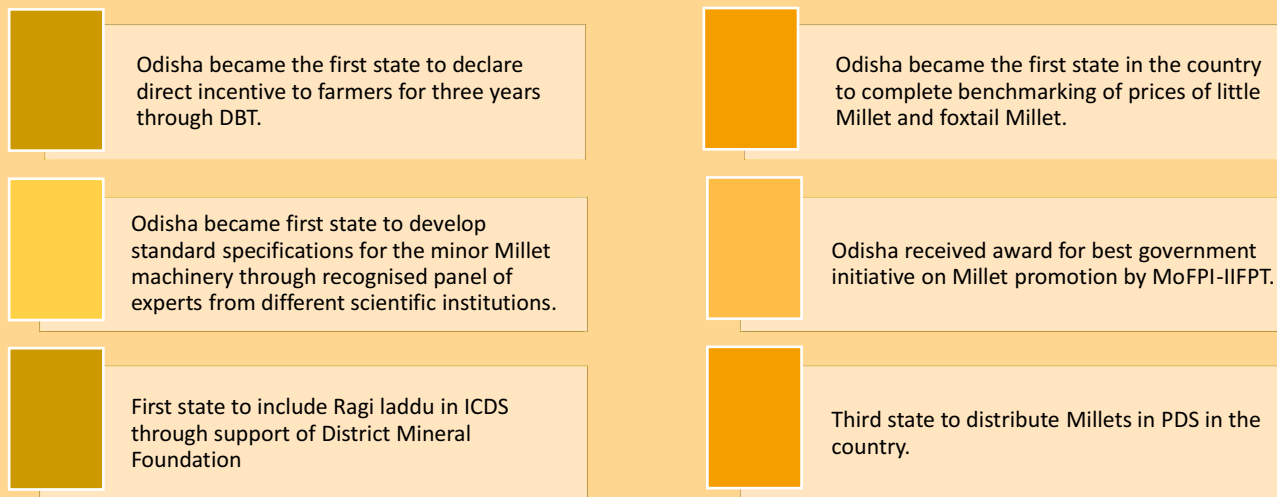
### Process of Farmer Registration for Procurement of Millet At Minimum Support Price



## Millet Procurement and Distribution Flow Chart



## Policy Level Milestones Achieved by OMM



A brief profile of the public and private stakeholders involved in the production and marketing of Millets in Bargarh district is given below who plays a pivotal role in policy formulation, formulating the rules, and regulations, and creating an appropriate business environment in the district.

**Table 13 Profile of Potential Public and Private Stakeholders**

Stakeholders	Role and Responsibilities
Scheme Officer, Millet Mission, Office of CDAO, Bargarh	Provides support for the cultivation of Millet by giving incentives to farmers for adopting SMI, LT, and LS methods while cultivating Millet for better yield, capacity building of farmers through Watershed Support Services and Activity Network (WASSAN), and marketing support through FPOs and value addition like processing of Millet.

**Table 13 Profile of Potential Public and Private Stakeholders**

Stakeholders	Role and Responsibilities
Chief District Agriculture Officer (CDAO)	The Chief District Agriculture Officer (CDAO) is the apex District level officer to assist farmers in enhancing the production of agriculture and supply of input services.
Agriculture Technology Management Agency (ATMA)	It is a district-level registered society responsible for technology dissemination at the district level. It imparts training on technical know-how and cultivation practices.
Nationalized Banks and Regional Rural Banks (RRB)	Nationalized and Rural Banks are providing loans/credits to the farmers at the time of cultivation.
National Bank for Agriculture and Rural Development (NABARD)	NABARD is the facilitating Agency for credit flow to the farmers for the promotion and development of agriculture.
Tribal Development Cooperative Corporation Ltd (TDCC), Department of SSD, GoO	It procures Millet from farmers through Farmers Producers Company (FPOs)/FAs to revive the Millet in farms and Millet cultivation remuneration. The Millet procurement system is streamlined through an online system in which the growers get their money through online transfer to their respective accounts.
Farmers Producers Organisation/ Producers Group	Farmers Producers Organisation/Producers Groups are encouraged to form and act as the catalyst for supporting the farmers and provide handholding support in the cultivation, processing, and marketing of the products.
Odisha Rural Development and Marketing Society (ORMAS)/DSMS	Provides and facilitates critical linkages for the marketing of rural products. It extends marketing support to the farmers through SHGs. It organizes district and state level exhibitions and festivals to demonstrate rural products and promotional sales.
Private Inputs Traders	Farmers purchase their inputs like seeds, fertilizers, pesticides, and implants from private traders located at district, block, GP, and village levels. Mostly village -level traders are giving credit to the farmers for cultivation as well as their other necessities.
Village shopkeepers/Traders	Shop keepers particularly grocery/ daily needs suppliers and petty Traders buy surplus Millets from the farmers.

Since the Bargarh District Millet Mission has not started its operation in the Bhatli block of the district, the business environment for Millet and other agricultural products was found to be more or less similar in availability and quality of inputs and services; government extension system; land leasing system; and infrastructures and farmers organization.

### 1.7.1 Timely Availability of Input

Millet is one of the most farmer-friendly crops. Maximum Millet cultivation happens in the Kharif season. Millet cultivation requires fewer inputs compared to other crops. But farmers do not get good quality seeds rather they use the seeds they keep from their previous crops, which is the reason behind the low yield from Millet farming. Millet farming in the project villages lacks an organized seed distribution mechanism to supply good quality seeds by farmers' preferences. They buy chemical fertilizers at a higher price than the recommended government rate from the local traders during the time of requirements. Further, they procure the fertilizers on credit. While Millet cropping requires fewer pesticides and other insecticides, farmers purchase the pesticides locally at a higher price.

## 1.7.2 MFIs/Financial Institutions and Credit Availability

The farmers require credit to realize higher productivity in agriculture. The timely availability of credit helps in enhancing the confidence of the farmers as they are in a gap between crop sowing and realization of income after production. The government has adopted several developmental programs, schemes, and policies that focus on higher incomes for the farmers. Kisan Credit Card (KCC) offers production loans to the farmers, but they utilize the loan for procurement of inputs for their main crops and to fulfill other needs.

Farmers in the project villages possess Kisan Credit Card through which they avail credit during the paddy cultivation season only. They avail a loan for paddy but invest a part of it for cultivating Millet. But, the study did not find any farmers availed loans from MFIs or Formal Financial Institutions exclusively for cultivating Millets. Due to the shortage of operational capital during cultivation, input suppliers also provide finances to producers which then get repaid during harvesting at an interest rate that is exorbitantly very high. The farmers in the project villages of Bhatli Block expressed their need for credit and other support to take up Millet as their main crops by expanding the areas brought under Millet cultivation. They also sought financial support for purchasing inputs, bearing labor and irrigation cost so that they can not only grow Millet in the Kharif season but in Rabi and Summer seasons also.

## 1.7.3 Land Leasing and Ownership Status

Poor, small, and marginal farmers hardly have access to land and, therefore, limited ability to expand production. In addition, the poor cannot afford to experiment (precisely because their access to land is constrained) and have difficulties in obtaining government support. Some farmers cultivate other person's land in sharecropping mode as a tenant who can not avail loan and crop insurance facility and avail other government support as the land is not in their name.

Although agricultural land in the district is mainly governed by a similar kind of contract agreement between land owners and tenants, there is some specification that is followed in the case of cultivation of any crop. There are 3 types of land leasing systems mainly followed in the district which are as follows:

**System-1:** If the Land owner shares 50% of the cultivation cost, gets half of the share of the total commodity produced.

**System-2:** If the Landowner does not share cultivation cost, gets 1/3 parts of the total commodity produced.

**System-3:** Farmer cultivates lands in agreement with the land owner and pays Rs.6,000/acre for one crop. Apart from this, the farmer has no obligation to divide the produce after harvest. The leased-in farmer stops cultivation if the land owners demand renewed rent for the land after one season. Otherwise, the farmer will continue production until the land owner continues the same rent for subsequent seasons.

## 1.8 Challenges in Production of Millets

### 1.8.1 Challenges in Production

**Preference for Crops:** One of the main challenges of cultivating Millets in the project villages is the preference of farmers for cultivating paddy. Since rice is the staple food of farmers as well as consumers, they always tend to be attracted to paddy cultivation. **It was observed that the younger mass and the** persons with semi-literacy levels perceive that Millet is the poor man's crop. Thus, they do not show interest in cultivating Millets citing that it would not be profitable for them.

**Land Preparation:** Over the years, the land used for cultivation has degraded due to improper land preparation leading to reduced or poor soil fertility. The few farmers who were growing Millets in the project villages are cultivating the same rainfed crop using the same land having poor and marginal soil fertility. Soil amendment practice; and crop rotation practice were found to be absent among the farmers in the areas. Lack of knowledge of farmers on land preparation and nutrient management was found to be another major constraint.

**Quality deterioration due to same seed rotation:** The quality of the product is gradually deteriorating because of the continuous use of the Farmer's seeds. Farmers in the project villages were growing the same old and traditional varieties of Millets. The absence of seed treatment practices and also, the absence of using the improved and high-yielding varieties have adversely affected the quality of produce and productivity.

**Nursery Development:** Both the practice of treatment of seedlings and nursery development of Millets were found to be absent in the project villages.

**Transplantation:** Farmers were found to not adopt a required spacing method for transplantation. The lack of transplantation machinery for Millets also poses a challenge for ensuring proper transplantation practice. The farmers in the project villages also expressed their difficulty to hire laborers while adopting SMI and LT methods due to non-availability and higher wage rates.

System of Millets Intensification (SMI) is being promoted under Odisha Millet Mission. In the areas covered by OMM, SMI in Finger Millet is practiced by most farmers. Because of getting higher yields more and more farmers are now encouraged to adopt SMI for the cultivation of finger Millets.

SMI stands for System of Millets Intensification. It is similar to SRI (System of Rice Intensification) in rice. This method of agronomic practice is to enhance productivity and increases production in Millets. Now SMI in Finger Millet is practiced by most of the farmers in Odisha under Odisha Millet Mission. This practice is getting popular in the farmer field because it is giving promising yields as compared to the traditional method. Generally, this method is followed only by Finger Millet.

**Irrigation:** Although finger Millet has high drought resistance capacity, shortage of rainfall during the Kharif season in the area and inadequate irrigation facility during the Rabi and Summer season discourages farmers to cultivate

Millets. The farmers were found to be lacking knowledge about the plasticity of tillering and pre-pone or postponement of flowering in Millets, which is important to achieve drought escape.

**Application and Availability of Fertilisers:** Farmers in the project villages do not have the know-how of preparing organic manures and pesticides which are made of cow urine and other ingredients available locally. Since there is a shortage of or non-availability of locally prepared manure, the farmers had to depend on the chemical fertilizers, though the guidelines of Millet Mission do not encourage the use of chemical fertilizers and pesticides. The chemical fertilizers were also not available to them in time, so the farmers had to buy them at higher prices than the approved government rates. No subsidy from the government on fertilizers given to the Millet farmers created more difficulties for the farmers in the project villages.

Unlike the project villages, the Odisha Millets Mission has been promoting improved agronomic practices for improvement in the quality and diversity of Millet seeds as well as higher productivity and incomes from Millets. Thus, a monetary incentive is transferred to farmers' accounts on the completion of the following practices:

- a) Application of adequate quantity of farm yard manure, compost, etc. for soil health
- b) Seed treatment as prevention from diseases and pests and to enhance purity and yield
- c) Improved agronomic practices like System of Millet Intensification (SMI), Line Transplanting (LT), and Line Sowing (LS)
- d) Use of organic preparations for disease and pest management

It was observed in the Bijepur block that the farmers engaged in Millet cultivation are preparing and applying Handi Khat (Organic Manure) in place of chemical fertilizers used by them before.

**Weeding:** Weeding increases the yield up to two quintals in an acre. A minimum of three weedings is required for better yield, but using traditional methods of weeding or even using a cycle weeder is labor-intensive. Farmers were found to not follow the right methods of weeding. So, the practice of weeding was found to be another major problem for the farmers. The requirement of a power weeder is felt for the Millet crops as no manual cycle weeders are available with the farmers in the project villages. Hence, the farmers not only require manual cycle weeders but also power weeders which cover more areas in less time.

**Disease and Pest Management:** Overall, the farmers in the project villages lack knowledge of disease and pest control by applying organic methods. Organic pesticides need to be sprayed on weekly basis considering the magnitude of the problem. But the current practice of manual spraying is time-consuming and labor and cost-intensive. Hence, power sprayers or electric sprayers are required to save time and money in the project villages, though Millet Mission supplies Manual Sprayers to the farmers through the FPOs in its operational areas.

**Harvesting:** Millet crops are required to be harvested two to three times, which is carried out manually by hiring labor and is found to be not cost-effective. Due to improper practice of harvesting, more broken grains are found thus, it necessitates the use of machinery for harvesting the Millets in the area.

**Threshing:** Presently the threshing method adopted by the farmers is time-consuming. So improved and hi-tech threshers are needed for the Millet farmers.



**Yield:** The yield of Millets per acre is declining over the years due to low soil fertility, not giving attention to and not taking the required action in time with regards to disease and pest control, weeding, harvesting, threshing, etc. Only 8 to 10 quintals yield per acre or even lesser in some cases was observed in the project villages.

**Lack of Extension Services e.g. Field demonstration and Capacity Building of Farmers:** Farmers were found to be not well informed about the benefits of Millet farming. Farmers were also not aware of the use of machinery which is needed to save their money on labor and time. Hence, the knowledge and skill-building of farmers are needed to enhance the yield-reducing cost of cultivation.

**Government Incentives:** The absence of any incentives to farmers in the project villages discourages them to choose to cultivate Millet over paddy. Millet Mission in its project areas supports the farmers in Millet cultivation by providing incentives for transplanting the seedlings in SMI, LT, and LS methods. Farmers spend money on transplantation but receive the incentives almost after harvesting the crops, which discourages the farmers.

**Linkages with Financial Agencies and Handholding Support:** For the cultivation of paddy, the farmers get credit from the PACS and banks. Institutional finance specifically for the Millet farmers should be available to encourage more and more farmers to cultivate the same.

## 1.8.2 Post-Harvest Challenges

The study did not observe any post-harvest value additions made by the Millet farmers in terms of drying, grading, storage, packaging, processing, and preparing any value-added products. Hence, adequate steps may be taken for processing the produce at the local level which will encourage the farmers.

## 1.9 Value Chain Analysis

### 1.9.1 Average Cost and Income from Millet Production

The cost of cultivation of one acre of Millet is Rs.10,530/- which does not include the computed cost of the family labors and the marketing cost. The average production in the surveyed area was 10 quintals per acre. The average price the farmer realized was approximately Rs. 3,300/- per quintal. The total value of sales from 1 acre of Millet was Rs. 33,770/- which gives an average net profit of Rs.23,240/-. Whereas the farmers engaged in paddy cultivation gets an average net return of Rs. 12,000/-. The profitability of Millet cultivation is at least three times more than the paddy.

**Table 14 Average Cost of Millet Production and Net Income (per acre)**

Sl. No.	Particular	Quantity/Nos.	Amount
1	Seed	1kg	60
2	Seed Treatment		20
3	Seedbed preparation and seedling cost	1 Labour	250
4	Main field preparation	2 time	2,200
5	Cow dung	1,000 kg	2,000
6	Organic product Handikhat and Jivamrut	3 time	1,000

**Table 14 Average Cost of Millet Production and Net Income (per acre)**

Sl. No.	Particular	Quantity/Nos.	Amount
7	Transplanting labor cost	11 number	2,200
8	Weeding	2 times	1,000
9	Crop cutting	5 numbers	1,000
10	Threshing machine hiring cost	10 quintal	300
11	Labor cost	2 numbers	500
	<b>Total Expenditure</b>		<b>10,530</b>
	<b>Total Value of Ragi Production</b>	<b>10 quintals</b>	<b>33,770</b>
	<b>Net Profit</b>		<b>23,240</b>

Very few farmers, who were cultivating Millets, kept records of their input, production, and labor costs. Hence, calculating the average profit margins from collector to retailer was difficult to establish. The information was collected during the focus group discussion with the farmers.

### 1.10 Gender Analysis

It was observed that women are mostly engaged in the preparation of seeds for sowing, plantation, and Mulching after regular intervals. Women played role in harvesting and post-harvest management in a major way. However, the selling of products and expenditure-related decisions are always made by men. The following matrix indicates the details of the same.

**Table 15 Matrix of participation of women in the production of Millet**

Particulars	The extent of participation (in %)										
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
1. Preparation of land											
2. Cleaning of land											
3. Clod breaking											
4. Weeding											
5. Purchase of seeds											
6. Purchase of fertilizers											
7. Selection of land											
8. Trading with input Suppliers											
9. Seedling Plantation											
10. Ploughing field											
11. Mulching											
12. Irrigation											
13. Harvesting											
14. Threshing											

Table 15 Matrix of participation of women in the production of Millet											
Particulars	The extent of participation (in %)										
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
15. Winnowing											
16. Drying											
17. Storing											
18. Grinding (Manual)											
19. Transportation											
20. Post-Harvest management											

### 1.11 SWOT Analysis of Millet Sub-sector

Analysis of risk and opportunities examines Millet transactions at local, district, and state levels to determine the nature of the challenges the sub-sector face and areas for intervention many be carved out to make a tangible impact. This analysis identifies strengths, weaknesses, opportunities, and threats where strengths and weaknesses refer to the internal factors governing the vegetable sub -sector, while opportunities and threats encompass the external factors influencing the larger business environment.

Table 16 SWOT Analysis of Millet Sub-sector	
STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> <li>○ High nutritional value (rich in Iron, Calcium, and Phosphorous)</li> <li>○ Medicinal value (diabetic patients and lactating mothers)</li> <li>○ Organically grown</li> <li>○ The government of Odisha gives higher priority to support Millet farming by establishing Millet Mission</li> <li>○ Less dependency on irrigation as the crop requires less water consumption</li> <li>○ Sufficient upland available for promotion of Millet cultivation</li> <li>○ Agro-climatic factors support the Millet farming</li> <li>○ Short crop production cycle and the small gestation period for rotation etc.</li> <li>○ Potential to create jobs and employment, especially for poor farmers in processing units.</li> <li>○ India possesses the world’s greatest range of Millet and Millet products.</li> </ul>	<ul style="list-style-type: none"> <li>○ Less attractive and coarse food items</li> <li>○ Traditional food items only</li> <li>○ Unavailability of information on nutritional value and market demand of Millet</li> <li>○ Poor technical knowledge, skills, and experience in Millet cultivation</li> <li>○ Unavailability of local expertise in Millet farming</li> <li>○ Unavailability of primary producers group for Millet</li> <li>○ Farmers adopt conventional techniques for Millet production</li> <li>○ Unavailability of technological and extension services for Millet</li> <li>○ Irregular and inadequate supply of necessary inputs and technology</li> <li>○ Low productivity due to the use of self-preserved seeds by the farmers</li> <li>○ Improper use of chemical fertilizers and pesticides</li> <li>○ Lack of access to capital for investment in Millet production</li> <li>○ Poor skills in land planning and management</li> <li>○ Inadequate/improper handling of crops and post-harvesting processes</li> </ul>

**Table 16 SWOT Analysis of Millet Sub-sector**

OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> <li>○ The United Nations General Assembly has declared 2023 as the “International Year of Millets”</li> <li>○ The Union Budget 2022-23 announces assisting in post-harvest value addition, increasing domestic consumption, and national and worldwide branding of Millets</li> <li>○ Millet farming will indeed become the rising star among all the other crops</li> <li>○ Product diversification</li> <li>○ Potential for marketing</li> <li>○ The Millet cultivation plays an important role in addressing the concern of climate change, environmental degradation, and malnutrition</li> <li>○ Through the revamped National Food Security Mission Operational Guidelines (NFSM), the Government of India has focused on 212 Millet districts in 14 states to provide an incentive to farmers for quality seed production/distribution, field-level demonstrations, training, primary processing clusters, and research support</li> <li>○ The Government of Odisha's five-year "Millet Mission" is supporting the inputs and marketing requirements of indigenous and small farmers across the state.</li> <li>○ Considering global warming and severe changes in the climatology in the years to come, the only solution is to shift more economical means of cultivation that withstand extreme weather conditions condition while also benefitting the lives of the farmers.</li> </ul>	<ul style="list-style-type: none"> <li>○ Farmers have limited knowledge of Millet cultivation techniques and skills</li> <li>○ Unavailability of reliable irrigation system</li> <li>○ Post-harvest losses in Millet production due to inadequate harvesting, storage, packaging, and transportation methods.</li> <li>○ The first stage of milling is very labor-intensive since all work is done manually</li> <li>○ Farmers adopt traditional practices in cultivating Millet which leads to less productivity.</li> <li>○ Absence of proper market linkages, Millet consumption is restricted to rural haat, tourist spots, and festivals. For instance, SHGs are engaged in making traditional food items and usually participate in fairs and events that provide them limited exposure to visitors and tourists and not the masses.</li> <li>○ Non-interest of young farmers and urban people in Millet production</li> <li>○ Low priority for research and development by formal sectors</li> <li>○ Changing food habits (thick porridge to rice)</li> <li>○ There is no assured market for Millet</li> <li>○ Poor credit facilities</li> <li>○ Poor extension services</li> <li>○ Lack of involvement of private sectors</li> <li>○ Inadequate market outlets</li> <li>○ The drudgery in the primary processing of Millet has led to a decrease in their consumption</li> </ul>

**Table 16 SWOT Analysis of Millet Sub-sector**

<ul style="list-style-type: none"><li>○ Of late, the Government of Odisha as well as the Government of India promotes both cultivation and consumption of Millets among the poor mass of the country focusing on improving their nutrition, income, and resilience, while it is getting popularized among the elites as a means to address lifestyle diseases, which creates enormous opportunity for making it more market-oriented crop</li><li>○ Since the outbreak of novel coronavirus disease (covid-19), the "immunity foods" have gained traction. Micro-nutrient-rich Millets are suitable substitutes for reviving our traditional food systems and maintaining ecological harmony with nature.</li></ul>	
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## 1.12 Vision for Sustainable Outcomes

Boosting initiatives around the Millet value chain is one of the most effective ways to address agricultural challenges. The recent farmer's protests bring attention to the two chief food crops viz. wheat and paddy. These were considered the harbingers of food security since the mid-1960s when the green revolution led agriculture policy lent too much focus to food crops. However, this focus soon became skewed towards excluding the bio-diversity principles and crop diversification, resulting in a dominating mono-cropping pattern because the approaches were not holistic. This further facilitated consumerist eating habits. It also created ecological threats because the varieties of paddy and wheat, especially the high-yielding ones, consumed more pesticides and chemical fertilizers and increased production costs. Thus Millet's value chain is one of the most effective ways to address agricultural challenges. Boosting Millet cultivation will empower the average farmers and achieve the objectives of enhancing incomes and improving crop diversification. The farmers are interested in adopting Millet cultivation on a bigger scale with certain assurances like institutional credit for the crops, supply of inputs at the right price at the right time, and marketing linkages and exposure and extension services from the line department of Government.

The small, marginal, and landless farmers in the project villages expressed their willingness to undertake Millet cultivation once again if there will be an improved storage and processing mechanism, provision of irrigation facility, loan for the crop, and linkages with the market can be established on a sustainable basis. The following vision for outcomes can be set to augment Millet production and strengthen the value chain of Millet in the project villages.

### 1.12.1 Input Supply

#### 1.12.1.1 Good Demand for Quality Inputs

There is good demand for quality seeds and effective plant protection measures from Millet farmers. This is a clear opportunity to develop a seed supply chain that can benefit this sector. Farmers face the shortage and high cost of required fertilizers during their time of need.

### 1.12.1.2 Good Demand for Training and Skill Upgradation

There is good demand among the farmers for changes required in production mechanism and post-harvest primary processing. Training and capacity enhancement of farmers on quality seeds and effective production techniques needs to be imparted to enhance the Millet production. There is a clear opportunity to invest in irrigation facilities for the smallholders in the upland which will fetch good benefits for them.

### 1.12.1.3 Improved Post-Harvest Practices

Storage, cleaning, and grading are the basic post-harvest handling practices that can be easily adopted at the farmers' level. These simple practices can add value to the product resulting in higher revenues. Training and skill up-gradation is required to achieve improved storage and sustainable post-harvest management.

### 1.12.1.4 High Scope to Increase Area and Productivity

All the upland and fallow land available in the region are suitable for Millet cultivation, and therefore there is great potential to increase the area of cultivation. Similarly, productivity can be significantly increased by introducing assured irrigation sources and improved cultivation practices like the use of quality seeds, proper weeding, and plantation management.

## 1.13 Processing and Marketing

### 1.13.1 Market Demand/Major Markets

Market demand describes the demand for Millet and its potential buyers. This is determined by how willing consumers are in spending a certain price on Millet. As market demand increases, so does the price. When the demand decreases, the price will go down as well. Market demand of Millet is the total of what everyone within a specific market desires. India is becoming the new global market for Millets. India is an important consumer and producer of nutria-cereals in the world and the fifth-largest exporter of Millets globally. Nearly 41% of total global production was met by India in 2020. In 2020-21, it exported Millets worth the US \$ 26.97 million. India's major export destinations are Nepal, UAE, Saudi Arabia, Libya, Tunisia, Morocco, the UK, Yemen, Oman, and Algeria. Nepal (the US \$ 6.09 million), the UAE (the US \$ 4.84 million), and Saudi Arabia (the US \$ 3.84 million) were the top three importers of Millets from India in 2020-21.

Of late, the transformation of Millets from a featuring in a poor man's diet to a rich person's lifestyle choice reflects the market-oriented commodification adopted by the government in India and the UN. There is increased awareness and demand for the consumption of Millets among the elite mass in India. Due to its nutritious value, increased consumption of Millets is also evident among pregnant women and lactating mothers. Therefore, the Government of Odisha as well as the Government of India promotes both cultivation and consumption of Millets among the poor mass of the country focusing on improving their nutrition, income, and resilience, while it is getting popularized among the elites as a means to address lifestyle diseases.



Based on the application, the market for Millet is segmented into infant food, bakery products, beverages (inclusive of Alcoholic and Non-Alcoholic), breakfast food, and fodder. Millets-based infant foods such as porridge are ideal for infant -food market growth and will aid in lowering the occurrence of malnutrition in babies and infants. Bakery products including packaged cookies are gradually gaining importance on account of their easy accessibility through supermarkets and hypermarkets and e-commerce sites.

### 1.13.2 Value Addition and Product Diversification

It would require that value-added products be innovated and developed within the district at different value chain points of Millet for better market penetration and economic gain for the primary producers. A market study would explain what kind of products are in greater demand and accordingly various products may be suggested.

To make the products competitive in regional markets, simple activities like cleaning, grading, sorting, and proper packaging can be done. These activities would increase the shelf life of the product and help generate premium prices in the markets.

Apart from this, processing units can be set up to produce finger Millet flour, which is extensively used in the preparation of a wide variety of products like Ragi Flakes, Ragi Noodles, and Ragi Vermicelli. It is also extensively used in the preparation of a large variety of bakery products like bread, cakes, muffins, cookies, etc. Today ragi flour is used to prepare almost all varieties of snacks and breakfast items like Ragi Idli, Ragi Dosa, Ragi Bajji, Ragi Pakodi, Ragi Upma, Ragi Poori, Ragi Uthappam, etc. Ragi sprouts can be used in the preparation of sumptuous soups and salads. A large variety of Indian desserts are now being made using gluten-free flour like Ragi Halwa, Ragi Kheer, Ragi Laddoo, Ragi Malpua, etc. Health-conscious and weight-conscious people are increasingly consuming Ragi-based products. These products are not only high in nutrients but also help in easy digestion and are very tasty. However, people suffering from thyroid issues need to consult their physician before consuming Millet-based products.

Important reasons,  
why people hesitate to take Millet:

- i) Ease of Access & Availability
- ii) Processing Millet Food
- iii) Cooking
- iv) Attractive Recipe
- v) Taste
- vi) Absence of Wide Options
- vii) Moving from Existing Food Habit



#### Millet Shakti Caf by Mission Shakti

Recently, a memorandum of agreement was signed between the Mission Shakti and Odisha Millets Mission of the Government of Odisha for the promotion of Millet entrepreneurship and Millet awareness campaigns through Women SHGs in 14 districts of Odisha. Under this initiative, the exclusive Millet Shakti Cafe is opened to provide nutritional food to people and promote dietary diversity as well as nutritional security. The Millet Shakti

Café will be managed by Women SHG Federation and supported by Mission Shakti. The café will sell an array of Millet-based food products to provide an option in Millets food to people who wish to have a quick breakfast or snack with tea or coffee, ready to eat/cook items to make recipes as per their preferences.



### 1.13.3 Market Diversification

A list of Millet trading centers in India is given in the following table. It is quite clear from the table that there are few players from Odisha involved in trading and exporting Millet to other parts of India and outside India.

**Table 17 Trading centers of Millets in India**

Cms Industries Bhuj, India	Yashraj Agro Exports Pvt. Ltd. Pune, India	Btl Herbs & Spices Pvt. Ltd. Navi Mumbai, India
Pankaj Agro Processing Pvt. Ltd. Dahegam, India	Gurave Trade Llp Gandhidham, India	Andalan Shakti Private Limited Ahmedabad, India
Potatoes Whole Sell Smd Koraput, India	Medusa Exim New Delhi, India	Safal Seeds And Biotech Ltd. Jalna, India
Reshma Chemicals Pvt. Ltd. Krishna, India	Accept Organic and Natural Products Exim Private Limited Indore, India	Aarasuri Enterprise Mundra, India
Shree Yamuna Proteins Dahod, India	Shreeji Trading Dahod, India	Shree Raghvendra Agro Processors Dahod, India
Vijayshri Trading Company Aurangabad, India	Vijaya Enterprises Mumbai, India	Maa Adhishakti Traders Semiliguda Koraput, India
Maxcor Agro And Allied Mumbai, India	Pasa Export Deesa, India	The Natural International Surat, India
Nathubhai Cooverji & Sons Mumbai, India	Metco Export International Mumbai, India	Nascent Star Trading Private Limited, Bengaluru, India
Visit the website to find more such trading centers in India, <a href="https://www.tradeindia.com/manufacturers/Millets.html">https://www.tradeindia.com/manufacturers/Millets.html</a>		

Most of the Millet is sold in the local market at the regional, district, and state levels. A more aggressive market diversification would be required to ensure that the demand for Millet is managed in a sustained manner. The farmers of the study area have the most access to the nearby market and do not have access to the organized market which reduces their possibilities of higher price realization.

### **Union Government in India looks to brand 'India-grown' Millets for the global market**

The country is now looking to raise output and branding of "India-grown" Millets to drive exports and tap into a growing global market.

India, a major producer of Millets, had formally requested the UN in 2018 to declare 2023 as the global year of Millets, which was approved at the UN General Assembly this year.



The Union government will launch a program to ramp up farm-to-fork value chains for Millets or coarse cereals, following up on proposals in the Union Budget 2022-23 and view the UN's declaration of 2023 as the International Year of Millets.

The country is now looking to raise output and branding of "India-grown" Millets to drive exports and tap into a growing global market. In the Union Budget 2022-23, the finance minister proposed a policy push for branding of Indian Millets, which are key ingredients in the breakfast cereals, biscuits, and healthy snack segments. The agriculture and food processing ministries will coordinate to mobilize farmer producer unions, which are collectives of cultivators, to expand Millets farming in key growing states. The program to promote Millets being worked on will focus on post-harvest value addition, raising productivity, and also strengthening supply chains. A major thrust of the program will be to brand the homegrown produce with its logo, which will be carried on food packaging to uniquely identify Indian Millets.

Source: Hindusthan Times, May 6, 2022, Available at <https://www.hindustantimes.com/india-news/centre-looks-to-brand-india-grown-millets-for-global-market-101646420714929.html>

## **1.14 Possible Intervention Strategies: Recommendations**

In terms of the future of Millet to be considered as commercial production, it is suggested that the formation of primary producer's clusters, saving and credit for these groups formed, and drying and storage facility would result in improved return on investment in the intervention area. Efforts should be given to tap the opportunity to further augment the process of enhancing production by investing in social, natural, and physical capital to achieve the desired level of output of Millets for the small and marginal excluded community.

Further, there are no integrated efforts to link up all the stakeholders in the value chain system with the assurance of critical support for achieving standards. The demand and supply scenario is to be synchronized to formulate a closely knitted value chain and achieve a win-win situation for primary producers as well as the stakeholders involved in the storage, processing, and marketing functions in the value chain.

Based on a detailed analysis of the value chain, market system, and demand for Millet, the following recommendations are suggested for enhancing benefits to primary producers:

### 1.14.1 Social Mobilization and Institution Building

Since, only a negligible number of farmers in the project areas are currently cultivating Millets, the first and foremost task before the project is to conduct sensitization cum awareness meetings in the Bhatli and Ambabhona blocks in Bargarh district to develop community understanding among the farmers on the dynamics of production and productivity of Millet; and its advantages in terms getting higher income from the same. Such interactions with the farmers at the initial stage of the project would help to create an acceptance among the farmers and facilitate their decision to cultivate Millet as a commercial crop. That would also enable the project to identify the farmers showing interest to cultivate Millets and also help identify the potential leaders among the farmers, who would act as a bridge between the project and the farmers in the operational villages.

In the next step, the project may facilitate and organize the interested farmers to form Farmer Producer Groups (PGs) at the village or Gram Panchayat level, which may be then federated and registered as a Farmer Producer Company (FPC) at the Block level. As the distance between the Bhatli and Ambabhona blocks is more than 50kms, forming one FPC for the entire district would not help the project reach out to the farmers of both Blocks. On the other side, the farmers may get discouraged if they are not able to access or receive timely services due to the distant location of the FPC. Therefore, the study strongly recommends that one FPC per block should be formed so that the farmers do not face any problems in accessing the services from their FPC. After the formation of the FPC, the project may take steps to provide training and exposure to the members on the functioning and management of the FPC.

Since only a few farmers are cultivating Millet in the project areas, the project needs to plan for a target-based gradual increase in the number of farmers brought into the fold of FPC. Keeping the project duration in mind, the project should target organizing a maximum of 300 farmers per FPC, which would help the project to have a realistic plan to cater to the farmers' requirements for taking up Millet as a commercial crop. Adding the two blocks, a total of 600 farmers in the Bargarh district may be provided support for Millet cultivation under the project. Further, to achieve the target of 300 farmers per FPC, the project may take gradual steps by setting a target of achieving 100 farmers per FPC in the 1<sup>st</sup> year of project implementation followed by 200 farmers in the 2<sup>nd</sup> year and then, 300 farmers by the end of 3<sup>rd</sup> year of project completion.

### 1.14.2 Production Management

#### 1.14.2.1 Development of Location-Specific Package of Practices (PoPs)

Location-specific Package of Practices (PoPs) should be developed, demonstrated, and supported for the production and marketing of Millets focusing on the farmers in the project areas. The PoPs should incorporate the best practices in the region like mixed farming practices and monocropping with improved varieties/ hybrids and fertilizers.

- At a later stage of the project, certified organic Millet production may be encouraged and supported under the project.



- Agrochemicals should not act as the only strategy for increasing productivity.

#### 1.14.2.2 Training on PoPs

Farmers in the project areas follow traditional ways of farming learned from their forefathers. To raise their income, they need to adopt modern methods of agriculture. They need training and exposure to commercial farming for higher yield and adopt irrigation systems without wastage of water and application of plant machinery and use of fertilizers and pesticides. So, after the development of the PoPs, the project needs to train the farmers on how to execute the PoPs for better production, processing, and profitable marketing of their products. Exposure/training on technical aspects of sustainable Millet cultivation (e.g. soil treatment, inter-cropping, de-cubing, drying, storage, etc.) should be imparted to the farmers.

#### 1.14.2.3 Demonstration Applying Farmer Field School (FFS) Approach

The project may plan for adopting the Farmer Field School (FFS) approach to build farmers' capacity to analyze their production systems, identify problems, test possible solutions, and eventually encourage the participants to adopt the practices most suitable to their farming systems. FFS is an approach based on people-centered learning which is participatory and enables farmers to learn by doing. The package of practices, which the project is going to develop, may be demonstrated to the farmers applying the FFS approach. Applying the same approach, the project may take efforts to organize field demonstrations to showcase the yield potentials of high-yielding varieties with a package of nutrient management and production including the technology demonstration may be organized for the farmers in the project areas.

#### 1.14.2.4 Adoption and Scale-up of PoPs

Farmer Field School (FFS) approach of training and demonstrations would help the most interested farmers in the project areas adopt the PoPs through learning by doing. The farmers, who are based in the neighboring villages of the demonstration sites, may be invited to observe and learn the skill required for adopting the correct method of production outlined in the PoPs, which would enable the project to encourage them to adopt in their agriculture field. As a result, the knowledge and skill about the improved practices will gradually diffuse to other farmers in the project areas and will help the project achieve scale-up by bringing more and more farmers under its umbrella of support.

#### 1.14.2.5 Inputs Demand Estimation and Facilitate Supply of Quality Inputs

Before the adoption and scale-up of PoPs, the project needs to train farmers on how they can carry out input demand estimation (e.g. estimation of seeds, fertilizers, and pesticides requirements as per the land size) before 2 to 3 months of an agriculture season. After the demand estimation of inputs is completed by the farmers, the project may further facilitate how those farmers can access timely and quality inputs.

#### 1.14.2.6 Mechanization Support (Custom Hiring Center)

Mechanization support to the farmers is required for various agricultural activities, especially weeding, harvesting, threshing, and dehulling, which would help improve the productivity of labor engaged in agriculture. Apart from

implements like e.g. sprayers, weeders, threshers, etc., the farmers also need harvesting machinery to reduce the quantum of broken grains (Millets) and cleaning of the produce. Hence, the project may plan and facilitate the establishment of a Custom Hiring Center at the Farmers' Producer Company. Efforts should be made to equip the centers with all the required equipment, which would help the farmers easily access the equipment at the time of their needs. The establishment of a Custom Hiring Center would enable the farmers to hire the equipment on a rental basis, which in turn would provide an income to the FPC for bearing its management and maintenance costs. So, simultaneously, at the time of training and demonstration to the farmers, the project may facilitate the setting-up of a Custom Hiring Center so that the farmers can access the equipment that is required for adopting the improved practices demonstrated under the project.

#### 1.14.2.7 Financial Support

The project may facilitate providing financial support to the farmers by organizing them into producer's groups and companies and then linking the same to various government schemes of KBK and line departments; commercial banks; MFIs; Millet Mission; etc. so that the farmers in the project areas can avail loan and other benefits specifically for the production, processing, and marketing of Millets. Thus, the project needs to coordinate with the Millet Mission, KBK, line departments, and other players for convergence and dovetail resource support to the farmers from these agencies. Advocacy with the Odisha Millet Mission may be given high priority to expand its operation to the project villages in the Bhatli and Ambabhona Block.

#### 1.14.2.8 Promotion of Soil Testing

Since soil testing is not practiced by the farmers in the project areas, the project may plan for promoting soil testing among the farmers in the project areas, which may be also demonstrated at the demonstration sites to show how it is done and the benefits of doing soil testing and doing land treatment based on the soil testing result. So, it is important that the soil testing should be conducted at the individual farmer level to know the Nitrogen, pH level, sulphur and potash content, and micronutrient level. Therefore, the project may facilitate the introduction of soil testing kits, moisture testing machines, and land treatment carried out by farmers based on the soil testing report.

#### 1.14.2.9 Soil Health Improvement (Land Treatment)

Based on the soil-testing result, land treatment should be done by individual farmers by applying proportionate doses of lime powder, neem cake, and organic manure. Also, the farmers should adopt the treatment of seed before sowing. By taking up these activities, the project may facilitate the farmers availing financial incentives under the Millet Mission for taking up such activities. In this regard, soil health mapping is required for improving crop productivity, and accordingly, the crop-wise recommendations for fertilizer applications may be carried out by the farmers based on the result of soil analysis. As Millets are grown mostly in marginal land in the diverse ecosystem, support needs to be given to the farmers for location-specific eco-friendly measures for improving the fertility of the soil and per acre productivity. Intervention in the cultivation process should include efficient application of fertilizer, pesticide, and soil and seed treatment. Farmers involved in Millets cultivation should be sensitized to improving soil health and it should be scaled up. Novel measures to support local practices like silp application, etc. may be promoted under the project.



#### 1.14.2.10 Encouraging Farmers for Organic Farming

The introduction of organic fertilizer and pesticides for "organic farming" may be promoted under the project as there is a huge demand for organic Millets in the international market. For which, "Organic certification" is required and a proper strategy to be developed so that the requirements could be fulfilled to attract the export market. So looking at the growing demand for organic food products, the project may plan for promoting and introducing the practice of organic farming among the interested farmers. By definition, produce can be called organic if it is certified to have grown on soil that had no prohibited substances applied for three years before harvest. Prohibited substances include most synthetic fertilizers and pesticides. Hence, one of the challenges for organic farming is to keep the agriculture field barren for at least 3 years, which would be difficult to adapt by the small and marginal farmers. Hence, the project may identify interested large and medium farmers who can afford to keep some portion of their land holdings barren for three years, which would enable them to get a certificate for their organic produce.

#### 1.14.2.11 Identification and Replacement of Current Seed Variety

Replacing low-yielding varieties of seeds used by the farmers with high-yielding varieties should be made in the project areas. The project may plan to ensure that the farmers have a choice of Millet varieties at their disposal. A two-pronged approach is required stressing, on the one hand, large scale organized seed channels for generally established and proven varieties; and on the other hand, local seed banks for niche varieties grown in the specific areas. The existing support mechanism for seed production should be extended to include well-performing local varieties.

#### 1.14.2.12 Care during the Harvesting of the Produce

There is an optimum time for harvesting Millets, depending on the maturity of the crop and the climatic conditions. This has a significant effect on the quality of the Millet during storage. Harvesting often begins before the Millet is ripe and continues until mold and insect damage are prevalent. Millet not fully ripened contains a higher proportion of moisture and will deteriorate more quickly than mature grains because the enzyme systems are still active. If the grain remains in the field after maturing, it may spoil through wetting caused by morning dew and rain showers. There is also an increased risk of insect damage. A range of mechanized harvesting equipment suitable for the small-scale farmer should be made available at the Custom Hiring Center for the farmers to hire at the time of harvesting the Millets. Harvested crops are left in the field for a few days to dry before further processing. The farmers in the project areas may be sensitized and made aware of all the above mentioned so that they can effectively handle the harvesting of Millets.

### 1.14.3 Value Addition and Product Diversification

#### 1.14.3.1 Cleaning, Grading, Sorting, and Drying

To fetch a better market price for their produce, the farmers may be trained and demonstrated on how the Millets after harvested are cleaned, sorted, and graded according to size. Winnowing machines may be introduced to separate the chaff, soil, and dirt from the produce. Winnowing machines having integral sieves that combine cleaning with grading may be used for the same.

In coordination with the Millet Mission, the farmers may be provided de-huller, and de-stoner machines to remove the husks and stone from the produce, which would further add value to the pricing of the product. Since the breakage of the kernel is a major issue in the case of Millets, the use of de-huller machines would prevent from breaking of the grains.

Before storage or further processing, Millet grains need to be dried. The most cost-effective method is to spread out in the sun to dry. As the moisture content is the most important criterion for getting a better price for their produce, solar drying technology may be introduced which is self replicable and self-reliant model. The project may provide support for getting solar dryers and microwave dryer machines at the Custom Hiring Center on subsidy. It is important to ensure that Millet grains should be dried to a maximum of 12% moisture before storage.

To reduce the post-harvest losses, effort should be made that the cleaning, grading, sorting, and drying activities are carried out by the farmers near to their fields.

#### 1.14.3.2 Construction of Common Drying Yard and Use of Solar Dryers

The prevailing practice of drying the Millets on an earthen floor should be stopped which is unhygienic and time-consuming. Sufficient numbers of common concrete drying platforms should be constructed to cater to the need of the farmers depending on the production of dried Millets in their village. As the moisture content is the most important criterion for getting a better price for their produce, solar drying technology may be introduced which is self replicable and self-reliant model. Solar dryers and microwave dryer machines may be made available to the farmers at the Custom Hiring Centers.

The drying and threshing yards built under various existing schemes should be utilized by the Millet farmers. It is expected that the creation of such infrastructures will improve the effectiveness of dehulling and the quality of dehulled grains by reducing the incorporation of impurities.

#### 1.14.3.3 Good Storage Facility

There is no common godown facility at the village level so that the farmers can store their products and avoid distress sales during bumper crops. As reported by the farmers on fluctuations in the market price of various crops, the farmers will be benefitted if good storage facilities would be established. Specialized store facilities in the vicinity of the Millet growing cluster could be a better solution to it. For this purpose, the institutions like NABARD, APICOL, etc; could be involved.

Also at the storage facility, Millet grains should be inspected regularly for signs of spoilage and the moisture content tested. If the grain has picked up moisture it should be re-dried. Grains are often protected with insecticides and must be stored in rodent-proof containers.

#### 1.14.3.4 Product Diversification

Millets are known to be nutritionally superior to other mainstream cereals like rice, maize, and wheat with substantial amounts of iron, calcium, and zinc. In addition, Millets can withstand semi-arid conditions and require

relatively low inputs, which partly make their products attractive to farmers. Due to increased market demand, more and more farmers are encouraged to take up Millet cultivation as a commercial crop. Therefore, processing and commercial diversification of Millets in partnership with the private players should be introduced in the project areas so that the farmer cultivating Millets gains from marketing various diversified products prepared out of Millets.



### Millet Grain Packet and Gunny Bag

used in the preparation of wide varieties of products like Ragi Flakes, Ragi Noodles, Ragi Vermicelli ; in preparation of a large variety of bakery products like bread, cakes, muffins, cookies, etc.; almost all varieties of snacks and breakfast items like Ragi Idli, Ragi Dosa, Ragi Bajji, Ragi Pakodi, Ragi Upma, Ragi Poori, Ragi Uthappam, etc.; ragi sprouts for sumptuous soups and salads; large varieties of Indian desserts are now being made using gluten-free flour like Ragi Halwa, Ragi Kheer, Ragi Laddoo, Ragi Malpua, etc.



An extensive list of diversified products prepared out of Millet flour is listed hereunder.

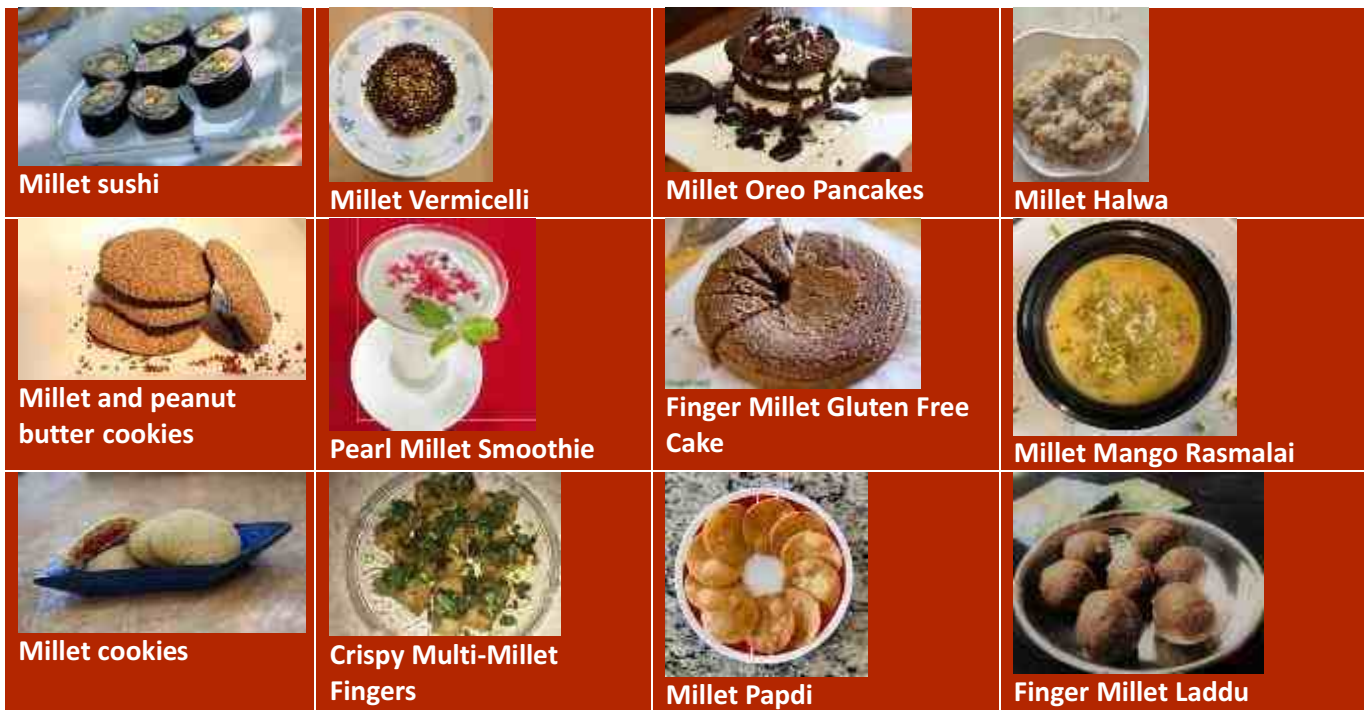
### Millet Flour Packet





## Recipes Prepared from Millet Flour

			
<b>Millet Manda Pitha</b>	<b>Millet Kakara Pitha</b>	<b>Millet Aloo Chup</b>	<b>Millet Khaja</b>
			
<b>M Karanji Pitha</b>	<b>Millet Samosa</b>	<b>Millet Upama</b>	<b>Millet Fried Rice</b>
			
<b>Mandia Challah</b>	<b>Mandia Mungdal Bada</b>	<b>Mandia Poda Pitha</b>	<b>Mandia Churma Ladoo</b>
			
<b>Little Millet Utappam</b>	<b>Millet Semolina Sandwich</b>	<b>Stuffed Finger Millet Idly</b>	<b>Kodo Millet Oreo Pancakes</b>
			
<b>Crispy avocado salad with Millet sticks</b>	<b>Millet and Oats Porridge</b>	<b>Finger Millet Porridge</b>	<b>Shrimp Scampi with Finger Millet Vermicelli</b>
			
<b>Proso Millet Pizza</b>	<b>Sorghum, Millet, and chicken soup</b>	<b>Cream of Millet soup</b>	<b>Cabbage and sorghum salad in Millet shell</b>
			
<b>Millet stir fry</b>	<b>Millet &amp; chickpea stuffed peppers</b>	<b>Millet couscous with roasted carrots</b>	<b>Sorghum &amp; Millet kebabs with mashed potatoes</b>



#### 1.14.4 Marketing

Processing, branding, and marketing of the Millets are the most important components of the entire value chain development. Therefore, the process of marketing should be initiated from the day of the inception of the project. The project will have to look beyond TDCC for the marketing of the products. Therefore, the identification and empanelment of market players both at the national and international level may be made, who would procure the Millets grains produced by the farmers. The project needs to also plan for the setting-up of large processing units and market outlets so that Millet flour and various other Millet recipes can be prepared and sold in the market. An exclusive web portal for the same may be developed for online marketing and ensuring wider outreach of the products like Millet grains, Millet flours, and various Millet recipes. The project may also plan for proper packaging and branding of the product in the name of Mahashakti Foundation, and there should be a continuous effort made through advertisement of the products to reach out to the private players and individual consumers both at the national and international level. The project may also plan for engaging women SHGs and individual women entrepreneurs to manage the processing units, preparation of various products, packaging, branding, and selling through a web portal and market outlets. All these marketing initiatives would not only fetch a better price for the farmers but also create employment opportunities and attract more and more farmers to start producing Millets.

##### 1.14.4.1 Creating Market Awareness

Creating market awareness among the farmers about the Millet and Millet-based products should be given high priority. The lack of awareness about Millets and the negative image of the crop that persists in certain areas could endanger supply-focused interventions like direct selling to the consumer in eatables form and the introduction of Millets in PDS.

Chemical fertilizers, pesticides, and fungicides are widely used in agriculture to improve crop yields. But most of the compounds used are synthetic and their overuse causes environmental pollution and health problems. People

prefer organic fruits and vegetables. Export quality of food products requires compliance with certain standards. So farmers should be sensitized for optimal use of chemical fertilizer instead of overuse of the same, use of bio-fertilizer, and practicing organic farming so that the products could be of export quality.

#### 1.14.4.2 Establishing Marketing Linkages and Transportation Facilities

The farmers sell their products to the village traders/commission agents in their village collection points but get the payment in late. Farmers also sell their produce at the local Haat on credit and get the price of their produce on weekly basis. Sometimes traders do their monopoly by observing the supply-demand scenario. The product reaches finally the consumers through three to four aggregators receiving a commission. So there should be regulated market price and institutional support through OMM for procurement of Millets from the producers directly so that they get the right price. Government marketing institutions like OMM, TDCC, and ORMAS can be tied-up for continuous market linkage support and sustainability of the promoted product. Sustained institutional linkages with OMM, TDCC, ORMAS, Corporates, etc. can help streamline systems.

As mentioned before, the project will have to look beyond TDCC for marketing the products by establishing market linkage with various private players and individual consumers at the national and international levels.

#### 1.14.4.3 Establishment of Aggregation Points for Procurement of Millets

Procurement of Millets should be organized and implemented in all Millets cultivating project villages of the Bhatli and Ambabhona Blocks on a relevant support price (MSP). Large-scale procurement measures will help boost the Millet production in the area. The project may plan to establish aggregation points within the vicinity of each production cluster, which would help for large-scale procurement from the aggregation point. The establishment of aggregation points may help individual farmers bring their produce to the designated collection points – aggregation centers – where the crops are collectively marketed to the buyers. That would also help the buyers/companies visiting and procuring the produce from the aggregation points instead of buying it from the individual farmers. With the establishment of aggregation points and storage facilities, the effort may be made under the project to encourage more and more farmers to not only cultivate Millet in the Kharif season but also cultivate it in Rabi and Summer seasons so that the buyers/companies can procure the product throughout the year as per their need.

#### 1.14.4.4 Post-Harvest Processing, Branding, Packaging, and Marketing of Millet Based Products

Support is needed for post-harvest processing both for improving and disseminating technology. The lack of effective and affordable post-harvest technology for Millets is a major barrier to the proliferation of these crops. Hence the technological supports that are needed for cleaning, de-hulling, de-stoning, sorting, grading, and drying may be introduced, which would attract better commodity prices in the market.

Marketing initiatives that aim to provide Millet farmers with a higher income share for their produce, like value chain integration, the establishment of Producers Group (PG), Farmers Producers Organisation (FPO), and various value addition initiatives should receive support. There is a dire need for linking small and marginal farmers to online marketing platforms, such as the Electronic Agricultural National market (e-NAM).



Apart from this, Mahashakti foundation should look for its branding and marketing of the Millet products. The following initiatives may be considered.

- i) **Millet grains:** After cleaning, sorting, grading, and drying Millets, the project may plan for packaging, branding, and marketing it in the name of Mahashakti Foundation. Other than the captive market of TDCC in the district, the Millet grain packets may be marketed to other private players both in India and the international market. Good varieties of Millet grains should be highlighted in the web portal to attract online buyers.
- ii) **Millet flours:** The project may think of setting up a large processing unit for preparing Millet flours. Like the packaging of Millet grains, the project may also plan for packaging, branding, and marketing the processed Millet flour in the name of the Mahashakti Foundation.
- iii) **Various Recipes prepared from Millet:** The project may also think of setting-up up two Millet outlets, one at the Bargarh district headquarter and another one at the State capital in Bhubaneswar. These two outlets may be opened in the name of the Mahashakti Foundation. Apart from selling properly packaged Millet grains and flours, these outlets may also prepare and sell various recipes listed in the earlier section of the report. Apart from this, a web portal may also be developed and linked to these outlets so that online supply can be made to various private players and individual consumers. Proper advertisement of both the outlets and web portal may be made to reach out to the individual consumers and private players. After the success of the outlets, the opening up of more outlets may be planned under the project. Women SHGs or individual women entrepreneurs may be engaged in processing, preparing, packaging, branding, selling at the outlets, and handling online selling of the products through web-portal. Such initiatives would fetch a better market price for the farmers in the project areas.

#### 1.14.4.5 Other Market Related Strategies

- Mapping the major players in the millet value chain who are responsible for moving the product along the value chain;
- Introduction of price stabilization system so the farmers get better price across the season and the fluctuation could be checked;
- Gradually, the project may plan for promoting organic farming and highlighting the organic Millet in the web portal to attract online buyers. Adoption of organic farming by farmers may take time but the project may keep it as a long-term goal to achieve in the future.
- Formalization of institutions and completion of all legal aspects.
- Increase in quantity and maintain quality parameters.
- Skill development of members on value addition.
- Exposure to processing units for value addition.
- Market exploring and dealing with traders.
- Finalization of selling modalities including quality, price fixation, transportation, payment, and date of lifting.
- Account keeping and maintaining transparency.

## 1.15 Conclusion

Society has not tapped the full potential of the Millet grains that is rich in nutrients and can offer solutions to the challenges of meeting global food security. Millet can be produced on a large scale if the different agencies involved in the promotion of Millet cultivation will address the issues faced by the primary food grower with regards to availing credit, input supply, orientation and availing extension services, marketing of the product, use of farm mechanization to ease the difficulties faced in harvesting and post-harvesting and processing. The farmers should be taken to Millet cultivating area in exposure visit so that they should have an idea of the modern Millet farming as well as the marketing of the product and getting the right price by the farmers on DBT mode after selling of the product to the FPOs. Foremost, the project from the day of its inception should focus on the processing of Millet grains by setting-up up large processing units; branding and packaging of Millet grains, flour, and other recipes; and both off-line and online marketing of these products through opening up of market outlets as well as exclusive web portal managed by the women SHGs, individual entrepreneurs and FPCs, which would help in achieving sustainability of the initiatives undertaken by the project.

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Conducted by



DCOR Consulting Pvt. Ltd.  
[www.dcorconsulting.com](http://www.dcorconsulting.com)

Corporate Office

131 (P), Punjabi Chhak, Satyanagar  
Bhubaneswar, Odisha, India, Pin: 751 007

Head Office

H. No. 424, Bagdola, Dwarka Sector - 8,  
New Delhi, India, Pin – 110077