


Community Hunger Fighters: An Adult Nutrition Literacy Programme

(Experiences in integrating nutrition literacy as part of the Farming system for Nutrition Study under Leveraging Agriculture for Nutrition in South Asia)

Rama Narayanan

D.J.Nithya

Akshaya Kumar Panda

Rupal D.Wagh

M. S. Swaminathan Research Foundation
Chennai, Tamil Nadu

LANSA
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MSSRF
Science for Sustainable Development

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A Report

Rama Narayanan, D.J.Nithya, Akashya Kumar Panda and

Rupal D.Wagh

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M S Swaminathan Research Foundation
3rd Cross Street, Taramani Institutional Area,
Chennai
www.mssrf.org

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About the Report

This report is a documentation of process of nutrition literacy programme undertaken as a component of Farming System for Nutrition (FSN) study under LANSA in Wardha, Maharashtra and Koraput, Odisha in 2015 to 2017.

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Contents

List of Tables

List of Figures

List of Annexures

I Background

Nutritional literacy is being recognized as an important dimension of interventions seeking improvement in nutritional outcomes. The UN Standing Committee on Nutrition notes that 'for all populations, nutrition education and social marketing are crucial components of national, municipal and community efforts for sustained improvements in food and nutrition security' (UNSCN, 2010). The Food and Agriculture Organization of the UN (FAO) also emphasizes the need to educate people about eating the right food, besides facilitating a supportive environment for healthy balanced diet and lifestyles (FAO, 2011; Ecker et al. 2012).

While nutrition literacy per se helps in generating awareness about healthy eating, when combined with interventions to augment household food security, has the potential to bring sustainable transformative behaviour in households towards dietary diversity. This report documents the processes and outcomes of a nutrition literacy programme undertaken by the M S Swaminathan Research Foundation (MSSRF) as part of a research study which attempted to find out the effectiveness of farming system interventions in improving nutrition security at the household level. Nutritional literacy here does not refer to literacy in the traditional sense which is reading and writing but involves a sensitization programme in nutrition based on principles of adult literacy and not the mere dissemination of technical messages.

The study adopted an approach termed as ' Farming System for Nutrition (FSN)', which envisaged the introduction of location-specific agricultural remedies for nutritional maladies by mainstreaming nutritional criteria in the selection of farming system components involving crops, animals and wherever feasible fish (Das et al 2014; Nagarajan et al 2014 and Bhaskar et al. 2017). The core strategies for addressing nutritional outcomes were:

1. Increasing the availability of cereals and pulses for household food requirement by enhancing production at the farm level
2. Widening the on-farm crop diversity to improve the dietary diversity
3. Promoting vegetable cultivation through household and community level gardens with naturally biofortified fruits and vegetables species and nutri-dense varieties especially green leafy vegetables to address micronutrient malnutrition.

The nutrition literacy component was undertaken as part of the research study with the following objectives:

1. To identify strategies for sustainable and effective behaviour transformation towards nutrition security at household level
2. To understand the issues involved in integrating nutritional literacy in an agricultural research programme seeking to address nutritional maladies
3. To develop a framework for mainstreaming nutritional literacy in agricultural research and interventions
4. To give suggestions for enhancing nutrition literacy component in some key government policies and programmes.

II Conceptualization of Adult Nutrition Literacy

Interventions to promote healthy eating habits fall under two broad categories namely 'nutrition education' and 'behaviour change communication (BCC)'. Both vary in their approach in attempting transformative behaviour. The definition of nutrition education ranges from helping individuals, families and communities to make informed choices about food (USDA, 2012), to planned educational activities aimed at targeting certain population groups for acquiring healthy nutrition behaviour (GIL, 2010). Mcnulty (2013) observes that the definitions range from a narrow perception of knowledge dissemination to complex descriptions of a multi-faceted discipline. They consider education to come from outside rather than as a self directed experience. Behaviour change communication is held as a research based consultative process for addressing knowledge, attitudes and practices (UNICEF, 2012). It makes strategic use of communication to provide messages and inspiration and uses both interpersonal and mass media channels to help people adopt desired behavioural outcomes (FHI, 2012). It focuses on creating an enabling environment besides providing information on healthy eating.

Another conceptual framework termed 'Social and Behaviour change' endorsed by UNICEF and USAID (UNICEF, 2012, Core group, 2003) consider that individual behaviour change must be accompanied by social change. UNICEF considers social change as a process of transformation in the way society is organized within institutions and in the distribution of power within various

social and political institutions. USAID proposes that besides communication, social and behavior change refers to actions promoting sustained behaviour change such as formulation of policy, provision of need systems, services or infrastructure besides social support and measures to sway social norms.

Whatever be the definition or terminology used, the key question to consider is how far the programmes are effective to help participants inculcate healthy eating habits that would be sustainable. After reviewing the published results of fifteen interventions, Shi and Zang (2011) conclude that successful interventions are those that are 'culturally sensitive, accessible and integrate local resources'. Vella (2002) observes that a learner centred approach involving adult learning principles that are required to address adults and adolescents are either inadequate or missing in several programmes. The learner centred approach, referred to as **nutritional literacy** acknowledges that the participants bring their own lifetime experience into the learning session. The adult learning principles build on the real experiences of the learners, encourage dialogue, facilitate problem solving in small groups, emphasize on practical application and engage the emotions, intellect and affirmation of the learners. Peoples' participation in the programme is central to such an approach. In programmes that adopt a prescriptive approach over a learner centric approach, there is a demarcation between the 'giver' of knowledge considered to be empowered with all the needed information and the recipient whose behaviour needs change. Communication is a one way process with minimal role for the learners to discuss, question or engage in a dialogue with the implementers on the relevance, merits, economic, social and cultural implications of the technical messages. The facilitators or the change agents neither undergo nor experience transformation themselves, which is held to be solely occurring at the level of the learners.

The Indian scenario

In India, various nutrition programmes include nutrition education as a component. National Nutrition Program, 1993 and Vitamin A Supplementation Program, 1970, 1991, 2006 recommended nutrition education for creating appropriate behavioural changes among mothers in addition to direct intervention like provision of food supplements to children under 6 years, pregnant and lactating women, and adolescent girls.

The Integrated Child Development Services (ICDS) Scheme in operation since 1975 offers a package of six services with nutrition and health education as one of the components particularly for women (15-45 years). Health education is provided through Anganwadi workers Auxiliary nurse midwives (ANM) and Medical Officers (MO) [Health system, Ministry of Health and Family Welfare (MHFW) & Ministry of Women and Child Development (MWCD)]. The government has initiated a community based care programme for undernourished children under 6 years across India through ICDS scheme and one of the components is "Sneha Shivir" which is designed to be a community based approach and rolled out in 200 identified high burden districts, for the prevention and management of moderate and severe under nutrition. Theme based education using IEC on feeding, health, hygiene and psychosocial care were given in 12 day sessions, through an Additional Anganwadi Worker/Nutrition Counsellor at the ICDS/Anganwadi Centre.

The Tenth Five Year Plan (2002- 2007) proposed strengthening of nutrition education under Supplementary Feeding of Children 6 months to 6 years, pregnant women, lactating mother, and adolescent girls, under the ICDS Program. Promoting family practices regarding feeding and caring for children's needs and hygiene has to be addressed through nutrition education (Vir et al., 2014). The Tenth Five Year Plan articulated a focus on nutrition education and research towards defining nutritional requirements of Indians and recommended initiating national nutrition education and communication campaigns for a Five Year Strategic Plan (2011–2016).

Nutrition Education and Training though Community Food & Nutrition Extension Units (CFNEUS) under Ministry of Women and Child Development, Govt of India, has the main objectives to create nutrition awareness among the people particularly, women and adolescent girls, skills and education for achieving adequate nutrition within their available means, the importance of non-food factors like hygiene, sanitation, safe drinking water etc. for nutrition and health of the people, grassroot level workers of concerned sectors with basic messages on food, nutrition and health so as to enable them to communicate to the community during the course of their duties (http://www.wcd.nic.in). By and large, the State programmes target certain sections of the population for behaviour change communication, through dissemination of technical knowledge supported with audio visual aids.

The CHF model of adult nutrition literacy

An experiment in implementing a learner centred adult nutrition literacy programme known as 'Community Hunger Fighters' was first undertaken by MSSRF in twelve hamlets and six revenue villages in Koraput district of Odisha during 2012 – 2015 (Narayanan et al. 2015). It considered 'people's' participation' as the core of the literacy programme. People's participation was defined as creative social involvement by people in fulfilling their needs, their capacity for self sustained development and not passive engagement merely to enjoy the fruits of economic and social activity. It operationalized the concept enunciated by Paulo Freire, namely, of collective reflection, action, critical reflection, further action and dialogue through a series of capacity building exercises. These exercises took a problem solving approach and helped participant's link theory with existing social realities and ways of overcoming them. Participants were continuously engaged throughout the project period in a process of critical reflection and action on how to achieve nutrition security.

The approach adopted was to create a loose network of resource persons at the community level for nutrition security through whom all the households and all sections of population such as youth, men and women across social groups, traditional leaders, caste leaders and elected representatives could be gradually helped to move towards nutrition security, over a period of time. The focus was to build the capacity of the village community for nutrition security. Initially five persons from each village consisting of men and women and belonging to different caste groups were to be selected by the community. The men and women were not employees of the implementing agency but were considered as community representatives with a free will to set their own agenda. A residential programme was the initial triggering activity to set the process in motion. This exercise enabled the selected participants to stay together, share common facilities, discuss issues pertaining to their villages and critically reflect on ways of improving the quality of life for themselves and their communities. While in real life, social spaces as well as interaction between people are defined by considerations of ethnicity, caste and gender, the residential programme created space for equal participation, encouraging people to speak up freely on the existing social scenario and its impacts on their everyday lives, including their health and nutritional status.

Observation and follow up of the participants after the training along with critical reflection on how far it was useful to them in their daily lives was done by field staff who were based close to the villages and were in touch with the people on a daily basis. This led to identifying and implementing a series of capacity building exercises that included exposure visits, learning from each other's experiences, interface with other experts, government officials and developing a village action plan for nutrition security, street theatre performances and strengthening of grass root level institutions. In all these exercises other men and women from the villages besides the 'Community Hunger Fighters' joined, such that from the initially selected 90 men and women, the number of people who were involved in capacity building exercises rose to 154 by the end of the project period. The role of MSSRF was one of facilitation and not control.

At the individual level, 23 observations were recorded under three dimensions of nutrition identified during the workshops, namely, actions for improving dietary diversity, personal hygiene practices, and child health and nutrition. Within each of these dimensions, the specific activities varied, in line with the resources available and the possibilities the CHFs saw for making changes in their lifestyles. Thirteen observations pertained to efforts to consuming a diverse diet, but each of them was different. While several changed their agricultural practices and started growing more vegetables and fruits, one woman had to get her land back from lease for this purpose, one landless CHF had to lease in some land, and another landless woman started growing vegetables in the foundation of the house she was constructing. The uniqueness of these actions and the manner in which they were done reiterate the limitless possibilities of reflective action that is not likely to be facilitated in a formal education programme. Existing gender norms especially with regard to child care were challenged and there was growing engagement of men in issues of child health and nutrition. Some womens' group leaders, CHFs and women ward members started mobilizing women in large numbers to attend village level meetings.

Existing caste and power structures were questioned. The voices of the most marginalized *Dalit* community were heard in village meetings. Community members undertook monitoring of direct feeding programme of the State namely the ICDS, revived defunct village structures for nutrition security such as the community grain bank, discussed their village situation in the Gram Sabha (village council) meetings and demanded facilities for improving nutrition security.

Based on the above experience, the CHF model of adult nutrition literacy was decided to be included in the FSN research study underway in a cluster of villages in Wardha and Koraput districts.

Operationalization of the concept

Approach to the programme

1. The focus of the programme was to build a sustainable community resource base in nutrition security such that nutrition issues would continue to be part of peoples engagement even after the project ended.
2. Building a relationship with the community was the key to engaging with them as partners in the exercise.
3. The programme would attempt to integrate principles of adult literacy such as recognizing and building on peoples own knowledge and experiences and helping them through a continuous process of action, reflection and further critical reflection in their daily lives.
4. It would take a problem solving approach by helping people to link theory with social realities and ways of addressing them.
5. Initially it would start with five members from each village chosen by the community and gradually involve other community members as the programme unfolded.
6. It would be inclusive of caste, class and gender considerations.
7. It would be an integral part of the agricultural research project and provide the linkage between food and nutrition literacy with agricultural endeavours.

Activities

1. Two residential workshops were thought of as initial trigger activities to help launch the community nutrition literacy endeavour.
2. This would be followed by other capacity building exercises identified by the community as necessary problem solving steps to achieving nutrition security.
3. Sharing of knowledge among the trained members and other community members, revisiting their practices and action would be facilitated at the village level.

Staffing

There were three levels of implementation, namely conceptual, managerial and field operations. The conceptual team consisted of the CEO of the project, programme manager, agriculturist and nutritionist based at the headquarters of the Institution in Chennai, and the nutrition consultant who had earlier piloted the CHF programme at MSSRF. The middle managerial level consisted of the project coordinators in the two sites. Staff with agricultural background (project coordinators) and a nutritionist was in-charge of field operations providing technical support. There were 5 to 7 field investigators at each location who were assisted by paid volunteers from the community. While the nutrition consultant served as the trainer in the residential capacity building trainings, one of the field investigators in each site was given the additional responsibility of following up the CHFs and the community at large.

Assessment

1. Formal surveys carried out by the research team consisting of agricultural and nutrition professionals and a data manager, collected data on socio economic details, existing cropping pattern, dietary intake and frequency and nutritional status (assessment consisting of anthropometry and biochemical parameters).
2. Transformative behaviour among the trained CHFs and the community members was documented as descriptive narrations in monthly reports through personal observation by the staff, volunteers and through interviews with the CHFs. These reports were discussed in detail with the staff members. The qualitative observations in these reports were classified and organized under thematic heads such as dietary diversity, household cooking practices, decisions related to agriculture, entitlements and so on.
3. Focus group discussions were held with a cross section of the village community to know how far the programme had succeeded in its objectives.
4. Individual interviews were held with community leaders, PRI members, government functionaries and trained community members to assess the effect of the programme to help people to move towards nutrition security.

III The Setting

The nutrition literacy project was implemented as part of the research study on Farming System for Nutrition in seven villages of Koraput District of Odisha and five villages of Wardha District in the Vidarbha region of Maharashtra (Fig 1.) In Koraput, 6 revenue villages and 1 hamlet (Rauliguda) and in Wardha 4 revenue villages and 1 hamlet (Heti, hamlet of Susund) were the study villages.

Figure 1. Study location

Profile of the study villages

The demographic profile of the study villages is given in Table 1. Although agro-ecologically the two study intervention locations are different, both of them are characterized by rain-fed farming and high burden of malnutrition (Das et al 2014).

The caste, gender and literacy profile of the study villages is given in Tables 1 to 4.

Table 1. Caste profile of study villages in Wardha

Block	Panchayat	Villages	No of Households	Caste Composition			
				Scheduled Tribe (ST)	Scheduled caste (SC)	Other Backward communities (OBC)	Others
Arvi	Saheli	Saheli	143	45	15	7	76
		Vitpur	71	28	27	-	16
Karanja	Borgaon	Susund	123	32	4	81	6
		Heti	45	3	20	--	22
		Borgaon Gondi	174	124	2	31	17
		Total	**556**	**232 (42)**	**68 (12)**	**119 (21)**	**137 (25)**

Figures in parenthesis are percentages

Table 2. Population and literacy rate in Wardha

Block	Villages	Population			Literacy Rate* (%)	
		Men	Women	Total	Men	Women
Saheli	Saheli	300 (52)	276 (48)	**576**	40.5	34.7
	Vitpur	137 (52)	127 (48)	**264**	40.3	34.0
Borgaon	Susund	249 (51)	242 (49)	**491**	40.3	31.4
	Heti	111 (56)	88 (44)	**199**		
	Borgaon Gondi	380 (53)	344 (47)	**724**	40.4	31.2
	Total	**1177 (52)**	**1077 (48)**	**2254**	**42.0**	**36.0**

*defined as ability to read and write; Source: Census 2011; Figures in parenthesis indicate percentage

Table 3. Caste profile of study villages in Koraput

Block	Panchayat	Villages	No of households	Caste Composition			
				Scheduled Tribe (ST)	Scheduled caste (SC)	Other Backward communities (OBC)	Others
Boipariguda	Chandrapada	Atalguda	**77**	3	--	74	--
		Banuaguda	**128**	102	--	26	--
		Bhejaguda	**94**	59	20	15	
	Bodaput	Chikima	**59**	1	3	50	5
		Kurkuti	**180**	83	37	45	15
		Maliguda	**92**	2	1	89	--
		Rauliguda	**28**	23	1	4	--
		Total	**658**	**273 (41)**	**62 (9)**	**303 (46)**	**20(4)**

Figures in parenthesis indicate percentage

Table 4. Population and literacy rate in Koraput

Block	Villages	Population			Literacy rate* (%)	
		Men	Women	Total	Men	Women
Boipariguda	Atalguda	171(47)	189 (53)	360	9.1	2.5
	Banuaguda	246 (48)	267 (52)	513	16.0	18.0
	Bhejaguda	194 (46)	228 (54)	422	10.3	7.0
	Chikima	120 (48)	131 (52)	251	36.0	20.5
	Kurkuti	362 (47)	412 (53)	774	19.4	8.9
	Maliguda	195 (48)	214 (52)	409	17.1	8.9
	Rauliguda	54 (47)	62 (53)	116		
	Total	**1342(47)**	**1503 (53)**	**2845**	25.0	16.5

*defined as ability to read and write; Figures in parenthesis indicate percentage

There were less than 200 households in each of the study villages in either site. In the existing social hierarchy in India which involves the caste system, the *Dalits* or the Scheduled Caste (SC) forms the lowest in the social order. Above them is the Scheduled Tribe (ST), or the *Adivasis*. The Other Backward Communities form the middle order. The topmost in social hierarchy are the other groups such as Brahmins and *Kshatriyas*. In Wardha, the overall sample had the highest proportion of STs at 42%, followed by Other groups at 25% and the OBCs at 21%. About 12% were SC households. However the caste composition of individual villages differed

from the above. In Saheli, the highest number of households belonged to Other groups. The proportion of households belonging to SC and ST were near equal in Vitpur. In contrast OBC households were in a majority in Susund. In Heti, households belonging to SC and other groups were near equal. In Borgoan Gondi the SCs were in the majority. Fifty two percent of the population was men and 48% were women. Less than fifty percent of adults were literate with literacy rates were higher for men over women.

In Koraput the overall sample had the highest proportion of OBCs at 46% followed by the STs at 41%. Less than 10% belonged to SCs and other groups. Here too the caste composition of individual villages differed from that of the overall sample. In Atalguda, Chikima and Maliguda the predominant community was the OBC. Banuaguda, Bhejaguda and Rauliguda had a higher proportion of STs over OBCs. In Kurkuti though STs formed the majority with 83 households about 45 and 37 households respectively belonged to OBC and SC communities. Proportion of women in the population at 53% was higher to that of men. Very low literacy rates were reported with only a quarter of adult males and about 16% of women being literate.

Across the study sites, about 60% of households were nuclear (1-4 family members) and 37% were extended nuclear (5-7 members).

Amenities

About 54% of households in the total study area had kutcha houses. Fifty two percent of households in Wardha had access to piped water supply. In Koraput 66% of houses sourced drinking water from tube wells and 56% of houses have piped water facility. About 22% and 1% of households in Wardha and Koraput respectively had access to sanitary latrine facility.

In Koraput the villages of Atalguda, Banuaguda and Bhejaguda where the CHF project had been implemented earlier, had applied for drinking water supply under the Swajaldhara scheme as well as for individual household toilets. The local government was also keen on developing Atalguda as a model village for toilet construction. However, no project had been sanctioned for Boipariguda Block until December 2018. Piped water was brought to villages but as it was not functioning, the community went back the earlier source for drinking water.

Wood was the major source of fuel for practically all households, which was obtained from nearby forests. There was road connectivity and electricity supply in both sites.

All the study villages in Koraput except Rauliguda had schools upto 5th standard and an anganwadi centre each. Kurkuti had school upto 7th standard. In Wardha, Borgoan Gondi, Heti and Saheli had primary school (1 to 4th standard) and Susund had a middle school upto 7th standard. Anganwadi centre was there in all the villages.

Livelihood

Agriculture was the mainstay of the population in both sites. A comparison of the land holding pattern in both sites is given in Table 5.

Table 5. Land holding pattern in Wardha and Koraput (% of households)

Category	Definition	Wardha	Koraput
Landless	Do not own any land	37	17
Marginal	Less than 1 hectare	10	81
Small	>1 but <2 hectares	26	2
Semi medium	>2 but < 4 hectares	19	-
Medium & Large	More than 4 hectares	8	-
Homestead garden		15	48

Source: Nithya et al., 2018

Landlessness was higher in Wardha than in Koraput. However there was higher proportion of small, semi medium and medium farmers in Wardha while in Koraput practically all were marginal farmer households. The practice of maintaining a homestead garden was much higher in Koraput than in Wardha.

It was predominantly commercial crop cultivation with Bt cotton in Wardha. Among kharif (monsoon season) growers, 24% practiced intercropping of cotton with pigeon pea. Typically, cotton and pigeon pea occupied bulk portion of land area. About 21% and 15% also cultivated soybean and sorghum respectively and about 15% cultivated both. Very few households practiced sole cropping i.e. soybean (5%) or sorghum (1%). About 58 (15%) of the kharif season

cultivator households who hd irrigation facility, opted for crops such as wheat and bengal gram during the rabi season. In contrast to Wardha, the agriculture in Koraput was based on food crops. About 98% of households cultivated kharif season crops, mainly rice. Among kharif growers, nearly 89% of households cultivated rice. Rice occupied a major portion of the land; about 7% additionally cultivated some portion of upland area with finger millet. A very small percentage of farm households (3%) cultivated either solely or a mixture of horse gram, black gram, ground nut, finger millet or little millet. Of the 98% of kharif growers, only 38% cultivated rabi season crops. Rabi crops were ground nut (29%), green gram (13%), onion (9%), maize (2%), finger millet (5%) and black gram (1%).

In the homestead gardens of Wardha, a variety of vegetables and fruits were cultivated namely beans, brinjal, papaya, guava, lemon, bitter gourd, custard apple and green chillies. There was very limited cultivation of spinach, tomato, radish, carrot, onion and pumpkin. About 50% of households grew only one type of horticultural crop with only about 11% and 10% respectively reporting 3 and 4 crops. More varieties of crops were cultivated in Koraput in homestead gardens. These were broad beans, tomato, brinjal, onion, green chillies, amaranthus, cauliflower, radish, spine gourd, cabbage, field bean, garlic and papaya. There was limited cultivation of bottle gourd, mustard, spinach and ginger. Several tribal households reported to accessing the forest for wild greens, mushroom and bamboo shoots. However they reported that it was becoming increasingly difficult due to the disappearance of forests. Some households in Koraput had domesticated *'Poi'*, a wild variety of green leafy vegetable in the homestead garden.

Seventy one percent of households in Koraput and 55% in Wardha reported having livestock, mainly milch animals, small ruminants, draught animals and poultry. Landless households also reported rearing of poultry and small ruminants.

Food habits

Rice and Ragi kanji or porridge, were the staple food in Koraput. Ragi porridge was drunk throughout the day and along with the main meal. In Wardha, wheat was the staple cereal followed by rice. Total cereal intake in a day in the form of rice and millets was about 564 grams

in Koraput much higher than Wardha which had a cereal consumption of 323 grams. Millet consumption in Koraput was much lesser than that of rice. In contrast, consumption of pulses in a day was only about 35 grams in Koraput while it was nearly double at 61 grams for Wardha. Green gram was cultivated in Koraput and since it fetched a higher market price than other pulses, it was usually sold off and lentils which were cheaper were bought and consumed. The percentage of households consuming pulse protein, less than 70% of Recommended Dietary Allowance (RDA) stood at a high 75% for Koraput and 41% for Wardha. This could be due to the fact that in Wardha, many dietary preparations require the use of pulses or dhal. The practice of eating *wadi* or small balls made of dhal is common in Maharashtra. Ninety five percent of households in both sites consumed less than 70% of Recommended Dietary Intake (RDI) for green leafy vegetables. With regard to roots and tubers and other vegetables, about 95% of households in Wardha consumed less than 70% of RDI. However it was better in Koraput since only 76% and 77% of households respectively reported to consuming less than 70% of RDI for roots and other vegetables. As mentioned earlier, this could be due to greens collected from forests or river bunds and also harvested in home gardens. Consumption of colocasia leaf is also widely prevalent in Koraput.

Intake of milk and milk products is very low in both sites with about 99% of households consuming less than 70% of RDI. In Wardha milk consumption is limited to tea. However intake of sugar is very high with only 6% of households reporting to consuming less than 70% of RDI. The culture of preparing and drinking tea at household level does not exist in Koraput, so much so that even the milch animals are used as draught animals in ploughing. In some households men solicit tea shops in the morning. Per day consumption of fish is limited to 2.2 grams in Wardha while it is 11 grams in Koraput, where fish are sometimes caught from the fresh streams during monsoon season. Thirty seven percent of households in Wardha reportedly consume less than 70% of RDI for fats and oils while the percentage stands at 86% for Koraput.

While dietary and nutrient intakes are generally inadequate in both sites, nevertheless they pose an interesting contrast when viewed from the caste lens. In Wardha the SCs are doing marginally better than other caste groups with regard to consumption. However in Koraput the SC diets are the most inadequate. This could be due to the fact that Wardha has had a history of SC

mobilization and struggle for entitlements since the 1960s, resulting in higher levels of education and salaried jobs for SCs when compared to other regions in India. In contrast SCs in Koraput are landless and have generally been relegated to the background since all political attention has been centred on the tribals. There is not much difference in the dietary diversity scores across caste groups in Wardha. This is due to the fact that the predominant crop cultivated is cotton and all are dependent on the market for food. However in Koraput dietary diversity scores are highest for the OBCs who have more resources, particularly the *Mali* community who are known for their prowess in vegetable cultivation. The *Bhumias* who are the highest in the social order among tribal community also fare better than other groups. (Mitra and Rao, 2017).

With regard to sources of food, in Wardha 76% reported to procuring rice and wheat from the market, while 24% obtained it from the PDS. This was due to the fact that the primary agricultural crop was cotton and there was dependence on the market for food. In Koraput, 43% each utilized home grown rice and that distributed through the PDS, while 14% were market dependent. There was a heavy dependency on the market for Ragi, which was a staple cereal in Koraput. Only 30% consumed home grown Ragi, while 70% bought it from the market.

Nutritional Status

Nutritional status assessment consisted of anthropometry (height and weight) and was carried out for all household members. Biochemical analysis for anaemia and Vitamin A deficiency through blood sample was carried out on a sub sample of 300 households consisting of either children between one to five years or adolescent boys or girls in the age group of 12 – 17 years. Practically every household had an undernourished individual and undernutrition was across board and not confined to any specific age group. However the percentage of undernourished individuals varied across age groups especially with reference to the type of deficiency.

A higher proportion of women over men had chronic energy deficiency (BMI <18.5). The high levels of undernutrition and anaemia among children is commensurate with what is reported from the rest of India. While in adults the causal factor for undernutrition is the lack of access to food or sanitary facilities as in the case for women, in young children, feeding difficulties also add to the problem. Feeding is essentially a female activity undertaken by adult women usually the mothers. It is a skilled activity requiring time and patience. Women bear the triple burden of

homemaking, engaging in the farm and childcare. During harvest and planting seasons when women's role in agriculture is very critical, child feeding has a huge setback. Among adolescents undernutrition levels declined for girls especially in Koraput as compared to Wardha. The possible reasons for this could be that there is high value placed on girls' and womens' labour in Koraput, greater access to ecosystem resources and services controlled by women and low access to education and returns for boys (Mitra and Nithya, 2017). While there is improvement in the nutritional status of older cohort of boys and girls in Koraput this is not the case in Wardha for which there is no ready explanation.

Table 6. **Prevalence (%) of under-nutrition among children, adolescents and adults**

Age group	Status	Wardha	Koraput
Children (1 to 5 yrs)	Underweight	41	45
	Stunting	36	35
	Wasting	28	27
	Anemia	74	65
	VAD	34	33
School going (5 to 9 yrs)	Undernutrition	33	42
Adolescent boys (10 to 17 yrs)	Undernutrition	70	35
Adolescent Girls (10 to 17 yrs)	Undernutrition	39	20
	Anemia[@]	76	62
Adult men (>18 yrs)	CED	39	39
Adult women (>18 yrs)	CED	48	48
	Anemia	78	65

Source: Baseline Survey 2014; CED: Chronic Energy Deficiency
*non pregnant non lactating; @ 12 to 17 years

The prevalence rates of chronic energy deficiency, underweight, stunting and wasting were calculated based on the cut off limits given by World Health Organization standards. In the study locations, 41% and 45% of children in Wardha and Koraput respectively under age five reported underweight (low weight for age), 35 to 35% stunted (low height for age) and about 27-28 % wasted (low weight for height). Further, about 33% and 42% of school-age children (5-9 years) and about 70% and 35% of adolescent boys in Wardha and Koraput respectively were undernourished. Adolescent girls were better when compared with boys in both locations. Also the percentage of women (48%) with CED (BMI<18.5) was found higher than the men (39%).

The biochemical analysis indicated that about 74% and 65% of children under age five and around 76 % and 62% of girls in the age groups of 12-17 years were reported to be anaemic in

Wardha and Koraput respectively. The percentage of non-pregnant non-lactating women having anaemia was 78% and 65%. It was also found that about 33-34% of children under age five were having vitamin A deficiency (VAD) in both locations.

A detailed paper on the socio-demographic, agriculture practices and food consumption pattern is available (Bhaskar et al., 2017 and Nithya et al., 2018.)

IV Implementation and Observations

The CHF project for adult nutrition literacy had already been implemented in three of the seven sites in Koraput, namely Atalguda, Banuaguda and Bhejaguda between 2013 to 2015. Some of the CHFs who had been earlier selected for the residential training continued to participate in the FSN study also. Hence in these villages it was a continuum of the previous experience. When the FSN study started its operations in 2014, several of the CHFs started involving themselves in the study and supported the FSN staff in providing interface with the community (Narayanan et al, 2015). While the time frame of the FSN study was between 2014 and 2018 and nutrition awareness activities undertaken, the nutrition literacy project was implemented only for a year between 2016 and 2017, probably because the initial focus was on research rather than literacy. In both the sites the project coordinators were in overall charge of the literacy component while in Wardha a nutritionist in the team was directly in charge of implementation.

Individual activities for nutrition education

Between 2014 and 2017, a number of individual educational activities related to nutrition, health, hygiene were carried out by the staff on their own initiative at both sites (Annexures 1 and 2). They targeted adult women, pregnant and lactating mothers, adolescent girls and school children. In Wardha, the number and range of activities were more probably due to the presence of a nutritionist dedicated especially for nutrition education, who remained till the end of the study, unlike Koraput where the nutritionist left midway. The activities ranged from celebration of nutrition week, special days such as World Food Day, Wash Day, Vaccination Day, World Toilet Day, etc at the community level. Meetings were held with village women during rainy and winter seasons for planning ‘homestead nutri-garden’. Awareness meetings on anaemia were

held with adolescent girls. There were recipe demonstrations using cassava and radish leaves, drawing competition for school children, pulses exhibition cum competition for adolescent girls, discussion with the community on nutritional status assessment, distribution of nail cutters to school children, development of a nutrition calendar from the work of school children, skit on nutritional concepts by school children and exposure visits to see vegetable cultivation. In Koraput the activities involved discussion with women, adolescent girls and school children about anaemia, programmes for school children about the importance and role of Vitamin A in the diet, meetings with mothers regarding diets of young children, celebration of vaccination day and farmer's day and exposure visit to see cultivation of pigeon pea.

In addition, community based endeavours were facilitated by the FSN study to enable people to share information and learn from each other, for sustainability of the material and technical inputs provided by the project and to create an institutional base for food security. These were community nutrition gardens and community seed banks in Wardha, school nutrition gardens in both locations and poultry and fish farming.

The CHF Project

The CHF initiative for adult nutrition literacy began with a three day workshop for the staff between the 25th and 27th of May 2016. The purpose of this workshop was to help the staff reflect on the learning derived from the individual educational activities and to orient them to the concept and philosophy behind the CHF project and its operationalization. This was followed by the staff members discussing the project with the community, community selection of CHFs, residential training, follow up, identification of further training and implementation, monitoring workshop for the staff, internal and external evaluation. The various steps are summarized in Figure 2.

Staff orientation

The individual educational activities conducted by the staff were discussed and analysed. The following pointers emerged:

- The activities helped build awareness about balanced diet, nutritional deficiencies and role of food production for nutrition security.

- However the target population such as adolescent girls, school children and pregnant and lactating mothers were not the primary decision makers at the household level in aspects related to food production and consumption. The participants have to be from all levels of the adult community (ie) adult men / women who are heads of households involved in decision making as well as PRI members, SHG leaders and so on.
- The content of a theme should cover all aspects of the subject such as biological, physiological, dietary, social, religious, cultural and economics, for example a topic on anaemia should include dietary aspects, personal hygiene, worm infestation, environmental cleanliness, physiological condition, social situation, opportunities for overcoming etc.
- Training materials have to be customized for the participants (e.g.) for PRI members, the capacity building should include discussion about various schemes/programmes and their implementation.
- Agricultural intervention under the FSN study should be linked to nutrition awareness programme and both should not be implemented in silos.
- Feedback of a training programme or any other activity at the community level is necessary to understand its impact.
- Celebration of 'important days' set by national and international agencies did not have much relevance for the community. Celebrations based on their local calendar would help reinforce the nutrition concepts in a better way.
- Some of the topics such as vaccination though relevant to nutritional well being and outcomes, were not linked to agriculture and food production.

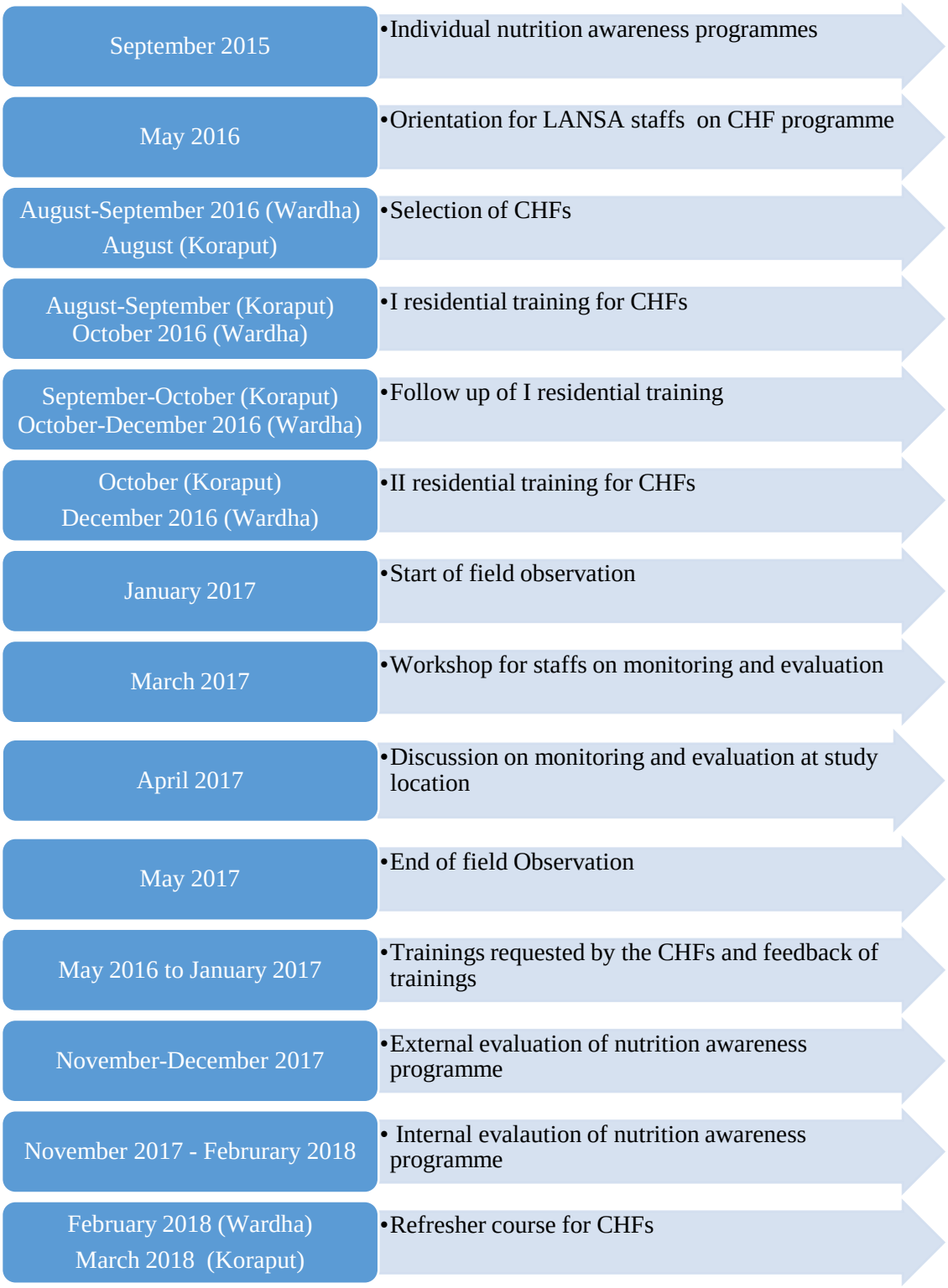

Figure 2. Steps in implementation

Following the above reflection the purpose of the workshop was explained. It was to deliberate on how the capacity of a community could be built through nutrition literacy such that it would be sustainable. While the focus of the FSN study was on building the technical capability for food production, that of CHF was one of human resource development for nutrition using principles of adult literacy. The staff expectations from the workshop were

a) How to link nutrition and agriculture?
b) Nutrition knowledge for self.
c) Awareness generation (target groups, materials and method)
d) How to work as a team?
e) Understanding Participatory approach
f) Government entitlements

Except for the second and last item which was to be taken up in a later workshop, the first five issues were addressed through a series of exercises that involved group work, presentations and reading and discussion of case studies. It was also emphasized that most of these involved a continuous process of learning and could not be confined to one workshop. The highlights of the outcome were:

1) Participatory research meant that the study was implemented jointly by the researchers and the community, with the latter having control and say over the activities planned.
2) While tangible material inputs such as money, seeds, fertilizers were well recognized the intangible gains such as change in attitudes and perceptions, gaining control over one's own life etc were less easily understood. It was important to make the intangible, tangible, to enable the community to understand the concept of empowerment.
3) Hence establishing a relationship with the community such that the staff are seen as partners by the community is essential. The traditional method of research wherein the implementors have the control and the community remained as 'consumers' was to be reversed. It would be useful to work with ASHA / anganwadi workers who were involved on a daily basis with the community.
4) In implementing the FSN study, the agriculture and nutrition inputs remained as standalone items with not much linkage with each other. The inter relationship of both had to be experienced by both the staff and the community members.

5) The CHF concept would be discussed with the community, who would select the participants for the residential training. There would be two residential trainings – the first would deal with nutritional concepts and the social, cultural and economic constraints to achieving nutrition security. It would take a holistic approach.
6) The second would focus on linking nutrition with agriculture and Government entitlements for nutrition and agriculture.
7) The focus of the research was both on food production and consumption. Both teams had a fair understanding of the food habits of the people and the social, cultural and economic determinants of the same. Both sites had a predominance of cereal consumption, yet the outcomes in undernutrition were due to differences in consumption patterns.
8) In Koraput though cereal consumption was higher than RDA, undernutrition could still be due to heavy manual labour. Intake of all other food groups showed a deficit. The approach proposed by the staff was to focus on improving ragi production, enhancing kitchen garden to address hidden hunger, and promote pisciculture. In Wardha, the intake of sugar was high while there was a deficit in meeting the RDA requirements for cereal. Intake of other nutrients was well below the RDA. The approach adopted was to help in cultivating food crops for consumption, especially to address hidden hunger and supporting landless households with poultry rearing.
9) The concept of community was extended beyond to include institutions such as schools and anganwadis.
10) While both teams had the technical expertise in improving production strategies they did not have the required expertise in managing other challenges such as crop destruction by animals, cyclones / natural disasters and mainstreaming gender.
11) The CHF methodology involved a continuous process of capacity building of the community to move towards nutrition security. It also required continuous monitoring, follow up and documentation. Both the staff and the community had to go through a process of action and reflection to evaluate and become aware of how they are moving towards the goal of nutrition security.
12) Since no separate developmental staff had been recruited for the literacy project, atleast one staff member was to be assigned for follow up and further action.

The idea of a developmental intervention wherein you work in partnership with the community building their capacities through an 'action reflection' process was not familiar to the Wardha team who had experience of working with communities through hired community personnel who supported the staff in carrying out project objectives. In addition to lack of experience, there was both disbelief and skepticism towards the CHF approach. This influenced implementation at every stage. In the Odisha team, the coordinator was familiar with the concept and operational aspects of the literacy project since the CHF programme had been implemented earlier in Odisha.

Selection of CHFs[1]

Both teams visited the villages several times between August to September 2016. They met with a number of people such as village men and women, Sarpanch, PRI members, government functionaries such as ASHA and anganwadi workers and discussed the adult literacy project and the initial selection of CHFs for the residential training. Once the villagers expressed their willingness to participate in the project, a meeting was convened in each village for the initial selection of five CHFs by the community. At the start of the meeting, a presentation on the nutritional status of the village, food consumption pattern, existing agricultural practices, interventions in progress, linkage between agriculture and nutrition and the purpose of the CHF project was explained.

In Wardha, less than 50% of all households attended the selection meeting in any village. The maximum participation at 48% and 47% was at Saheli and Heti respectively. Inspite of Borgoan Gondi being the largest among the FSN villages with 174 households, only 17% of households was represented. In general, participation of women was much lesser than that of men except for Heti. Only 3% of the total women's population in Borgaon Gondi attended the meeting while it was 27% in Heti. With regard to caste representation, In Saheli where the general category was in majority about 50% of the households belonging to this group as well as 50% of ST households which were next in numerical strength attended the meeting with only 2 households each of SC and OBC caste being present. In Vitpur one third of SC households and one fourth

[1] *full report available at* *http://lansasouthasia.org/content/community-nutrition-awareness-program-under-farming-system-nutrition*

each of ST and general category attended the meeting. In Susund the presence of OBCs who formed the major caste group was much higher, though one fourth of the ST and a couple of SC households were also represented. In Heti, where there were nearly equal number of households belonging to SC and general category, a majority of the former and about one third of the latter attended along with the three ST households. In Borgaon Gondi all attendee households belonged to ST who formed the majority. Except for the latter village, in all others there was representation of almost all caste groups among the selected CHFs.

However, subsequent to the community selection, another round of selection was done by MSSRF for various reasons. In Saheli one of the selected persons belonging to the OBC caste did not want to continue since the majority of households in his village belonged to the general category. In Vitpur, of the six selected candidates, three were dropped by MSSRF staff as they were considered redundant since there were only 71 households. In Susund and Heti, only one and two respectively wanted to participate in the residential training. In Borgaon Gondi only one of the selected persons was approved and finalized by MSSRF since the other was considered unsuitable being recently married and new to the village. Following this, in each village the staff consulted some villagers who were considered progressive to identify other candidates in the place of those who were dropped. A profile of the candidates finally identified through both types of selection and who attended the first residential training is presented in Table 7.

Table 7. Profile of selected CHFs in Wardha

Villages	Men	Women	Total	Age (yrs)	Caste	Literacy		
						Class 10	Class 12	College
Saheli	2	2	**4**	19, 23, 24, 33	SBC - 4		2	2
Vitpur	1	2	**3**	18, 28, 37	ST -2, SC – 1	1		1
Susund	1	2	**3**	25, 27	ST -1 OBC - 1	1	1	1
Heti	1	1	**2***	21, 25	SC – 2			1
Borgaon Gondi	2	2	**4**	19, 20, 21, 28	ST –4		4	
Total	**7**	**8**	**15**		**SBC – 4 ST – 7 SC – 3 OBC – 1**	**2**	**7**	**5**

**one person held a diploma in agriculture*

The low representation of households in selection meetings and control of the selection process by the implementers implied a weak relationship between the implementers and the participating communities and a lack of ownership over the project by the community. In some villages there was monetary expectation by the selected resource persons which got reinforced after the interviews at MSSRF office. Fifteen CHFs over an expected 25 had been selected. There were eight women and seven men. They were young, educated and some of them were married with young children or with aspirations for white collared jobs and an urban life style. One of the women CHFs had earlier worked as a sales girl and as a telephone operator and had dropped out after having a child. Another had served as a helper in an anganwadi for about six months and a male CHF had been engaged as a labourer with the forest department. The rest were awaiting opportunities. Except for two CHFs, the rest were in their twenties and did not enjoy much social standing. While ten out of fifteen CHFs belonged to the marginalized communities, at the individual village level the caste representation was skewed atleast in two villages with all CHFS belonging to one caste group. All belonged to landed households. While one CHF belonged to a household having 10 acres, the families of nine households owned between 4 and 5 acres of land. The rest had about 2 to 2.5 acres.

In Koraput except for Kurkuti, more than 50% of households were represented in village meetings, held in the evenings to enable everyone to attend. Maliguda and Rauliguda had the highest representation with more than 60% households attending the meeting followed by Bhejaguda at 58%. Women's participation was comparatively lower than that of men probably because the selection was done during the planting season when women were busy in the field during the day and with household work in the evenings. In all villages about 25% of the total male population attended the meeting, except for Maliguda where it was 37%. Only about 12% of women attended. Notwithstanding this, among the selected CHFs except for Atalguda where all those selected were males, there were equal number of male and female CHFs in four villages namely Bhejaguda, Banuaguda, Chikima and Kurkuti. In Rauliguda and Maliguda the ratio of male to female was 1: 2. With regard to caste representation, in four villages the OBC caste was predominant. While in Atalguda all households belonged to this caste group, in Chikima, Kurkuti and Maliguda they were in a majority. In contrast, in the other three villages namely Bhejaguda, Banuaguda and Rauliguda the ST households were in a majority. There were only a handful of

SC households in five villages, while they formed 24% and 21% respectively in Bhejaguda and Kurkuti. Hence it was no surprise when all the selected CHFs in three villages namely Atalguda, Maliguda and Chikima were from the OBC caste. In Bhejaguda and Banuaguda there were equal numbers of OBCs and STs among the selected candidates. There was a lone SC candidate in Kurkuti village.

In Kurkuti, during the selection process some members demanded monetary benefit to the selected CHFs, wherein other members said it was not needed since capacity building did not require financial compensation. It was suggested that in case the trained persons organized some programme at the village level financial compensation to cover the event could be provided. The villagers were of the view that as far as possible educated persons who were also willing to share their experiences had to be selected. The number and profile of the selected CHFs is presented in Table 8.

Table 8. Profile of selected CHFs in Koraput

Villages	Men	Women	Total	Age (yrs)	Caste	Literacy		
						Non literate	Primary or less	Middle/High school
Atalguda*	3	-	**3**	19, 32, 35	All OBC	1	1	1
Bhejaguda	2	2	**4**	33,34,48,45	ST – 2 SC-2	2	1	1
Banuaguda	2	2	**4**	25,29,39,48	ST – 2 SC - 2	2	1	1
Chikima	2	2	**4**	38,42,45,48	All OBC	4	-	-
Kurkuti	2	2	**4**	28,31,35,36	ST – 2 OBC - 2	2	2	-
Maliguda	1	2	**3**	25,32,48	All OBC	2	-	1
Rauliguda	1	2	**3**	40 – 2 48 - 1	ST - 3	2	-	1
Total	**13**	**12**	**25**		**OBC -12 ST – 9 SC - 4**	**15**	**5**	**5**

**though four CHFs had been selected only three attended the residential training*

In Koraput the selection of CHFs was done entirely by the community. Since three villages were already familiar with the approach of the programme and the Project co-ordinator also had some experience in implementing the same in the earlier project, the process went smoothly, so much

so that even in one village where a demand for remuneration for the CHFs arose, the community perceived it as an empowerment programme for itself and rejected the idea. Five of the selected CHFs namely Sania Hantal and Baghbati Majhi of Atalguda, Kamala Pujari of Bhejaguda and Ghasa Dolai and Damuru Paroja of Banuaguda had earlier also participated in the CHF project. Though none of the villages had selected five persons, four villages had selected four members. Proportion of men and women were equal in the overall selection. The OBC caste had a greater representation followed by the ST groups. About one sixth of the CHFs belonged to the SC category. A majority of the CHFs were older, in their thirties or forties with social standing. Of the 25, five members had been selected as CHFs earlier also. All the women were active members of SHGs. Three were engaged in government programmes, two as cooks in the school meal scheme and the other as ASHA worker. Two were PRI members. Two were members in peoples' institutions such as farmer's club and the *Vana Samrakshana Samithi* or Forest Protection Committee.

A majority of the CHFs (60%) were non literates and the rest had undergone schooling upto either primary or middle school level. Only one CHF was a high school dropout. All belonged to land holding households. However 44% were marginal farmers, 28% small farmers and the rest had more than 4 acres but less than 6 acres of land. There are three types of land in Koraput - upland, medium land and low land. Except for 6 CHFs who had only one type of land, the rest belonged to households that had either two or three types of land.
Profile of individual CHFs is provided in Annexures 3 and 4.

I Residential Training[2]

The first residential training for Wardha CHFs was held for three days from 7th to 9th October 2016 and for the Koraput CHFs from 31st August to 2nd September 2016. The objectives of the capacity building exercise was to help the CHFs reflect on their daily diets to see if they were consuming a balanced meal, discuss food requirement during key life cycle period, understand the social influences of food intake, identify all food sources such as forest, entitlements and opportunities for augmenting food supply and working out a balanced meal for the entire family across seasons. Participants first listed their expectations summarized in Table 9.

[2] http://lansasouthasia.org/content/community-nutrition-awareness-program-under-farming-system-nutrition

Table 9. Expectations of participants from the workshop

Wardha	Koraput
Nutrition, diet and addressing undernutrition	Nutritious food and nutritional status
How to link agriculture and nutrition	Agricultural production and improved technologies
How to get good agricultural production? (especially pest management)	Interaction with others and peer learning
	Diets of children and their care

Participants were assured that the topics they wanted to discuss and the questions they had raised would be covered over two workshops. In listing their expectations, participants exhibited a desire to learn more about diet, health and nutrition. The five CHFs from Koraput who had participated in the earlier literacy project and had benefitted from the peer group interaction looked forward to the experience in this programme also. They were requested to share their views and experiences of the project with the rest of the group. They spoke about personal gains and how the messages spread by the CHFs helped influence the dietary habits of the community. Some of the women CHFs showed an interest in child feeding.

Participants were divided into groups and given pictures of food groups. Each group was required to identify the foods that they ate everyday, once or twice a week or occasionally as in once a month. This was followed by a discussion on what constituted a balanced diet and requirement versus actual intake.

Koraput

Wardha

Figure 3. Group work on identifying foods that they consume

In both sites, the participants identified that the daily diet was predominantly cereal based and practically only two or three food groups were consumed daily, cereals and vegetables in Koraput and cereals, dhal and vegetables in Wardha. While dietary diversity was low, its manifestations were different in both sites.

1. In Wardha, food was cooked only once a day (rice, roti, dhal and vegetables) and was distributed and eaten throughout the day. In Koraput, ragi gruel was consumed every day. However the dilution was high.
2. While dhal was eaten every day in Wardha, in Koraput the frequency of intake was 2 or 3 times a week.
3. In Wardha drinking water before breakfast was a practice and this was also recommended for Koraput, since it activates digestion.
4. Fruits were lacking in the diets.
5. In Koraput refined oil was being consumed and it was well below the recommended dietary allowance (RDI).
6. Some of the foods listed as being frequently consumed by one group were reported as being consumed occasionally by another group indicating variations in food intake across households.
7. There were seasonal variations in food consumption and dietary diversity based on availability of food.

Some ways of improving the existing dietary patterns were discussed

- Drinking a glass of water before breakfast was good for digestion
- Dietary diversity is important as each food group had varied nutrients and they played a synergistic role with each other.
- Atleast 4 to 5 food groups needed to be present in the daily diet.
- The nutritive value of ragi gruel could be enhanced by adding other foods.
- Fermented and sprouted foods as well as well as whole grains were rich in vitamins.
- Consumption of oil obtained directly from the mill over refined oil was healthier.
- When compared to dhal animal sources of protein had a higher bioavailability. For vegetarians mushroom was an excellent source of protein.
- Consumption of drumstick leaves atleast twice a week was good for blood.

- In Koraput where there was a practice of accessing forests for small animals the question was raised if they could include crabs and fruits more often than now. Since several households had a home garden whether a mango tree could be grown in the backyard to provide fruits during summer.

A pictorial booklet showing energy giving foods, body building foods and protective foods was distributed and discussed (Narayanan and Nayak, 2015). Based on the above inputs participants were requested to come up with a balanced meal for a household for a whole day for each season. The framework developed by the participants for bringing in dietary diversity in the everyday diet across seasons is presented in Tables 10 and 11.

Following were the highlights of the discussion on the framework presented by Wardha CHFs.

- Spacing between meals was at three hourly interval. After breakfast, two lunches were eaten (one at 11 am and another at 2 pm). However there was a huge time lag between the second lunch and dinner with a six hourly time gap.
- It was suggested that lunch could be pushed by an hour from 11 am to 12 noon since a four hourly gap between meals is ideal. Similarly instead of another lunch at 4 pm, a nutritious snack could be thought of. Dinner could be at 8 or 8.30 pm.
- While the menu of all the main meals were more or less the same (ie) rice, roti, dhal and vegetable, the variations came in the form of vegetables. To relieve monotony one meal could have rice and the other roti.
- An attempt had been made to bring in locally available wild and common fruits
- Participants said that they could not afford foods of animal origin very often owing to the cost. It was suggested that eggs could be consumed more frequently.

The discussion on the dietary framework presented by the Koraput CHFs were as follows :

- **Summer** – meal pattern had not changed but the quality of the diet had changed. The plain rice gruel or *ambila* was enhanced with dhal/other vegetable/green leafy vegetable. Use of biscuit and bread was suggested to be kept to a minimum since they were usually made from refined wheat flour. However bread could be eaten along with cucumber or

tomato to enhance nutritive value. A twenty minute gap was needed between drinking tea and consuming other food.

- **Rainy –** Breakfast was not sufficient to get adequate energy. Work load was very high during rainy season and the gap between lunch and dinner was very large. A snack could be had inbetween which could be ragi gruel or *ambila* or banana. The diet plan included four food groups in a day.
- **Winter –** On Mondays and Thursdays non vegetarian food and ambila was not consumed. Dhal could be substituted. Availability of vegetables was much higher and they needed to be spaced out between meals.
- In general the framework consisted of cultivated as well as wild foods such as mushroom, crab and small fish available in local ponds.

Exploring social influences and value systems

Role play was used to understand real life situation and social values that influenced food intake. In Koraput, the participants enacted a role play on the puberty ritual of an adolescent girl and the dietary regimen followed immediately after puberty. The role play depicted how the family disposed off the land to meet out the expenses incurred for the celebrations. The adolescent girl was given only rice and jaggery to eat.

Figure 4. Role play in Koraput

Table 10. Suggested dietary pattern across seasons by Wardha CHFs

Meal Pattern	Meal Time	Summer	Winter	Rainy
Morning	7.00 am	1 glass of water	Milk/tea with biscuit, bread, custard apple	Milk/ Tea
Breakfast	8.00am	Sprouts (*usal*)	Sprouted pulses	*Poha*, Sprouted
Lunch	11.00am	Chapati, Rice, any one Dal red gram/green gram/Bengal gram, leafy vegetables i.e. Spinach, fenugreek, *gol*, coriander and lemon, onion, mango.	Chapatti, Rice, Red gram dal, cauliflower *sabji*, onion, cucumber, carrot, radish tomato, beetroot, lemon	Chapati, Rice, Dal red gram, Bitter gourd *sabji*, Cassia tora *sabji*, onion, cucumber, lemon
Lunch	2.00pm	Same	Same as above plus tender red gram chutney	Same
Dinner	8.30pm	Chapati, Rice, Green gram dal, cauliflower *sabji*, onion, mango	Chapati, Rice, mix dal, potato sabji, butter milk	Chapati, Rice, Green gram dal, cow pea, Spine gourd, cucumber, onion
		Wild fruits - Jamun, *Tembhur, charoli*, marking nuts (*Semecarpus anacardium*) flower	fruits after dinner - orange, guava, ber	Fruits - jamun, orange, guava

Table 11. Suggested dietary pattern across seasons by Koraput CHFs

Time	Group I (Summer Season)	Time	Group II (Rainy Season)	Time	Group III (Winter Season)
Early morning (6 a.m to 7 a.m)	Tea with milk powder and Biscuit /Boda (wheat flour with jaggery)/ pakudi (besan with onion, green chili)	4 to 5.00 a.m	Tea with milk powder, ginger and Biscuit/ Boda (wheat flour with jaggery) / pakudi (besan with onion, green chili)	7 to 8 a.m	Tea with milk powder Boda (Wheat Flour with Jaggery) /Pakudi (besan with onion, green chili)/bread/roti
(mid morning) (10a.m to 11a.m)	Ragi gruel or *Ambila* (Rice gruel made with tamarind and spices: to this any pulses, green leaves vegetables like Drumstick leaves / Amaranthus/ Pumpkin Leaves/ Cauliflower leaves / Radish Leaves/ Bahunia Purpuria, Jack fruit, Tamarind, Ginger, Garlic, Green/Dry chilli), 4. Fry (Ivy gourd, Potatoes, Brinjal)	10a.m Brunch (Breakfast +Lunch)	*Ambila* (Rice gruel made with tamarind and spices: pulses like Lentil/Horse gram/ Cow pea/ Pigeon pea/ green gram) and bamboo shoot/kanda (tubers) with Rice and green vegetables Ragi gruel and dal (masur/mung)	10 to 12 noon	Rice with dal, leafy vegetable/ *Ambila* with cauliflower, beans, potato and ragi gruel
Lunch (2p.m to 3p.m)	Ragi gruel /*Ambila* with Ripe/Green Mango chutney			2 to 4 pm	*Ambila*, bhaji (taken mostly in field)
Evening (4 p.m to 5p.m)	Cucumber/Water melon	5.00 pm	Tea with biscuit/pakodi	5 pm	Guava, Ripe Papaya, Custard Apple
Dinner (8p.m to 9p.m)	Rice with Dal, Curry (tomato, onion, potato, cashew)/ Occasionally Non veg curry (prawn/fish)	Dinner 8.00 pm	Rice, dal, Vegetable curry (potato, brinjal) /wild Mushroom/ crab/ small fish/Egg	8.00 pm	Rice, dal, Curry (tomato, onion, potato, cabbage , cauliflower)/Weekly Nonveg Curry (Dry prawn/ fish/Egg/ crab/ chicken/ wild bird (*Ghunduri*))

A detailed discussion was held on the implications of the actions for the health and well being of adolescent girls in general and for the society in particular. The first menarche could be a difficult experience for a girl and helping her to manage the same in a hygienic way was very important. While a joyous celebration was welcome, it should not leave the family in debt such that the girl child is not thought of as a burden. The expenses should be within affordable limits. Participants were reminded of the high levels of anaemia among adolescent girls in the villages of the participants and suggested that the girls needed to be provided with citrus fruits, green leafy vegetables and pulses or eggs to enhance the haemoglobin levels. Dietary prescriptions evolved based on the social conditions that existed at that time. When the context and relevant changed, many of them may become redundant. Hence revisiting many of these customs in accordance with the current social scenario, the health and nutritional status and making appropriate modifications was needed.

In Wardha, a role play was enacted to depict how adult men and women observed religious fasting and the implications it had for their nutritional status. The play depicted the adult male and head of household undertaking a fast and being served with food when he broke the fast. When he suddenly invited some guests to dine, his wife who had observed a complete fast gave up her share of food and chose not to break the fast. In the discussion the participants observed that there were different types of fasts – ‘total fast’ in which not a morsel of food is eaten, ‘partial fast’ in which liquids may be drunk or a light snack eaten. In the latter it was possible to maintain energy levels and electrolyte balance through choosing the drinks wisely. A traditional drink prepared with a local herb and medicinal leaf was good as a herbal supplement but other liquids such as coconut water and buttermilk could be consumed to maintain one’s energy. In the case of the former cutting down on activity level could help sustain energy. The gender dimension wherein women give up their share of food for the sake of a guest was also noticed by the participants. Some participants argued that there was always enough rice or rotis for everyone even if an unexpected guest arrived. It was reasoned that while the staple foods were available it was usually the vegetables rich in micronutrients or dhals rich in protein got fully consumed leaving very little or nothing for the woman who ate last.

Pictorial material on infant feeding (Narayanan and Nayak, 2015) was distributed and the dietary requirement as well as feeding challenges from birth to two years was discussed. At the end of the workshop both groups of participants undertook some resolutions which were

- Will try to eat a balanced diet every day
- All family members, men, women and children will eat together
- Puberty celebrations would be commensurate with one's ability to spend without getting into debt
- To feed the adolescent girl with wholesome healthy meals
- To include sprouts, wild fruits and leafy vegetables, wild vegetables such as *Cassia tora, Kunjar,* hibiscus and amaranthus.

II Residential Training[3]

After the first residential training, the CHFs were followed up to understand how far they could utilize the training in their daily lives. The second residential training on linking nutrition with agriculture was held for one day in October 2016 in Odisha, since it was the planting season, while in Wardha it was held for two days in December 2016. Of the 15 CHFS who attended the first residential training in Wardha only 8 could attend the second capacity building exercise, since the rest could not come for personal reasons. Four new participants from the community replaced the ones who could not attend. This works to about 2 CHFS from each village suggesting a low level of participation. In Koraput, 17 of the original CHFs attended the training while 6 new participants joined them. This works out to about 3 CHFs from each village indicative of average level of information. However it also signified that more members from the community started participating in the programme.

The objectives of the workshop were to facilitate CHFs to share their experiences on what they had done between the first workshop and till then, to help them undertake crop planning for the entire year balancing household expenses and nutritional needs, to orient them to some key Government entitlements and identify further training needs to move towards nutrition security. Participants were asked if the previous training had been useful and were requested to share their experiences after going home. Some of the CHFs in Koraput said that they had started making

[3] http://lansasouthasia.org/content/community-nutrition-awareness-program-under-farming-system-nutrition

thick Ragi porridge to increase the bulk. A few said that they were consciously trying to introduce four food groups in their diets atleast four times in a week, especially pulses and green leafy vegetables. They had also shared about the importance of having a balanced meal especially for pregnant and lactating women and children with friends, family and neigbours. In Wardha two CHFs reported that they started eating three meals a day so much so that one CHF who had been underweight had put on 3 kgs. Observations of the actions of CHF some changes in their diets and the other at the level of their community.

Participants were divided into groups and each group was allotted a certain type of land and was required to do the agricultural planning at two levels: First – to plan the various crops that they would cultivate across seasons to meet the nutritional and economic need of the household.
Second – to quantify the yield and check if it would be sufficient to meet the entire nutritional needs of a household with 5 members for a whole year.

In Wardha, each group was assigned a particular soil type namely black soil, medium red soil and sandy /rocky soil. One group was requested to plan for a kitchen garden such that vegetables and fruits could be grown throughout the year. Each group was also requested to visualize two possible scenarios, one rain fed and the other irrigated. In Koraput, groups were divided according to type of land. One group having three types of land such as upland, medium land and low land, one group having upland and low land another having medium land and low land, and yet another kitchen garden. In both sites a ceiling of half an acre to one acre was given to each of the groups. Participants were requested to draw and map the crops on the floor.

Wardha

Koraput

Figure 5. Participants drawing diversified crops that can be grown in field

The agricultural planning and crops decided to be grown by the participants according to season and type of land for Wardha and Koraput are presented in Tables 12 and 13.

In Wardha, in the available land food crops, fodder and cash crops were grown. Poultry and goat rearing could also be planned. Irrigated lands were depicted as having dug wells. Among food crops, besides cereals and pulses, a small space was earmarked for vegetables also. The broad conclusions reached by the participants was that it was possible to cultivate 4 – 5 types of food groups in any type of land and fruits and vegetables from kitchen garden throughout the year. About 20, 25 and 19 types of food crops could be grown in black soil, medium red soil and sandy soil. The number and varieties of crops was much higher for black soil. Among cereals besides wheat some groups had brought in jowar which had practically disappeared from cultivation and sorghum. All three types of vegetables could be grown.

In the discussion that ensued, some group members were of the view that beetroot and carrot could not be grown in red soil. This was discussed in depth by all participants and it was concluded that it was possible to do so if appropriate agricultural practices were followed. Similarly it was agreed that 4 types of food groups could be cultivated with or without irrigation. Oil seeds could also be grown since they were rich in proteins and calories as well as being cash crops. However threat by animals to plants was a huge problem which to some extent could be mitigated with planting insect repelling plants.

In Koraput, upland supported a wide diversity of crops during the kharif season while it was kept fallow during rabi season. Six varieties of cereals could be grown namely paddy, maize, little millet, fox tail millet, sorghum and ragi. Horse gram was the choice pulse. In lowland, along with paddy, fish and crab could be reared during kharif season. The rabi crops were pulses such as green gram, black gram, red gram and Bengal gram. In middle land the kharif crops were cereals such as paddy, ragi, little millet, maize and pulses such as black gram. Radish could be grown on the bund. A variety of crops could be grown during the rabi season, such as pumpkin, tomato, chillies, amaranthus, cauliflower, ladies finger, beans and egg plan. The participants concluded that with a landholding of half an acre of each type of land it was possible to grow 6

food groups whereas 5 food groups could be obtained from any 2 types of land of less than half an acre each.

In the above exercise, participants had opportunities to plan and discuss with other fellow cultivators about decisions regarding the various crop varieties that could possibly be cultivated. Women also had opportunities to voice their views especially with regard to food crops. Having established the possibility that dietary diversity could be achieved, the groups were requested to quantify the likely yield of all the crops from one acre of land to estimate how far they could meet the annual food requirement of a household with 5 members after selling in the market.

Participants were once again divided into groups and were given the annual food requirement of various food groups such as cereals, pulses, vegetables and animal food for a family of five with three adults and two children (Annexure 5). The quantitative yield of various food crops for Wardha and Koraput are given in annexures 6 and 7.

Annual production of cereals from black, red and sandy soil was estimated to be 725, 200 and 100 kgs respectively. The annual household consumption was estimated to be between 400 – 500 kgs respectively. Thus except for black soil, which could support household need as well as leave a surplus for sale, one acre of other types of soil could not meet the annual requirement of an entire household. About 5 acres of land was needed to meet annual household requirement without having to buy. Some members argued that even for black soil the reported production was too high and it was not possible to get such a yield. MSSRF staff held the view that with proper planning and adoption of appropriate package of practices such yield was possible. With regard to pulses, much of the estimated production was sold and the quantity reported as being retained for consumption would not meet the RDA for the whole family for an entire year. What was reported as consumed was less than the requirement. Soybean though produced was not consumed due to its taste but was sold in the market to purchase other foods. As far as vegetables were concerned, especially green leafy and other vegetables, only about two weeks' worth of vegetables could be stored since there were perishables and the rest had to be sold.

Table 12. Agricultural planning according to land type and season by CHFs of Wardha

Rainfed	Irrigated	Food groups *
Black Soil		
• Red gram, Green gram, ladies finger (for home consumption), jowar, soybean, maize, mango, cow pea • Fodder, cotton	• Wheat, red gram, soy bean, orange, sugarcane, pomegranate, Bengal gram, • In a small area – coriander, amaranthus, fenugreek leaves, spinach, brinjal, green chillies,onion, tomato, papaya, guava, mango, drumstick, cow pea • Cotton, dug well	Cereals, pulses, vegetables and fruits
Medium red soil		
Main field : Green gram, Black gram, Soy bean, Red gram, custard apple Cotton	• Main field : green gram, black gram, soy bean, custard apple, ram seethaphal, red gram, beans • In a small area : spinach, fenugreek, coriander, tomato, brinjal,ladies finger, cluster beans, green chillies, cucumber, pumpkin, bottle gourd, amaranthus, gogu, carrot, radish, beetroot, broad bean • Cotton, fodder, dug well	Cereals, pulses and vegetables
Sandy Rocky soil		
Red gram, Sorghum, maize, soy bean Cotton	• Wheat, Bengal gram, fenugreek, tomato, chilli, ladies finger, spinach, beetroot, carrot, radish, cauliflower, cow pea, coriander, cluster bean, lemon, papaya, guave, drumstick, mango amla • Poultry, goat and cow • Vermi compost pit	Cereals, Pulses, Vegetables, Fruits, animal foods
Kitchen garden		
Cow pea, pumpkin, bitter gourd, ladies finger, tomato, green chilli, beans, cluster bean, sweet potato	• Spincah, fenugreek, dil seed, beetroot, radish, carrot, rajgeera, onion, coriander, green chilli, drumstick, amaranthus, lemon, custard apple, curry leaves, guava, agathi, sweet potato	Vegetables and fruits

* crops that can be grown throughout the year

Table 13. Agricultural planning according to land type and season by CHFs of Koraput

Groups	Land Type	Kharif	Rabi
Group 1	Upland	Sesame, Pumpkin, Niger, Horse gram, Red gram (mixed cropping pattern,) maize, little millet, Black gram, Sorghum, Foxtail, ground nut ; On bunds – cow pea, rice bean and cucumber are grown	Keeping fallow
	Middle land		Ragi, little millet, maize followed by vegetable such as, tomato, radish, ladies finger, onion, carrot, ground nut, chilly, egg plant. Fish farming and duck rearing. On the bund fruits like banana, coconut are grown, If there is no water in the land then they are kept fallow
	Low land	Paddy, fish, crab	Green gram, Black gram, groundnut, tomato, bitter gourd, pumpkin, bottle gourd
Group 2	Upland	Sorghum, little millet, black gram, ragi, red gram, foxtail millet	Keeping fallow
	Low land	Paddy, fish pond, crab	Groundnut, green gram, black gram, red gram; If irrigated –vegetables like radish, lady's finger, tomato, cabbage, onion, egg plant, beans
Group 3	Middle land	Paddy, ragi, little millet, maize, black gram, radish on bunds	Pumpkin, tomato, chilli, amaranthus, radish, cauliflower, onion, ladies finger, beans, egg plant
	Low land	Paddy, fish, crab	Groundnut, green gram, black gram, Bengal gram, finger millet, maize, vegetables like pumpkin and radish

Vegetable cultivation had to taken up continuously to ensure supply throughout the year. This was not possible in rainfed lands. If irrigation facilities were available, then food could be grown throughout the year. Similarly fruits also had a shorter shelf life and all the food groups namely pulses, vegetables and fruits could cover about 2 – 3 months in a year. With combination of different types of land, about 6 months' requirement could be taken care of.

In Koraput participants opined that it was possible to meet the annual requirement of cereals and pulses with a landholding of half an acre of all three types of land. However cereals and pulses had to be stored for the whole year and hence post harvest technological means for proper storage was important. Production of vegetables and fruits (from land alone, not from kitchen garden) fell short of requirement but can be bought from the market through the sale of other food produced in excess. The forest also provided small game, fruits and vegetables. Participants of group 2, namely upland and low land felt that the agricultural production did not support household requirement throughout the year for any food group. Hence food had to be accessed from other sources such as the Public Distribution System (PDS), purchase from the market, from the forest through backyard poultry etc.

In group 3, participants felt that the combination of half an acre of low land and middle land could not produce the required food to meet the household food requirement throughout the year for a family of five except for vegetables. Some participants observed that the production estimate of 1500 kgs of vegetables was not possible from one acre of land. The group members clarified that it was possible with mono cropping. This was endorsed by those from the Mali community who were experienced in vegetable cultivation. Poultry was usually reared for home consumption and not for sale.

The purpose of the above exercise was to stimulate the thinking of the participants to see how far they can meet their food requirements with the existing piece of land. It was clear that while land was a primary source, other sources needed to be tapped especially the PDS. Participants also became aware of technical expertise with MSSRF and other farmers whom they could contact if needed for augmenting production.

Participants in Wardha were requested to enact two role plays. The situation of the first role play was that a family, with a man his wife, elderly parents and a school going son was planning for the upcoming agricultural season. Participants had to show how they planned for what crops to cultivate, mobilized resources and accomplished the task. In the second one, participants had to enact a role play in which they were seen coping with the aftermath of the cyclone.

In the first role play, the family was shown to be discussing the pros and cons of growing each crop. Jowar was voted out since it could easily be destroyed by pests. Crops like pulses could be grown and used both for household consumption and selling. Hence green gram was chosen. The family decided to do way with hired labour and tilled the land themselves. They bought the seeds and fertilizers and predicted that it would rain in two days and sowed the green gram. After 45 days, they harvested it. The yield was 60 kgs from 1 kg of seed. They kept some for consumption and sold the rest. The farmer decided to buy some sprinklers and dig a well. He requested his father to apply since the land was in his father's name. When his father suggested that he himself apply the farmer requested his father to change the land in his name. The role play was discussed and participants agreed that it was a real life depiction. While deciding on what crops to plant, all the negative factors are considered first such as lack of water, bird menace and fertilizer problem. Agricultural support by way of entitlements and schemes would go a long way in easing the job of doing business. A major problem was agriculture credit or getting subsidies when the land was registered in someone else's name other than the person who was going to cultivate and bear the expenses. Every step of the cultivation had a problem and it was important to be prepared for any contingency.

In the cyclone episode, the affected farmer went to the sarpanch for help who took him to the revenue officer. The officer was requested to arrange for an inspection. After due diligence the officer have a letter to the Agricultural officer for compensation. In the discussion that followed, participants discussed ways and means to tackle the problem caused by storms and cyclones. One way to prepare is to take crop insurance, the other was to have hardy crops which are climate resilient and third way out was to be prepared to cultivate something else that would grow in the rain battered fields. The enactment of the role play showed that the participants knew how the State system worked in the event of natural calamities and how it needed to be approached.

Entitlements

An entitlement card containing the various schemes / subsidies and programmes related to agriculture, health and nutrition applicable to the region were prepared by the Wardha and Koraput teams, distributed and explained to the participants. In addition an interface was provided with the Block Development Officer (BDO) of Boipariguda Block in Koraput and in Wardha it was with the Assistant Agricultural Officers and Block Agricultural officer of the State Agricultural Officer. The BDO of Boipariguda Block explained about various schemes that could be availed at the local level through PRI members and through the line departments of the State. For all agriculture related loans participants could approach the agricultural officer. The other facilities that could be availed were subsidy for developing a multipurpose pond, lift irrigation for which the village committee (*palli sabha*) and the Gram sabha had to pass a resolution, insurance for crop loss and housing subsidy.

In Wardha, the agricultural officers spoke about the facilities offered by the Government for soil testing, support for maintaining soil health and issue of soil health card. Technical and material support was also provided for organic farming and crop insurance was given for cotton crop especially to small and marginal farmers. Under the National Food Security scheme free take home ration of 5kg of wheat and 2 kg of rice was provided. Other schemes were accident insurance scheme and support for purchase of agricultural tools and equipments, farm pond and irrigation schemes.

The way forward

At the end of the training it was suggested to the participants to start planning for household food security from the next cropping season. In this context they were asked to identify further training needs, the agricultural entitlements that they wanted to access and what grass root level institutions existed to carry the concept forward. In Wardha, the participants identified the following :

1. Land preparation and technology training, crop diseases control and training on seed treatment. They wanted some support for the good quality seeds.
2. With regard to agricultural entitlements they wanted to avail the crop insurance scheme, support for soil testing and irrigation.

3. SHGs provided economic support for agricultural activities.

Participants from Koraput identified their training needs village wise (Table 14).

CHFs also identified their entitlement needs village-wise. They ranged from irrigation facilities such as lift irrigation, check dam, tube wells, farm pond, pond renovation and multipurpose pond, to farmer's insurance scheme, housing schemes, toilet and drinking water facilities.

Table 14. Future training needs of Koraput CHFs

Chikima	1. Organic compost: Handi Khata 2. Mushroom Cultivation 3. Backyard Poultry 4. Non Formal Education
Rauliguda	1. Nutri garden 2. Package of Practices (POP) – agriculture crops 3. Caring mother and infants 4. Compost pit - Biofertilizer 5. Commercial Nursery
Maliguda	1. Integrated Pest Management (IPM) measures in cereals and pulses 2. Awareness on sanitation and personal hygiene 3. Compost fertilizer 4. POP in vegetables
Atalguda	1. Vermicompost 2. Handi Khata 3. IPM of vegetables and pulses 4. Agriculture implements 5. Entitlements
Banuaguda	1. Post harvest technology for wild tubers 2. Production enhancement in rice, pulse and vegetable
Kurkuti	1. Culinary practices for millet and pulses 2. Post harvest technology 3. Production enhancement 4. Organic compost
Bhejaguda	1. Yield enhancement in paddy 2. Vegetables cultivation in limited space 3. Government entitlements on agriculture and nutrition 4. Community mobilization 5. Rain water harvesting

Further to this, capacity building exercises on the themes identified by the CHFs were organized. In Wardha, they were conducted between February 2017 to July 2017. In Koraput these were conducted between February 2017 to June 2017. These were held in the villages. In these trainings, besides the CHFs other villagers also participated. In the beginning the CHFs briefed the participants about the importance of nutrition in our daily life, need for dietary diversity,

significance of a balanced diet and the need to augment food supply. They said that to be able to have a balanced meal everyday with four or five food groups it was necessary to improve agricultural production to the maximum and to this effect they had requested MSSRF to organize specific training programmes. This was followed by the technical inputs. The resource persons were either MSSRF staff or external experts.

Each of these trainings had about 10 – 20 participants such that on an average about 30 to 40 persons from each village were trained on various aspects of food and nutrition security such as balanced meal, agricultural practices, rainwater harvesting, child feeding, government entitlements and so on.

Monitoring, support and evaluation

Soon after the first residential training a follow up was done at an interval of ten days (i.e.) 10th, 20th and 30th day by staff to know how the participants were utilizing the learning from the training programme. Further to this, after the second residential training, a follow up was done by the field staff. The staffs were given an orientation on monitoring in March 2017. However continuous monitoring and direct observation of transformative behaviour could be undertaken only by the paid volunteers who being from the community resided right within the village and were witness to the changes that occurred within the community. The observations of the volunteers were documented by the field staff, to the extent possible.

After completion of all field interventions an external evaluation of the adult literacy project was undertaken by an outside expert. The purpose of this exercise was to eliminate investigator bias in assessment as well as provide an opportunity to the field team to understand how a project assessment is made. In Wardha it was completed between 9th to 15th of November 2017. In Koraput it was completed between 4th to 10th of December 2017. The evaluation was done through focus group discussions in each village with representatives of the community including the CHFs.

An internal assessment of the entire programme was done by the field staff through in depth interviews with various categories of people namely

- CHFs

- adult men and women belonging to households whom the CHFs contacted,
- those who participated in collective endeavours such as nutri-garden,
- specific target groups such as adolescent girls and mothers who had participated in programmes organized for them
- Government functionaries such as ASHA, anganwadi worker, school staff
- Traditional leaders if any and PRI members

The interviews were held between December 2017 and February 2018.

The assessments carried out by the field staff and the external expert with varied stakeholders provided rich perspectives about the intervention and helped form a holistic understanding about the effectiveness of the programme as a whole (Table 15)

Table 15. Participants in the evaluation exercises

Wardha			
	No interviewed		
Category	**Men**	**Women**	**Total**
CHFs	5	6	11
Government functionaries			
ASHA	-	3	
Anganwadi workers	-	5	
School teachers/cook	5	-	
Traditional / PRI leaders		7	
Participants in community endeavours	-	6	
Adolescent girls	-	26	
External evaluation**	NA	NA	110
Koraput			
CHFs	17	12	
Government functionaries			
ASHA		5	
Anganwadi workers		4	
School teachers/cook	5		
Traditional / PRI leaders	18	10	
Participants in community endeavours*	NA		
Adolescent girls	-	23	
External evaluation**	NA	NA	150
Total	**50**	**107**	**271**

***information gleaned during monthly meetings with the participants*

*** Figure approximate. 24 key informants plus villagers. Low Women's participation*

Behaviour change amongst the CHFs

Transformation of personal behaviour was observed immediately after the residential training and continued to be observed during the course of the intervention. These ranged from personal discipline such as taking meal on time, increasing the number of meals eaten, bringing in changes in food consumption, accessing entitlements and starting a nutri-garden in the home. The CHFs could clearly see the agriculture-nutrition connect. In Wardha,

- Sandhya a lactating mother who was indifferent to meal timing and frequency started taking her meals three times a day and at a regular time.
- The male CHFs Yogesh Raut and Suraj Kamble and the woman CHF Ravina Kamble started drinking a glass of milk everyday.
- Ravina Kamble, who was underweight made a conscious effort to make and consume a balanced meal and also drank milk regularly such that she gained about 4 kgs.
- Pradip Ivante started eating two vegetables everyday. He also established a nutri garden in his backyard.
- Mangesh started a nutri garden in his backyard.
- Suvarna Chamlate and Sheetal Nahare started making and consuming salads with onion, tomato, cucumber, lemon and other seasonal fruits.
- Rupali who never used to eat red gram dhal started including it in her diet after attending the residential training.
- Naresh Mandari who was underweight, started including milk and pulses in the diet and gained about 6 kgs of weight in three months.
- Dipali who was diagnosed as being anaemic in the workshop, started taking the iron tablets she got from ASHA.
- Hema joined community nutrition bank and seed bank.
- Ms Sarika grew Agathi in her garden and consumed its flowers and leaves.

In Koraput,

- Anand Pradhani said '--- *I got knowledge about food groups, daily diet, fruits and vegetables being rich in Vitamins and care of pregnant mothers and much more'*
- Damaru Paroja shared *'—Early morning I drink water before drinking tea'*
- Janaki Nayak said ' *I include 3 to 4 types of food groups daily and in the morning I drink tea with milk instead of black tea'*

- Budri Mundagadia started a nutritious garden at her place.
- Nayana Sukri, who was pregnant during the training was conscious to eat healthy meals and started eating papaya, lentils, garlic and continued to do so even after the baby was born.

Recall was also high with the CHFs being able to identify more than 10 messages ranging from a balanced diet, to food consumption patterns, importance of not giving up on wild foods which had been a traditional part of one's diet, child feeding and care, hygiene, sanitation, avoidable social practices such as lavish puberty rituals, importance of a balanced diet for adolescent girls, the nutrition agricultural connect and entitlements.

Influencing family members

Most of the CHFs had shared the messages with family members. Some of them could even identify nutritional deficiencies with children in their families and suggest or take corrective steps.

- Suvarna Chamle from Wardha said that her relative's daughter was 'very weak' and had recommended sesame and jiggery laddu along with green leafy vegetables in the diet. She also suggested to another relative to drink milk to improve calcium intake.
- Sandhya started giving eggs to her children regularly and tried to include fish and chicken twice a week in the family diet.
- Ravina suggested to her aunt who was obese to reduce sugar, bring in dietary diversity and follow regular meal timings.
- Pradeep impressed upon his family the need to eat wild food collected from the forest.
- Sheetal persuaded her parents, who never stopped to eat lunch while working in the field, to carry lunch with them. She also cut down on salt in food preparations.
- Naresh's mother joined the community nutrition garden and brought home fresh vegetables.
- Surya Mali of Maliguda said '*I give my daughter leafy vegetables and ripe fruits, dhal, egg etc because she is anaemic and recently discharged from hospital'*.
- The families of about 10 CHFS started drinking water early in the morning before drinking tea.

However when it came to influencing household decisions with regard to cropping pattern there were mixed results. In Wardha, where agriculture was predominantly based on commercial crops such as cotton, the women CHFs had very little say in the selection of crops, since women's labour is recognized and valued more in a food crop based agricultural system. Also because most of the CHFs were young it was their parents who took the decisions. However some of the CHFs were smart enough to depute their parents to the agricultural trainings. All the agricultural training identified by the CHFs as being critical to enhancing production or augmenting food supply were conducted in the villages and anyone who was interested was encouraged to join.

- Sheetal had demanded a training on 'seasonal food crop calender' and techniques for improving production. While she attended all the training programmes she also encouraged her father to attend several of these programmes. She started listening to agriculture (*Krushiwani*) and health related programmes on Radio FM. She could influence her family to cultivate red gram, soya and sorghum besides cotton. Her mother joined the community seed bank and started to store seeds at home.
- Yogesh Raut had requested for capacity building on soil testing and use of agricultural tools. His father attended the trainings. The family adopted intercropping techniques and other sowing methods.
- On the other hand, CHFs such as Naresh Madari who attended the training on soil testing and Praveen Somkumar who attended all the agricultural training organized by the CHFs were able to decide on the crops they wanted to cultivate. Naresh who had earlier cultivated only cotton, soya and red gram, brought in diversity with green gram, black gram, sorghum and vegetables. Praveen applied the seed treatment techniques he had learnt and got a good yield. He started storing seeds. He diversified crop varieties to include sorghum, red gram, green gram and black gram. Pulses were also stored for home consumption.
- Hema, Sandya and Sarika though not having land participated in all trainings and shared the information with others while working in the field or with family members who had land holding.
- Sandya whose family was also landless attended the training on goat rearing and was planning to rear goats
- Ravina had requested for training on child feeding but also attended all the agricultural interventions. Her family increased diversity of food crops from 4 to 9.

- Suraj who had requested for inputs for soil testing attended training on land preparation and disease control. He went on an exposure visit to pulses exhibition and seed bank. He obtained red and green gram seeds from his relatives for cultivation and also started storing. He developed a nutri garden and obtained fresh vegetables. However sorghum used as fodder for cattle got destroyed by pests.

In Koraput where the agriculture was predominantly based on food crops there was comparatively greater role for women in decision making over choice of crops.

- Raila said that cropping decisions were taken jointly by herself and her eldest son. She had a say over choice of vegetables but it was her husband who took decisions about selling and consumption.
- Nine CHFs (mostly males) said that they could independently take decisions about choice of crops while 11 said that they did so after discussing with wife or husband
- In the residential training some of the CHFs who were vegetarian requested for training on mushroom cultivation since it was a good source of protein. Ghasa, 2.5 and 2 kgs of mushroom respectively. Rukmani was already cultivating oyster mushroom and shared this knowledge with others.
- Niranjan prepared two beds of mushroom and used the entire yield for household consumption. He also started cultivating different types of vegetables.
- Most of the CHFs had attended the trainings on line transplanting for paddy and ragi, as well as Integrated Pest Management (IPM) and seed treatment.
- Most CHFs reported paddy fields that had been kept fallow after harvest were now used for pulse cultivation making use of the residual moisture. Many were not aware of this.
- Manika started with bio compost and uses it for nutri garden.
- Almost all CHFs had attended the training on IPM and seed treatment and were satisfied with improved productivity.

However when asked if they would be able to consume a balanced diet throughout the year, most of the CHFs said that they would not be able to do so. In both sites, the CHFs said that it was not possible to consume a balanced diet throughout the year and it varied according to seasons. In Wardha the dietary plan prepared by the CHFs during the residential training was shown to them and they were asked if they would be able to stick to the plan. Six CHFs said that they would be

able to consume a balanced meal for three to four days in a week. Four of them said that they would be able to do so for two to three days in a week and one said that it was possible for only once a week. The reasons given were

1. Dietary diversity could be achieved only during winter and rainy seasons but not during summer / lean season as the availability of fruits and vegetables will be less. It has to be purchased from the market which is very expensive. So during summer more pulses were included in the diet. Frequency of vegetables was very less.
2. The dietary pattern was – summer: chapati, rice, pulses, onion and lemon. Rainy season: staple cereals, leafy vegetables, wild vegetables and fruits. Vegetables were dried and used during the lean season.
3. Meals had to be planned according to season. During harvesting, the busiest season in the agricultural calendar, there is very little time for cooking and hence preparing a variety of dishes is not possible. Cooking a balanced meal with cereals, pulses and vegetables takes an extra 20 – 30 minutes. Most of the CHFs said that the time spent in the kitchen had increased also because they used the traditional chula for cooking.
4. Earlier leftover food was carried over to the next day morning and no cooking was done. However after the training CHFs had started preparing fresh food or made one or two dishes to make it a balanced meal.

In Koraput, the CHFs said that they included three food groups namely cereals (rice, ragi) pulses and vegetables. A few were able to include animal foods. Most of the CHFs who attended the first residential training said that it was not possible to follow a balanced meal throughout the year. The reasons given were

1) Vegetables were produced and consumed in rainy and winter seasons. However they could not be stored beyond two weeks and excess had to be sold. Hence during summer / lean season when nothing was cultivated there was a shortage. Availability was less and prices were exorbitant.
2) It was impossible to bring in 4 to 5 food groups everyday. It could be done once or twice in a week.
3) The time for preparing a balanced meal also increased by 30 minutes. Hence during busy seasons it was not possible to invest more time in cooking.
4) They compensated by drinking more of ragi porridge or *ambila* between meals.

5) In the focus group discussion to assess the impact of the nutrition literacy programme all CHFs agreed that knowledge of nutrition is essential for daily life. They were appreciative of the training exercises but felt that the programmes would be more effective if the resource persons could speak the local language instead of engaging with them through translators.

Creating a community resource base for nutrition security

At the core of the CHF model of adult nutrition literacy is the creation of a human resource base for nutrition security at the village level such that even after the withdrawal of the project there would be men and women whom the community recognizes as being knowledgeable about nutrition and from whom they can draw upon for advice and help. The knowledge base needed for such an endeavour was postulated as basic knowledge about nutritious food, nutrients from different food groups, concept of a balanced meal, nutritional problems in their community, agricultural remedies for the same and the government entitlements and schemes. The implementation of the previous CHF project in Odisha had shown that this required the involvement of various sections of the society such as men and women farmers, PRI leaders, peoples' institutions etc. The initial selection of five community representatives (the first set of CHFs) was only the first step in the involvement of the community. When these trained CHFs went and shared the messages gradually others would join who will then become the drivers of the programme. Hence the first set of CHFs had to be those who commanded some respect within the community, or atleast those whose selection had been endorsed by a majority of households (either by the village as a whole or by the caste groups that the CHF represented) and who could reach out to people. The community had to be aware of the nutritional status of its people, the need for such a programme, the role that the selected individuals have to play atleast initially, show up for the selection process and identify the most suitable candidates for the residential training.

In Wardha, less than 50% of households were present in the selection meeting while the percentage was higher in Koraput. After the first residential training the CHFs from Wardha and Koraput shared some of the information and insights they gained from the residential training with others in their community. The messages that they shared could be grouped under the following themes

- Importance of balanced diet and dietary diversity

- Food availability and sourcing of food
- Good dietary practices
- Food and Nutrition care during different stages of life
- Health care
- Livelihood and social issues

The range and depth of information provided was impressive (Annexure 6). The CHFs could clearly identify the kind of nutrients that the different food groups provided, could say what constituted a balanced diet, could link diet with health and nutritional status, could give suggestions for improving the existing diets, discussed the various sources of food stressing the importance of accessing wild food from the forest, were aware of food exchanges (ie) for vegetarians they could suggest eating soya flour, mushroom, suggested best practices like not skipping breakfast, food requirements during various stages in the life cycle, health care issues such as immunization, spacing between children, government entitlements and avoiding unnecessary spending over rituals.

The mode and method of communication is summarized in Table 16.

Table 16. Method and Mode of Communication

Elements of communication	**Wardha**	**Koraput**
Target groups	Adolescent girls, lactating mothers,	Adult men, women, SHG members, PRI members
Place of sharing	Homes, agricultural field	Tea shops, During functions such as Ganesh Pooja, In a death ceremony While playing football In the threshing yard In agricultural field During travel to weekly market Anganwadi centre In a formal meeting
Mode of sharing	Informal	Informal and formal

All the CHFs expressed that the residential training had given them the confidence to talk to people. Rukmani Harijan, the ASHA worker of Koraput said that the workshop helped her to engage with men confidently and in an equal footing. In Wardha, most of the CHFs were very young, especially women who shared the information with their peers such as adolescent girls

and other young mothers. However in Koraput, the CHFs could discuss the training with varied sections of the society such as elderly men and women, those in leadership position such as SHG President and PRI members and in a wide variety of contexts. Kamala Pujari from Bhejaguda village shared the information with older women and when asked why replied that older women would share messages with their husbands. Nianjan Khada and Sahadeb Pujari from Chikima shared their experiences in a death ceremony (!). Only men had attended the function and they requested the men to share the information with their wives. Besides this they conducted a formal meeting in their villages as did Prahlad Harijan, Balaram Harijan and Kamala Pujari from Bhejaguda. Kamala Pujari was a SHG member and worked as a cook in the anganwadi and hence he was able to meet a lot of women and parents. Sanya Hantal of Atalguda helped the SHG women to maintain the register and hence was able to discuss with them about the training. However in Wardha the young CHFs who were either unmarried or young parents had neither the social status, nor the age or any other social marker that would enable them to meet a lot of people who would listen to them. Though they themselves benefitted from the experience and valued it saying '*—it has given us a whole new perspective and platform to share our views'* they were totally nonplussed when it came to sharing with the larger society. As one CHF put it *'—no one comes to us or listens to us'*. Only 4 CHFs could talk to a few other people outside of their families. In Borgaon Gondi, a woman CHF had shared food and nutrition related issues with the PRI member.

By and large, women shared messages with women while men discussed with other males. In Wardha female resource persons shared messages with adolescent girls and young mothers nearer to their age. However there were exceptions. Naresh, a male CHF from Borgaon Gondi discussed about importance of breastfeeding with a lactating mother. Sahadev Pujari of Chikima discussed about ideal age of marriage and diet during puberty for adolescent girls as they were future mothers.

In Wardha, when some of the originally selected CHFs could not attend the second residential progamme, the replacement came from either the families or because of personal connection (e.g.) in Heti, Ravina was replaced by Suraj who was her brother. When Surekha, one of the CHFs could not anymore participate Sarika joined out of her own interest. When Naresh could not attend, there was no substitute. This was reflected in the village meeting held to evaluate the

literacy project and how far people could see the agri nutrition connect – most of the assembled people had not heard about the CHFs and were unaware about nutritional literacy.

There was confusion about the role of CHFs among the implementing team as well as the community at Wardha. The staff perceived the CHFs as instruments who would assist the project staff in spreading messages rather than seeing it as a community empowerment exercise. Hence besides the community selection they felt they had a role to play in finalizing the CHFs. In the eyes of the CHFs this was seen as a job selection process. They equated the CHFs with the paid volunteers in the community who assisted the staff in carrying out the project activities. Hence the conflict of paying a 'monthly salary to services rendered' was deeply etched in the minds of both. This coupled with the fact that the implementers initially had difficulties in establishing a rapport with the community, led to a situation when the project consultant and staff from Chennai had to address the CHFs and explain about the objective of creating a resource base of knowledgeable people in the community. It was also clarified with the staff that though no 'salary' of 'honorarium' was to be paid, the CHFs had to be compensated with a day's wage during the residential training for as many days as they participated since they had to forego wages to attend the training programme. While the staff members were willing to revisit the entire programme from the beginning, there was no time for the exercise to be repeated.

It was in the final assessment with the community, that the concept of human resource development for creating a community resource base in nutrition security became clear to the community members. They requested for a 'refresher' course and reading materials. This was held in early 2018 and there was a wider representation of older men and women such as SHG leaders and PRI members who participated in the programme.

In Koraput where there was comparatively better understanding about the objectives of the project, both among staff and the community, owing to previous experience, peoples' participation at every stage of the project was done willingly and with a lot of interest. In Atalguda, Raila Guntha and Samari Majghi joined the residential training out of their own interest. In kurkuti when Chanchala Bisoi could not participate anymore, four more people were interested to join. At the start of the programme the proportion of male to female CHF was 13: 12. However as the programme progressed, more male members showed an interest in knowing

about health and nutrition (considered a female subject) and its linkage with agriculture such that there were 17 males and 12 females towards the end of the programme.

In the final assessment when focus group discussions were held, it was observed that people assembled easily in Koraput, they were well aware of the CHF programme for nutrition literacy, they could identify and relate to the CHFs and could clearly see the linkage between nutrition and agriculture. Further they were also able to assess the effectiveness of the State interventions for nutrition – (eg) in Atalguda the CHFs pointed to the inadequate funds allotted for procuring eggs in the school mid day meal programme such that the headmaster had resorted to replacing eggs with biscuits which were cheaper but less nutritious. In Wardha peoples' assembly was not so enthusiastic and in two villages the assembled persons had no idea of the CHF progrmame, though they could recall the various agricultural interventions as well as recipe demonstrations. Hence relationship between nutrition and agriculture was also not clearly seen.

The CHF model of adult nutrition literacy is as technical as any agricultural / technological intervention and requires skilled personnel for implementation. In the absence of professionals with the required skill and experience, the staff with agricultural and nutrition background were involved in implementation. The biggest challenge faced by the staff was in the correct understanding and internalization of the concepts and methods of intervention within themselves. This intervention required a commitment to the spirit of fellowship. In a significant manner, the mandate was more than a positivistic research project, where typically the social reality is viewed in a lab like fashion and people are viewed as subjects. It was also not an implementation project- where the project staff is typically forced to be dependent on the persons/beneficiaries for the 'achievements of their targets'. This intervention required egalitarianism in its true spirit, in active and passive resistance to the hierarchical social reality, where all outsiders, esp. more educated, the one's who have come with noble 'research 'goals are viewed as 'Higher ups/elders'. It is easy to be mesmerized by the notion, that one (project staff) is superior with assumptions that 'we will do this for you, we will give you this knowledge', othering the villagers and compromising the basic rapport between human beings. This reflects in an unequal relationship between the staff and the villagers, during the village meetings esp. the meetings held for the selection and identification of CHF. The doubt and mis-communication experienced

by the project team about the voluntary nature of the CHF would reflect in the manner in which the CHF perceived themselves and their role and enthusiasm for action in the village.

Since, an initial resistance to new ideas implies a learning curve and the team on site (any team) is expected to take its time to unlearn the earlier held notions of projects and their typical conceptualizations, the Wardha team could have had more preparation time. The CHF intervention could have been initiated even as the baseline was being prepared; when the project itself was initiated and the staff prepared on the idea of a non-paid community knowledge human resource (Pandit, 2018).

The other challenge faced by the staff in both sites was that though conceptually they could see the link between nutrition and agriculture, operationally they remained as silos, a fact they mentioned in the initial workshop held in Chennai. Nutrition related and agricultural activities were planned independently by the respective staff, addressing different target groups. To some extent this was addressed in the second CHF residential training when participants were requested to seek agricultural remedies by planning for cropping decisions balancing food, nutrient and economic needs. Both set of staff participated in the training and were requested to follow up on the decisions made by the CHFs. Discussion on the follow up reports and observations were held together for all the field staff.

For conducting the residential training and other capacity building exercises involving personal reflection, social critiquing and analysis, experienced trainers with the necessary skills and orientation are needed. They should also be able to bring in egalitarian strategies such as both trainers and participants having the same seating arrangement and sharing the same facilities at the centre.

The third issue was the nature and effectiveness of agricultural interventions. In seeking agricultural remedies to food security, the intervention has to take care of all stages of agricultural production and provide technical solutions to problems (ie) in effect from the time the seed is sown till food appears on the table, This starts with addressing soil health, procurement of good seeds to seed treatment, effective sowing methods, control of insects, pests and animal attack to post harvest technology and storage. While MSSRF's strength lay in

improved production technologies the staff had apprehension over climatic vagaries and cyclones and lack of irrigation facilities for which they felt they had no suggestions, In Koraput the communities practised the 'broadcast' method of sowing in which the seeds were broadcast with minimum inputs. During the FSN intervention using a systematic demonstration design the farmers changed from the broadcasting method to line sowing method with the recommended package of practice. This yielded very good results with regard to food production. Since the agricultural intervention preceded the CHF intervention, this had a positive effect on the receptivity of the literacy project. In Wardha crop losses due to animal, insect and pest attach were high and voiced repeatedly by the farmers. The adjacency of farms to a protected forest area and the inability of the farmers to protect their harvest was a significant distress in their minds. It coloured their overall perception of the project itself, as they continued to lament on the effort required to protect their crops. The use of animal refuse as an organic measure to protect their harvests as suggested by the project staff was not convincing for them. Since the agricultural intervention preceded the CHF intervention this is likely to have affected the receptivity of the CHF project itself.

The FSN study could have addressed this to some extent by networking with other agencies, especially the Government to seek technical solutions to the problems as experienced by the staff and the community, The expertise with various line departments especially the agriculture and forest department could have been roped in right from the beginning to find solutions to agrarian problems, rather than MSSRF being the sole technical expert. While the nutrition literacy programme provided a linkage between the government departments and the CHFs by inviting them as resource persons to address the CHFs, networking between MSSRF and the Government to jointly address the agrarian crisis through technical solutions would have given better results and provided greater sustainability.

Given the above observations and despite its short duration it seems reasonable to conclude that there is a 'moderate' effect of the CHF intervention in Koraput facilitated by the following factors

- Staff members who had some experience in understanding and internalizing the CHF concept, its philosophy and approach

- a large pool of CHFs who joined the capacity building exercise with a genuine interest to learn about nutrition and its connect with agriculture and 'seeing' their own empowerment in the process
- a community that was aware of the advantages of having its own resource base and selecting suitable participants
- A food crop based agrarian economy which allowed for greater gender parity and easy connect with nutrition
- Technical inputs striking to the community that enabled increased production

Similarly it is reasonable to conclude that there is a 'mild' effect of the CHF intervention in Wardha due to following factors

- Staff members who are yet to understand and internalize the CHF concept, its philosophy, approach and operationalization
- A limited pool of CHFs who joined the capacity building exercise seeing it as a stepping stone to a paid career
- A community that was not fully involved in the exercise and which could not be helped to visualize its own empowerment
- A commercial crop economy which severed the connection between production and consumption and which had limited gender parity
- Agricultural interventions not addressing acute farmer distress

Sustainability

The FSN study with the adult nutrition literacy component needed to address two major aspects that needed to be sustained even after t the project ended

1. to ensure continued learning of the CHFs to keep up with the knowledge
2. to ensure continued support for agricultural and livelihood inputs

1) The project had an advantage in that in both sites the CHFs, women and male farmers, government functionaries such as school teachers, anganwadi workers, key leaders such as Sarpanch and the village volunteers identified the need for knowledge about nutrition as a key requirement. To ensure continued learning of the CHFs two strategies were built into the project

a) Linking the CHFs with the anganwadi worker trained in basic nutrition literacy, child nutrition and early childhood development and with the ASHA worker knowledgeable on health related issues
b) Providing an interface with Government functionaries on aspects related to health, nutrition and agriculture.

2) In Koraput, two of the CHFs were cooks in the local school and were responsible for preparing the mid day meal. One of the CHFs was an ASHA volunteer. In Wardha, one of the CHFs was also a cook in the mid day meal programme. During the residential training, the ASHA worker was introduced as a resource living amidst the community and was requested to explain about her role in addressing health and nutrition issues. After the training programme, the ASHA worker was actively engaged in promoting nutrition related activities. She had been cultivating oyster mushroom and had also requested for and attended the mushroom training provided by MSSRF. She discussed the importance of mushroom as a source of protein with the women who came to the anganwadi center and also shared information on cultivation. Similarly when some of the CHFs wanted to have training on child nutrition, care and feeding, the programmes were organized at the village level with the anganwadi worker as a resource person. In almost all the villages the CHFs especially the female CHFS were found to interact closely with the ASHA and anganwadi worker. However for reasons not very clear, they made no contact with the school teachers who were involved in the school nutri garden project initiated by MSSRF. The Agricultural officers from the State Agriculture Department in Wardha and the Block Development Officer in Koraput came as resource persons during the residential training to explain about the various schemes of the government related to agriculture, animal husbandry and horticulture. After discussing about the facilitation offered by the Government, the officials shared their phone numbers with the CHFs for further contact.

However these strategies were not adequate to satisfy the information needs and knowledge seeking behaviour of the CHFs. The range and complexity of information needed by the CHFs was beyond what these sources could provide. One CHF in Wardha wanted to know how to handle obesity and several others sought information on the nutritive value of wild food. The

pleasure and joy of eating fresh fruits from the homestead garden motivated several CHFs to think about growing apples and grapes. Though the nutritionist in Wardha could help them as long as the project lasted there was no well thought out strategy to link them with knowledge sources once the project ended. This resulted in the CHFs seeking their own avenues and sources of information. In Wardha where the CHFs were educated, some like Sheetal made use of the FM radio to listen to agriculture and health related programmes. However in Koraput where no such facility existed the withdrawal was abrupt without any support in place. Towards the end of the project linkages with the PRI members were attempted to ensure continuity.

One of the major challenges that hindered sustainability was the 'unmeasuredness' of the CHF intervention. While it is idealistic and perhaps correct not to 'measure' the performance of the CHFs the drawback is that the community as well as the CHFs have no way of getting a feedback on their role – either through a social or institutional mechanism. Therefore there was an individual- centric variation based on their interest and motivation. This is especially poignant considering that in the first training the CHFs listed peer learning as an important takeaway of the project. This is a critical challenge for the self-motivation, self -regulation and action of the CHF and the community's ability to enable or support them, thus leading to a broader ownership of the intervention. At the systemic level, some mechanism of three levels of ongoing feedbacks- self-feedback, peer or cohort feedback and community feedback can be instituted. These feedbacks may not be quantitative targets; rather could be qualitative and focus on learning and initiatives taken by CHF. Over a period of time, the feedback session may be led by the CHF themselves. Going forward, in CHF interventions in other projects these may be conceptualised and implemented along with the training and capacity building.

3) Similarly the one off interaction with Government officials was not adequate to mobilize individual or community entitlements, since these require sustained interface with the State. Initially several of the CHFs shared information about farmers's crop insurance and subsidies for irrigation. Sania Hantal of Atalguda discussed about setting up Lift irrigation with fellow villagers in a meeting to be able to undertake cultivation during summer. He along with other villagers went to Jeypore to submit application and discuss about the electricity requirement. The process of collective decision making, applying, overseeing project completion and utilization by the community requires sustained effort

and planned strategies. Periodic interface – between the CHFs and the Government departments, with PRI members, peer discussion amongst the CHFs would help in clearing bottlenecks and realizing the entitlements.

4) The FSN study started by working with individual households for collecting data on social, agricultural and nutritional information. As part of its strategy to help improve food production the project imparted training to men and women farmers for improving production, distributed seeds and saplings and provided other material support. To ensure sustainability of these interventions after withdrawal, the project undertook several community based initiatives (Tables 17 and 18) which were
    - School Nutrition Garden (SNG)
    - Community Nutrition Garden (CNG)
    - Community Seed Bank (CNG)
    - Community Fish Farming (CFF)

Table 17. Community endeavours in Wardha

S.no	Village	CNG	SNG	CSB
1	Saheli	✓	*	✓
2	Vitpur	*	✓	
3	Susund	*	✓	
4	Heti	✓	✓	✓
5	Borgaon	✓	✓	✓
	Total	**3-CNG**	**4-SNG** 1-Genetic Garden	**3-SNG**

Table 18. Community endeavours in Koraput

S.no	Village	SNG	CFF
1	Chikima	✓	
2	Atalguda	✓	
3	Banuaguda	✓	✓
4	Bhejaguda	✓	✓
5	Maliguda		
6	Rauliguda		
7	Kurkuti		
	Total	**4**	**2**

The Community Nutrition Garden was initiated by LANSA in four villages in Wardha where there were a higher proportion of landless households to enable these households to have access to nutritious vegetables. Initially it was started as a demonstration of nutri garden to motivate women to take up cultivation of vegetables and fruits. It was also meant as a platform for women to share traditional knowledge and to discuss about cultivation of vegetables and fruits. In Saheli and Susund, land was provided by two private individuals in the beginning. Subsequently, this shifted to the land around the Farmers' Knowledge Centre established by MSSRF in Saheli and common land in Susund. In Vitpur it was provided by the Gram Panchayat and in Baorgaon it was provided by the forest department. Water was initially obtained from a nearby river but later on Panchayat water supply was arranged by MSSRF. An informal group of women from landless households were formed and they were provided with technical support for land preparation, seed and fertilizers. Roots, tubers, green leafy vegetables and other vegetables were cultivated and the saplings were provided by MSSRF. The number of women participating in the intervention ranged from 6 to 9. A register was maintained by the village volunteer. Women undertook land preparation, weeding, watering and harvesting. An hour's labour was spent twice or thrice during the week. The produce was shared between the members and excess if any was sold or given to the school for the mid day meal.

While the activity gave women an opportunity to come, learn and share together it did not enable women to gain control over operational aspects. First women were dependent on MSSRF for facilitating for land, water and other resources and had no control over the resources. It was difficult for them to spend time over and above their households chores and other activities. However in Borgaon Gondi women said that they would obtain seeds from the seed bank and also pay the Panchayat for getting regular water supply.

In future interventions it would be worth considering to see if such an initiative can be undertaken as a business opportunity that besides providing households with nutritious food also enables them to get compensation for their time. With an initial seed capital, land could be leased, water supply arranged and someone hired to take care of the cultivation. This would reduce drudgery for women while empowering them with skills in business management. However the viability of this project – whether there would be sufficient surplus left for sale that would cover the overhead cost and enable them to make atleast a small profit would have to be

worked out. On the other hand some of the CHfs after the training joined the nutri garden initiative. Hence sensitization and support for independent management with control over resources by the participants would be key for the sustainability of the project.

Nutri gardens were established in 8 schools in both sites. The objective was to sensitize school children about the important role vegetables and fruits played in our diet in especially providing vitamins and giving them the experience of growing their own food which would go into the diet. The concept was discussed with the school staff who provided the space. Seeds and materials were given by LANSA. Older children who arrived early to school maintained the garden. The vegetables cultivated were ladies finger, cow pea, cluster bean, brinjal, tomato, coriander and fenugreek. The produce was taken by the cook and added to the mid day meal. In Koraput the endeavour was well appreciated by the District Education Officer who was willing to support the project. While the exercise enabled children to learn about the role of vegetables, seasonal availabilty and form a good habit of eating vegetables there were challenges

- The project was completely dependent on the co-operation of the staff. In case there was a change in staff who was not interested it could suffer.
- During summer no one was available to water the plant. In one village a family living close to the school maintained the garden and took the produce.

The above problems are offshoot of the lack of State policies for supporting nutri gardens in schools. The state allocation for vegetables is inadequate and very often the noon meal organizers are dependent on the benevolence of local communities to provide vegetables. The lessons from this project should enable the FSN study to come up with a holistic policy perspective for the noon meals, that includes adequate financial allocation of food items, provisioning for school gardens and educating the staff in nutritional literacy. In general financial allocations are inadequate for other food items in the meal such as eggs, so much so that the school master in Atalguda decided to replace eggs with biscuits after consulting the children! Thus nutritional literacy is needed not only for the community at large but also for Institutional authorities who serve the communities.

Community Seed Bank was established in three villages in Wardha in 2017 towards the end of the project to conserve local seed varieties of vegetables and pulses, to ensure availability and for

communities to be self sufficient in meeting the need for seeds. Women were motivated to form groups. Seeds to the bank were contributed by households that had excess seeds and by MSSRF. MSSRF also gave technical support in storing and preserving the seeds. The seed bank had a formal structure with a President, secretary and members. At the time of sowing members could borrow the seeds and return double the quantity soon after harvest. Transaction registers are maintained. The successful functioning of the grain bank is dependent on the cohesion of the members and in prompt repayment of the seeds that they borrowed. It has the potential to enable farmers to have access to good quality seeds of local varieties which would ensure food security. The initiative had just begun and will take some time to gain root.

Community fish farming was facilitated in Banuaguda in 2016 to enable a group of farmers to come together to undertake fish farming in Panchayat pond. Since individual farmers do not have a separate fish pond, the common pond could be utilized by a group of people to undertake pisciculture which would enable them to get fish for consumption. It was done as an informal activity by a group of 28 male farmers. MSSRF supplied fingerlings and gave technical assistance. The activity was done once a year as an add on activity. In the first round of harvest about 107 kg of fish was obtained. The farmers shared about 2 kgs of fish each and gave the remaining as labour compensation for those who tended the pond. The major challenges were – priorities were set for the utilization of the community pond. First preference was given for utilization for domestic purpose, second for livestock, third to be utilized for irrigation if there was water crisis and lastly for fishery. Though there was no economic benefit for farmers, they got fresh fish for consumption once a year.

While all the community based endeavours had the potential to help participants to share information, the community seed bank had the potential to address one of the major agrarian problem faced by cultivators namely access to good seeds.

V Discussion

Sustainable and effective behavior transition happens with attitudinal changes on the part of the actors when they critically reflect upon their conditions, dream and desire to change and expand their capabilities for action. To this effect participatory research needs to take a problem solving

approach by addressing social realities along with technical and technological solutions. The nutrition literacy endeavor undertaken as part of FSN study was modelled on the principles of adult literacy propounded by Freire as a means of empowerment. Embedded in the spirit of 'conscientization' the literacy programme attempted to help participants to analyze their realities through activities, role plays, case studies, make their own plans, identify the needs for technical capacity building and gave them a birds eye view of State entitlements that they could claim. To our knowledge, this is the second such effort in the country to embed adult nutrition literacy in agricultural research, the first having been implemented by MSSRF in Odisha starting just prior to LANSA and running parallely in Koraput for a short time.

The programme by and large documented several examples of attitudinal and behavior changes initiated by the participants on their own to move towards nutrition security, with respect to consuming a balanced meal, spacing of meals, number of times a meal was consumed, sources of food that people accessed, setting up a nutri-garden to joining a community seed bank. It also shaped the scope of the research (eg) while the research had envisaged a set of interventions with certain food crops, in Koraput participants wanted mushroom cultivation to be included. Desire to continue learning was also demonstrated (eg) one participant started listening to agricultural and health programmes in the Radio. Further as interest gained amongst the community, more individuals joined the subsequent capacity building exercises. Several men also joined the programme even though health and nutrition related issues had been seen as 'women's subjects'. These observations validate the process, approach and methodology used in the literacy programme.

The idea of a CHF intervention is not only complementary to the FSN study, but integral to it since it needs to reflect in action from the beginning itself. This would enable the research team to understand the agricultural needs of the people and accordingly make provisions in the project over and above the technical interventions that they have already identified as inputs. However, right from the conceptual stage, the agricultural and the CHF intervention were implemented as separate activities with different time lines and with different external consultants with occasional interaction, such that it remained in silos at the field level. Given the typical models of research which do not normatively give back to the society as a research ethics practice, the research and technical staff needs an unlearning and relearning time. The research leadership at

the local level, with adequate orientation would more likely view CHF or such human interventions as integrated and not siloed out from the other agricultural interventions.

Further, the literacy programme requires separate set of research staff with a development background who are skilled in providing community interface and who would live close to the community, undertake capacity building, observe, document and continue with the action reflection process and feedback from the CHFs and community. They need to be accordingly recruited, going beyond the laboratory and office oriented work to more field based work involving human interface. At the programmatic level this highlights the need for an institutional policy on the part MSSRF ensuring that all agricultural research would embed the literacy component and make sufficient budgetary allocations for staff and programme.

Typically the literacy programme begins first as soon as baseline data is collected, by presenting the results of the nutritional status assessment to the community. In contrast to health issues which can be easily experienced and understood by the participants, nutritional problems that exist at the sub clinical levels such as anaemia or Chronic Energy Deficiency (CED) are neither seen nor felt. The results of the assessment when presented help the community to tangibly experience the intangible. This serves as an eye opener and helps them to contextualize the role of nutrition literacy. The process of how the literacy programme will be conducted can then be explained. The selection of CHFs can be done by the community in a meeting with atleast 80% attendance by households. This is followed by the first residential training programme wherein the participants are introduced to nutritional concepts and helped to analyse their own dietary patterns. Participants then leave with takeaways from the training to be applied in their daily lives. In the second residential training, they estimated family food requirement, plan agricultural cropping pattern, identify needed technical inputs and entitlements and make a plan. **It is suggested that, after the second residential training on the agricultural nutritional linkages that the agricultural research inputs begin.** The research team compares the outline prepared by the CHFs with their own schedule of interventions, modifies the same to accommodate peoples' agricultural priorities and then begins with the research interventions. If need be external expertise may be sought for those technologies and techniques for which there is no internal expertise.

The above methodology, which enables the research to be embedded in the given agro ecological and social context is likely to enable greater community participation in the research and provide better outcomes and results for all stakeholders. The key research question namely how far the agricultural policies can be shaped to leverage nutrition, requires that the research be embedded in the larger context of the existing agrarian crisis in the region. In both the sites the CHFs/community and the staff were deeply concerned over the lack of irrigation facilities and the vagaries of climate change. In addition there was the problem of animal attack in Wardha identified as critical to agricultural output. Given these problems it was not surprising that at the end of the project participants felt that consuming a balanced diet for most part of the year was still a distant dream.

After the second residential training in which entitlements were discussed, one CHF organized a meeting in his village about lift irrigation and went with his fellow villagers to meet the concerned Government authorities. Others wanted to know more about crop insurance. Since the focus of the project was on bringing in dietary diversity through food crops and maximizing production with technical expertise, these efforts by CHFs and the community to augment food production, became individual centric and 'their own problems' rather than as a collective process of demand facilitated by MSSRF. This problem was more acutely felt in Wardha. Further this was in contrast to the 'problem solving' approach propounded by the literacy programme. Hence participatory agricultural research needs to include the problems identified by the community, help create community demand and involve the Government departments and members of local self governance and grass root level Institutions to find lasting solution to the complex problem of nutrition security. Facilitating the collaboration, convergence and synergy between various agencies to address the local agrarian scenario should itself be seen as a research methodology to answer the question on how policies and programmes be leveraged to achieve nutrition security.

A second consideration in embedding agricultural research in the local policy context is to have a holistic understanding of the existing policies and how they may be shaped. The school nutrition gardens provided a tremendous opportunity to the children and the community to experience eating a variety of vegetables and fruits to which they had limited access, a fact very much appreciated by the community, the school functionaries and the District Education Officer.

However it also raised the difficulties in the sustainability of the endeavor with regard to care during summer, availability of seeds after project withdrawal, transfer of staff members and so on. This is due to the fact that there is a policy vacuum as far as school nutrition gardens are concerned. A policy commitment by the State to support such nutrition gardens in schools having space will lead to provision of honorarium for a person to care for the plants, ensure supply of seeds and water facility within the premises. The experience of the school headmaster in switching to biscuits over eggs due to inadequate financial allocation is also a pointer to two policy aspects – one – adequate financial allocation for purchase of food items in the school meal, two – nutrition literacy for school functionaries involved in implementation. Without evolving a policy framework that addresses and includes all these aspects, the endeavor would remain as a 'one off feel good' intervention. Such process of 'action reflection' is needed for all concerned and a collective discussion between all the stakeholders namely CHFs, school staff, district education officer, MSSRF and the community would have given a road map for preparing a policy statement.

Similarly, while several Government programmes have nutrition education as a component, these mostly focus on technical messages and usually target women and girls and thus stereotype the notion that health and nutrition are 'female subjects. A clear cut State policy for adult nutrition literacy embedding principles of adult learning is needed to make the current education and awareness programmes to be relevant to the social scenario.

A third consideration especially with reference to peoples' institutions is the operationalization of gender concerns in the research agenda, a concern raised by the staff. While the need for gender equity in implementation was recognized conceptually, the field staff at both sites expressed concern over how it may be operationalized. This highlights the need for capacity building of the staff and for themselves to undergo the action reflection process, to be built in as part of the research process itself. The fish farming endeavor in Koraput using the community pond by a group of male participants saw them taking a nominal share of fish after paying the 'help' hired to clean and guard the pond. In contrast the loose network of landless women's group in Wardha, had to themselves tend to the nutri garden and spend about an hour for atleast two days in a week to be able to take their share of the produce. Further the facilities needed for the endeavor namely land, water and seeds were provided to the women by a PRI

member/private individual through MSSRF facilitation. This gives several pointers to how the social intervention was engineered – first it was an excellent attempt to provide the landless women access to land which is a scarce resource. However, it stereotyped women's role and added to their existing workload. In contrast the men though taking lesser share of fish saved their time and energy. The same could have been done here also with encouraging the women to hire someone even if it meant initially that they could take less share or no share at all. This would have given them good experience in seeing it as a business endeavor.

Further unlike men who are able to command control over common property resources as in the case of fish farming, the women here needed MSSRF facilitation to use the government land or depend on the benevolence of a private individual. Though the women have said that they would continue with the endeavor, paying the Panchayat for water, it raises the issue of whether they have thought through of how they are going to contribute. On the other hand formalizing them as a group would have given them the power of a 'collective' to bargain and negotiate with the Panchayat for allocation for common land, even after the withdrawal of the project especially in the context of Wardha where landlessness was much higher. Further capacity building of doing a costing of the project and the ways of raising the resources to manage would have to some extent given them the ability to manage on their own. Even if the project had resulted in a loss, it has to be seen as a social capital being built by expanding the assets and capabilities of the people participating in the study. It also raises the question of how the results are measured – is it only in terms of material production such as food grain output or would it be also measured with regard to the assets and capabilities of people enhanced during the course of implementing the research. Only by raising such questions, that the shift in measuring research results not merely as outputs but as outcomes be possible. The participatory research should generate novel methods of measuring the benefits accrued to all stakeholders and this requires a process of critical reflection.

Given the above considerations, a conceptual and operational framework for integrating the CHF model of nutrition literacy in Farming Systems for Nutrition approach is proposed in Figure 6.

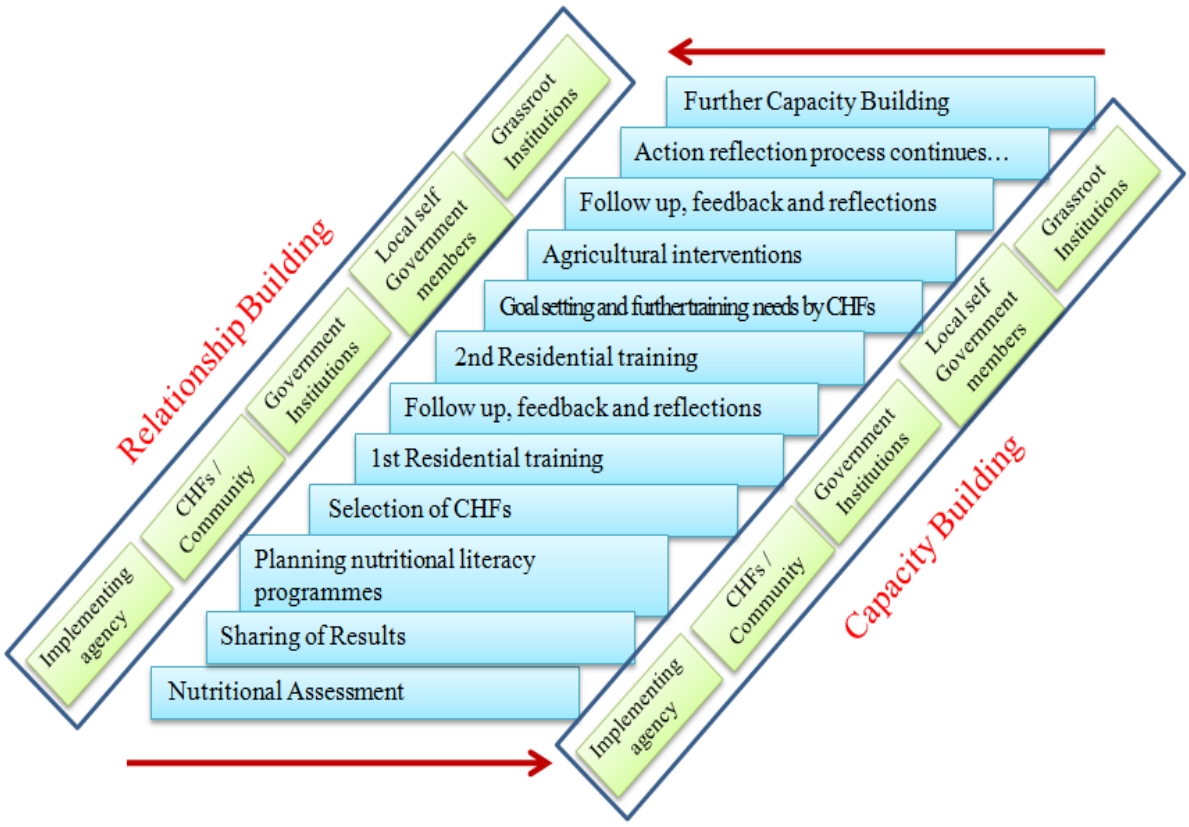

Figure 6. Conceptual and operational framework for integrating nutrition literacy in Farming Systems for Nutrition research

The experiences gained in the FSN study have underpinned the need for a nutrition education policy to be incorporated in all agricultural interventions / research. Currently 'nutrition education' programmes are being conducted only as part of health interventions and by the conventional education methods of imparting technical information, with the giver as the knowledge holder and the receiver as a passive participant.

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Annexures

Annexure 1. List of nutrition education activities conducted by staffs in Wardha

Programme title	Date	No. of beneficiaries	Village
Discuss survey result with community	18/12/ 2014	36	Borgaon
	20/12/ 2014	32, 20	Susund, Heti
	23/12/ 2014	34, 22	Saheli, Vitpur
Rainy season nutrition garden intervention planning meeting with villages women	20/05/2015	50	Saheli, Vitpur
	21/05/2015	55	Susund, Heti
	22/05/2015	30	Borgaon
	24/08/2015	75	Saheli, Vitpur, Heti
	25/08/2015	66	Susund, Borgaon
National Nutrition Week celebration	08/09/2015	22, 52	Saheli, Vitpur
	09/09/2015	58, 34	Borgaon, Heti
	10/09/2015	61	Susund
Training on kitchen garden	30/09/2015	10	Sevagrame
World Food Day celebration	16/10/2015	55, 64, 31	Saheli, Vitpur, Susund, Heti, Borgaon
Global Hand Wash Day celebration (Joint celebration with World Food Day)	16/10/2015	55, 64, 31	Saheli, Vitpur, Susund, Heti , Borgaon
Winter season nutrition garden intervention planning meeting with villages women	02/11/2015	65	Saheli, Vitpur, Heti
	03/11/2015	58	Susund, Borgaon
World Toilet Day celebration	19/11/2015	45	Saheli
	19/11/2015	50	Vitpur
	19/11/2015	58	Susund
	19/11/2015	60	Borgaon
	20/11/2015	21	Heti
Cassava and radish leaves demonstration	07/11/2015	90	Saheli
Discus survey result with community in Non-FSN villages	16/12/2015	50	Riapur and Heti
	16/12/2015	60	Ridhora, Tamasvada
Drawing Competition	16/12/2015	45	Saheli, Susund Borgaon
Iron deficiency anaemia	15/01/2016	69	Susund
	18/01/2016	34	Borgaon
	19/01/2016	23	Vitpur
	26/01/2016	38	Saheli
	27/01/2016	23	Heti
Meeting with Adolescent Girls on anemia	05/03/2016	11, 9, 10,8	Susund, Borgoan, Saheli, Vitpur
National Vaccination Day	16/03/2016	19	Saheli
Lecture on Balanced diet for MSSRF staffs	23/03/2016	16	MSSRF office
World Health day	7/04/2016	41	Saheli, Vitpur, Susund and Borgoan
World Immunization week	27 /4/2016	28	Borgaon gondi
	29/4/2016	45	Susund and Heti
Pregnant and lactating	28/7/2016	7	Saheli

National Nutrition Week	01/09/2106	47	Saheli
	02/09/2106	40	Vitpur
	06/09/2106	60	Susund, Heti
	07/09/2106	55	Borgaon Gondi
World Food Day (Exhibition on pulses)	19/10/2016	All villagers	Susund
World Food Day (Exhibition on Food group)	27/10/2016	All villagers	Borgaon Gondi
World Toilet Day	26/11/2016	All villagers	Saheli
	27/11/2016	All villagers	Borgaon Gondi
Exposure visit to MKSP site	08/12/2016	52	FSN villages
Workshop with adolescent girls on Balanced diet and Health	12/12/2016	40	FSN villages
Exposure visit to Center of Science for Villages, Dattapur	12/12/2016	40	FSN villages
Recipes Competition on pulses for adolescent girls	31/12/2016	39	FSN villages
Short skit by students for follow up of nutrition calendar developed using drawing competition	11/01/2017	47	Susund
	12/01/2017	35	Borgaon
Training on Balanced diet	24/01/2017	42	Saheli
	10/02/207	47	Borgaon
	28/02/2017	43	Vipur
Distributed of nail cutter distribution to school students	26/01/2017	All villagers	FSN villages
Cross field visit for vegetables cultivation under nutrition garden.	30/01/2017	20	Borgaon Gondi
Pulses exhibition cum competition for adolescent girls	31/01/2017		Saheli
Meeting on seed bank	09/02/2017	25	Borgaon

Annexure 2. List of nutrition education activities conducted by staffs in Koraput

Programme title	Date	No. of beneficiaries	Village
Programme for women and adolescent girls on addressing Anemia - Angnawadi center	6/10/15	32	Bhejaguda
Programme for women and adolescent girls	15/10/15	18	Chikima
Programme for women and adolescent girls on addressing Anemia - Village school	8/10/15	52	Banuaguda
Programme for women and adolescent girls on addressing Anemia - Angnawadi center	13/10/15	30 (including 6 Adolescents)	Atalaguda
Programme for women and adolescent girls on addressing Anemia - Anganawadi center	14/10/15	46	Kurkuti
Programme for women and adolescent girls on addressing Anemia - School verandah	24/11/15	36(including 8 men)	Maliguda
Programme for women and adolescent girls on addressing Anemia	24/12/15	20 (including 8 men)	Rauliguda
Vitamin A Awareness Programme - UP school	6/10/2015	60	Bhejaguda
Vitamin A Awareness Programme - Primary school	8/10/2015	33	Banuaguda
Vitamin A Awareness Programme - High school	7/10/2015	70	Chikima
Vitamin A Awareness Programme - Primary school	13/10/2015	25	Atalaguda
Adolescents girls High school,	11/1/2016	23	Chikima
Adolescents girls U. P school	20/1/2016	17	Bhejaguda
Mothers meeting AWC	20/1/2016	25	Bhejaguda
School children on Anemia -Primary school	21/1/2016	31	Atalaguda
Mothers meeting	20.01.2016 23.02.2016, 02.03.2016	27 22 21	Bhejaguda Banuaguda Atalguda
National vaccination day	16.03.2016	60	Chikima
Farmers day	17.03.2016	84+ (11 mssrf staff and Volunteer)	Chikima
Exposure visit of farmers to the on station trial of extra short duration Pigeon pea taken up IMP Project	16.04.2016	22	Tolla area

Annexure 3. Profile of CHFs –Wardha

Village		Name	gender	Age	Education	Primary Schooling	Cast/ Category	Landing holding		Family type	Family Size in no	Holding any position/ experience
								Rain fed	Irrigated			
Saheli	1.	Ms. Suvarna Chamlate	F	24	B.A. I	Saheli	Gowari (SBC)	4 Acers	--	Nuclear	5 M – 2, F – 3	--
	2.	Ms. Shital Nehare	F	23	B. A. I	Saheli	Gowari (SBC)	4 Acers	--	Nuclear	5 M – 3, F – 2	--
	3.	Mr. Yogesh Raut	M	33	12th	Saheli	Gowari (SBC)	10 Acres	--	Nuclear	3 M – 2, F – 1	
	4.	Mr. Suraj Nehare	M	19	12th fail	Saheli	Gowari (SBC)	4 Acers	--	Nuclear	5 M – 3, F – 2	--
	5.	Mrs. Surekha Uike	F	37	10th Fail	Amravati	Gond (ST)	--	2.5 Acres	Nuclear	4 M – 1, F - 1 Children M -2	--
	6.	Mr. Pravin Somkuwar	M	28	B. A. I Fail	Vitpur	Mahar (SC)	2.5 Acres	--	Nuclear	2 M – 1, F - 1	--
Susund												
	7.	Ms. Rupali Varthi	F	18	12th	Susund	Gond	2 Acres	--	Nuclear	5 M – 3, F - 2	--
	8.	Mrs. Sandhya Bhalavi	F	27	B.S.W. I	Nagazari Ta. Karaja Wardha	Gond (ST)	5 Acres	--	Joint	10 M – 3, F -3 Children M-2, F - 1	Sells girl at Pantaloon, Telephone Operator, Vodaphone
	9.	Mr. Mangesh Nikule	M	25	10th, ITI	Susund	Mali (OBC)	4 Acres	--	Nuclear	2 M – 1, F - 1	--
Heti												
	10.	Ms. Ravina Kamble	F	21	B. A. III MSCIT Typewriting	Susund	Mahar (SC)	5 Acres	5 Acres	Nuclear	4 M – 2, F - 2	--
	11.	Mr. Suraj Kamble	M	25	Diploma in Agriculture	Susund	Mahar (SC)	5 Acres	5 Acres	Nuclear	4 M – 2, F - 2	--
Borgaon Gondi												
	12.	Ms. Dipali Mangam	F	19	12th fail	Borgaon	Gond (ST)	--	--	Nuclear	5 M – 2, F – 3	--
	13.	Mrs. Hema Madavi	F	28	12th fail	Tembhari Ta. Arvi Wardha	Gond (ST)	--	--	Nuclear	4 M – 1, F - 1 Children M -2	Anganwadi Helper for six month
	14.	Mr. Naresh Mandari	M	21	12th fail	Boragon Gondi	Gond (ST)	2 Acres	--	Nuclear	4 M – 2, F - 2	Forest Labor Forest Department
	15.	Mr. Pradip Ivanathe	M	20	12th pass	Boragon Gondi	Gond (ST)	--	--	Nuclear	4 M – 3, F - 1	--

Annexure 4. Profile of CHFs –Koraput

Village	S.No.	Name of the Selected Person	Sex	Age	Caste	Education	Land holding (Acre)	Type of land	Family size	Family size	Position in the village
KURKUTI	1	Samaru Murjia	M	31	GADABA	4th Pass	2.3	UL-1.3 ML-1.0	4	Husband, wife, 1 son, daughter,	SHG member
	2	Chanchala Bisoi	F	35	DOMB	Iliterate	0.5	LL-0.5	5	Husband, wife, 3 son,	Nil
	3	Manguli Nageswari	F	36	RANA	2nd Pass	2.6	UL-0.6 ML-2.0	5	Husband, wife, 1 son, daughter-in-law, grandson	PRI member (Samiti Member)
	4	Madhav Paroja	M	28	PAROJA	Iliterate	1.0	UL-0.75 LL-0.25	7	Husband, wife, 3 daughter, 1 son, mother	Nil
CHIKIMA	5	Sahadeb Pujari	M	42	RANA	Iliterate	1.5	UL-0.5 LL-1.0	3	Husband, wife, 1 son,	Nil
	6	Manika Gouda	F	45	OBC	Iliterate	2.0	Ml-2.0	5	Husband, wife, 1 son, 2 daughter	Nil
	7	Niranjan Khada	M	48	RANA	Iliterate	3.0	ML-2.0 LL-1.0	6	Husband, wife, 2 son, 1 daughter, mother	Nil
	8	Janaki Nayak	F	38	RANA	Iliterate	0.5	LL-0.5	3	Self, 2 son	Nil
MALIGUDA	9	Sunadei Mali	F	32	MALI	Iliterate	1.5	ML-1.5	3	Husband, wife, 1 grandson	Cook in School, SHG member
	10	Surjya Mali	F	48	MALI	Iliterate	2.45	ML-0.45 LL-2.0	6	Husband, wife, 2 grandson, father-in-law, daughter-in-law	SHG member
	11	Mahendra Mali	M	25	MALI	9th Pass	4.5	ML-3.5 LL-1.0	6	Husband, wife, 1 daughter, sister, father, mother	Nil
RAULIGUDA	12	Shyama Naria	M	40	GADABA	7th Pass	2.0	UL-0.3 LL-2.6	5	Husband, wife, father, mother, brother	Nil
	13	Dashu Mundagadia	F	48	GADABA	Illiterate	2.1	UL-0.1 ML-1.0 LL-1.0	3	Husband, wife, 1 son	SHG member
	14	Budri Mundagudia	F	40	GADABA	Illiterate	4	UL-1.0 ML-1.0 LL-2.0	5	Husband, wife, 2 daughter, 1 son	SHG member
ATALGUDA	15	Ananda Pradhani	M	35	RANA	7th Pass	2.90	UL-0.3 LL-2.6	5	Husband, wife, 1 son, 2 daughter	Former Ward member
	16	Sania Hantala	M	32	RANA	5th Pass	1.5	UL-0.5 LL-1.0	2	Husband, wife	Member of Farmer's club, CHF

	17	Gupta Guntha	M	19	RANA	Iliterate	1	ML-1.0	6	Husband, wife, father, mother, grandmother, younger brother	Nil
BHEJAGUDA	18	Prahalad Pujari	M	38	BHUMIA	9th Pass	4.5	UL-0.5 ML-2.0 LL-2.0	5	Husband, wife, 2 son, 1 daughter	SMC President, CHF
	19	Kamala Pujari	F	44	BHUMIA	Iliterate	2	UL-0.5 LL-1.5	1	Self	SHG member, Cook in School, CHF
	20	Balaram Harijan	M	45	HARIJAN	Iliterate	1	ML-0.5 LL-0.5	3	Husband, wife, 1 son,	Nil
	21	Rukmani Harijan	F	33	HARIJAN	5th Pass	1.2	UL-0.4 LL-0.8	2	Husband, wife	ASHA
BANUAGUDA	22	Damuru Paraja	M	48	PARAJA	Iliterate	1.4	ML-1.0	5	Husband, wife, 1 son, 2 daughter	CHF
	23	Ghasamani Dalei	F	39	MALI	Iliterate	4	UL-1.0 ML-1.5 LL-0.5	7	Husband, wife, 1 son, 2 daughter, father-in-law, Mother-in-law	CHF, SHG member
	24	Prahalad Nayak	M	29	BHUMIA	5th Pass	6	UL-2.0 ML-2.0 LL-2.0	5	Husband, wife, 1 son, 2 daughter, father, mother	VSS member
	25	Nayana Sukuri	F	25	RANA	9th Pass	5.5	UL-2.5 ML-1.0 LL-2.0	5	Husband, wife, father-in-law, mother-in-law, sister-in-law	Nil

Annexure 5. Estimated food requirement of households (calculated based on RDA)

The following table on recommended level was provided for comparison and discussion:

Food Groups	RDA	Requirement for 5 member family (g)	75% of RDA
Pulses	70	350	250
Green leafy vegetables	100	500	400
Other vegetables	200	1000	750
Milk	250	1250 ml	1000 ml
Animal foods	100	500	400
Fruits	100	500	400
Fat	30	150	120

*RDA for cereals was not provided as cereals were consumed in sufficient amounts

Annexure 6. Quantitative yield of various food crops for Wardha

Group 1 Black soil (From 1 acre land for a family of 5 adults)

Production by Food groups	Total Production (kg)	Home consumption (kg)	Sold in Market (kg)	Remarks
Cereals (Wheat, Jowar, Maize)	725*	524	200	Soy bean produced is not consumed due to its taste; it is sold in market to purchase other food items.
Pulses (Red gram, green gram, soy bean, bengal gram)	1340	195	1145	
Vegetables (Greens- spinach, fenugreek, coriander)	150	50	100	
Other vegetables (Brinjal, drumstick, green chillies, ladies finger, cow pea, tomato, onion, cluster bean)	650	202	448	
Fruits (Orange, mango, guava, pomegranate, papaya)		whatever produced, is consumption		

*quantity given is for - after disturbing to labours

Group 2: Medium red soil (from 5 acre for a family of 5 adults)

Production by Food groups	Total Production (quintal)	Home consumption (quintal)	Sold in Market (quintal)
Cereals (Wheat, jowar)	10 (2)	4	6
Pulses (Red gram, green gram, soy bean, bengal gram, black gram)	27 (5)	2	25
Vegetables (Pumpkin, cluster beans, cucumber, brinjal, ladies finger, cow pea, spinach, fenugreek, coriander, carrot, radish, onion, amaranthus, *ambadi*)	1 (20 kg)	50 kg	50
Fruits (Custard apple, guava, banana, orange, amla, *ram seethaphal* (bullock's heart), pomegranate)	27 (5)	1	26

Figures in parenthesis denotes production from 1 acre of land

Group 3: Sandy Rocky soil (from 5 acre for a family of 5 adults)

Production by Food groups	Total Production (quintal)	Home consumption (quintal)	Sold in Market (quintal)
Cereals (Wheat, jowar, maize)	5	4	1
Pulses (Red gram, soy bean, bengal gram)	5q 50 kg	1.50	4
Green leafy vegetables (Spinach, fenugreek, coriander, agathi)	40 kg	20 kg	20 kg
Other Vegetables (Potato, cucumber, cow pea, cluster bean, drumstick, ladies finger, pumpkin, cabbage)	1	40 kg	60 kg
Root vegetables (Radish. Beetroot, carrot)	30 kg	10 kg	20 kg
Fruits (Mango, papaya, lemon, guava)	5q 30 kg	30 kg	5
Animal foods (from hen 10, goat 1, cow 2) – curd milk, meat and egg Curd Milk Egg Meat	 550 1550 150 nos. 20 kg	 50 50 50 nos 1 kg	 500 l 1000 l 100 nos 20 kg

Group 4: Kitchen Garden (6 x 8 ft)

Production by Food groups	Total Production (kg)	Home consumption (kg)	Sold in Market (kg)
Vegetables (Spinach, fenugreek leaves, amaranthus, coriander)	11.50	11.50	
Other vegetables (Pumpkin, drumstick, agathi flowers, cow pea, cluster bean)	112.50	37	75.50
Root vegetables (Beet root, onion, radish, carrot, sweet potato)	10.50	10.50	
Fruits Lemon Custard apple Guava	Nos. 150 30 70	Nos. 50 30 40	Nos. 100 - 30

Annexure 7. Quantitative yield of various food crops for Koraput

Group 1. Production and food requirement with half acres of three types of land

Food groups	Monthly requirement	Yearly requirement	Production	Gap (yes/no)	How to meet the gap
Rice	80 kg	960 kg	14 qunital	No	
Ragi	15 kg	180 kg	2 quintal	No	
Other millets	-	-	2 quintal	-	
Pulses	10 kg (consumption of pulses is reduced on consuming animal foods)	120 kg	120 kg	No	
Vegetables	30 kg	360 kg	270 kg	Yes	Excess of other foods can be sold and vegetables can be brought
Animal foods	4 kg	48 kg	60 kg (40 kg chicken, 10 kg	No	

			egg and 10 kg fish)		
Fruits	4 kg	40 kg	30 kg	Yes	i) Can be collected from jungle according to seasons ii) Fruits can be exchanged with sprouted pulses and nuts

Group 2. Food requirement and production from upland and low land

Food groups	Monthly requirement	Yearly requirement	Production	Gap (yes/no)	How to meet the gap
Rice	75 kg	9 quintal	6 quintal	Yes	3 quintal from PDS
Ragi	18 kg	216 kg	200 kg	Yes	Purchased from Market
Other millets	-	-	-	-	-
Pulses	12 kg	144 kg	100 kg	Yes	Purchased from market Animal foods can be added – wild animals
Vegetables	20 kg	240 kg	120 kg	Yes	
Animal foods	2 kg	24 kg	40 kg	Yes	
Fruits	4 kg	48 kg	25 kg	Yes	

Group 3. Food requirement and production from Low land and middle land

Food groups	Monthly requirement	Yearly requirement	Production	Gap (yes/no)
Rice	60 kg	720 kg	935 kg	No
Ragi	10 kg	120 kg	200 kg	No
Other millets (glv)	-	400 kg	400 kg	
Pulses	-	116 kg	225 kg	No
Vegetables	-	250 kg	1500 kg	No
Animal foods	-	50 kg	70 kg	No
Fruits	-	-	-	-