

# **FARMING SYSTEM FOR NUTRITION**

## **SUMMARY of BASELINE REPORT FOR WARDHA**

### **PART I**

(Demographic, Socio Economic and Nutrition Status Profile of Study Villages)

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## **Introduction**

The research question underlying the Farming System for Nutrition (FSN) study is – What is the scope of agricultural interventions such as ‘Farming System for Nutrition’ to improve the nutritional status of the undernourished? The study hypothesis is – specially designed agricultural interventions of FSN can enhance agricultural productivity and farm incomes, leading to more diversified and nutritive dietary pattern, contributing to better nutritional outcomes.

The research study is being conducted at two locations in India, viz. Wardha district in the Vidarbha region of Maharashtra and Koraput district of Odisha. This report highlights the key findings for Wardha. The tables are given in Annex I.

Five villages (556 households with population of 2254) from two blocks of Wardha district have been identified as FSN villages for the study (Table 1). The non-FSN villages comprise of three villages with 266 households and a population of 1033.

Based on the requirements of the study, a series of eleven surveys were decided on. The list of surveys is in the Annex II. These surveys aim to capture information on demographic and socio-economic characteristics, and status of nutrition characteristics of the population in terms of anthropometric indicators, history of morbidity in the past fortnight, prevalence of clinical signs of nutritional deficiencies and food & nutrient intakes, to build a baseline for the project. This is the crucial base against which the impact of the FSN interventions will be judged through a similar round of surveys towards the end of the project. This report is a summary of Part 1 of the Baseline Report for Wardha based on analysis of information from the six surveys completed so far out of the eleven planned.

## **Key Findings**

The majority of the population belongs to the Scheduled Tribe (ST) category in both FSN and non-FSN villages. They have road connectivity and electricity. Piped water is the main source of drinking water. Open defecation is however the predominant practice.

## **Nutritional Status**

The overall prevalence of chronic energy deficiency (CED; BMI <18.5) was higher among women than men in both FSN (43 % vs. 39%) and non-FSN (50% vs. 39%) villages (Table 2). The overall prevalence of wasting (<-2SD) was higher in the 1-3 yr age group compared to the 3-5 yr age group in both FSN and non-FSN villages (Table 3).

The prevalence of overall stunting ( $<-2SD$ ) tended to increase with increase in age both in FSN (from about 40% in 1-3 yr group to about 47% in 3-5 yr group) and non-FSN villages (from about 21% in 1-3 yr group to about 29% in 3-5 yr group). The overall prevalence of stunting was found to be higher among boys both in FSN (Boys: 48%; Girls:38%) as well as non-FSN villages (Boys:32%; Girls:17%). The prevalence of wasting tended to decrease with increase in age from about 38% in 1-3 year age group to about 19% in 3-5 year age group in FSN villages. Similar trends were observed in non-FSN villages also (from about 42% to about 14%). The prevalence of chronic energy deficiency (BMI  $<18.5$ ) was found to be higher among boys in the 10-14 years and 15-17 years age group in both FSN and non-FSN villages, as compared to girls.

### **Occupation and Income**

The population of the sample villages in Wardha district is predominantly dependent on agriculture. The occupational structure indicates cultivation and agricultural labour as the primary occupation of majority of households both in the villages chosen for farming systems for nutrition intervention (FSN) and non-FSN villages. 96 per cent of the FSN households and 93.5 per cent of the non-FSN households reported the head of the household's occupation as cultivation or agricultural labour.

When the households are distributed as per the monthly per capita income classes, we find that in the lowest income class of less than Rs.800/- per capita per month, the average income both in the FSN and non-FSN villages is less than Rs.600/-. The quartiles of the FSN villages compared with the same classes for non-FSN villages show that the average incomes across these classes are more or less the same. The average monthly per capita income in the FSN villages is Rs. 1476/- and Rs. 1770/- in the non-FSN villages. The income inequality measured by Gini ratios are close to each other for FSN and non-FSN villages at 0.28 and 0.22 respectively (Table 4).

The occupational distribution of the households in the lowest two per capita income classes of less than Rs. 1250/- shows that most of the households belong to the agricultural household category in both FSN and non-FSN villages. The implication of the occupational distribution and income distribution to the 'Farming System for Nutrition' intervention is that since most of them are engaged in agriculture, the proposed interventions in crop, livestock and homestead land are relevant to the majority of them.

The land distribution shows that those who operate less than 2.5 acres are 11.5% in the FSN villages and 7.5% in the non-FSN villages. Most of the holdings are in the middle two categories of 2.5-5 acres and 5-10 acres. About 49% of households in the FSN villages and 34.6% of households

in the non-FSN villages are in the land size classes of 2.5 to 10 acres. Even though, 68.5% of the households seem to hold land in the FSN villages, as against 48% in the non-FSN villages, the average size of the land is the same in FSN and non-FSN villages in the middle two size classes that account for the largest percentage of holdings.

### **Cropping Pattern**

Commercial crops dominate the cropping pattern in Wardha district. Cotton and soybean are the main crops that account for a major area in the “*Kharif*” season (the monsoon season from June to October). Crops are grown also in “*Rabi*” season, (the winter season from November to March). The crop pattern of the district is highly skewed towards cotton and soybean followed by pigeon pea in *kharif* season. About 47% of the gross cropped area in FSN villages and 53% of the area in non-FSN villages is under cotton. About 22% of the gross cropped area is under soybean about 12% of the gross cropped area is under pigeon pea in both FSN and non-FSN villages. The crop diversity is about the same at 3.3 in FSN villages and 2.9 in non-FSN villages. The crop patterns of the FSN and the non-FSN villages are almost the same across the land classes. A large percentage of the population depends upon the purchased food for their daily food needs as the cropping system is predominantly commercial crop oriented. However, a small percentage of gross cropped area is devoted to food crops. A large share of the staple grains (such as sorghum and wheat) and a substantial percentage of pulses (such as gram and pigeon pea) produced is retained for home consumption in both FSN and non-FSN villages.

### **Livestock Holding**

Possession of livestock is found to be more common than possession of homestead land in FSN as well as non-FSN villages. About 43% of the households reported possession of livestock in FSN and non-FSN villages. Most of the cattle in the villages are milch animals such as cows and buffaloes, both in the FSN and non-FSN villages. There are small ruminates such as goats, sheep and pigs in the FSN villages as well as in the non-FSN villages. Some households possess draught animals for ploughing and transport such as bullocks in FSN as well as in non-FSN villages. A few households keep poultry as well. The possession of livestock according to the land classes shows that the largest number of milch cattle and draught animals are with medium sized land holding size of 2.5 to 10.00 acres both in FSN and in non-FSN villages. This group also owns most of the small ruminates and poultry in the FSN villages, though the landless are the next important owners of small ruminates and poultry in the FSN villages. In the non-FSN villages, the landless own most of the small ruminates.

### **Proposed FSN Interventions based on Crop land-Livestock-Homestead land**

A majority of households amounting to about 82% in FSN and non-FSN villages did not possess any homestead land. Out of the households reporting homestead land, about 73% also reported possessing livestock in the FSN villages. In the non-FSN villages about 83% of those who reported having homestead land also reported possession of livestock (Table 5). The three types of interventions that constitute farming systems for nutrition have crop, livestock and home garden components. Barring about 15% of households in the FSN villages and about 25.6% of the households in the non-FSN villages, all the other households are amenable to interventions proposed in the feasibility study of the Farming Systems for Nutrition. Some of these excluded households are in non-agricultural occupations and hence not the target group. The remaining agricultural labour households without any land or livestock resources may benefit from livestock interventions such as poultry. There could be some spill over benefits of enhanced employment opportunities to this group.

### **Further Plans**

The data set collected under the baseline survey of FSN and non-FSN villages comprises information on household's social and economic profile, anthropometry indicators for all members of the household and details on agricultural activities. The data collected has to be further studied more carefully and probed and examined from several angles.

The data collected will be used:

- (1) To analyse the food items consumed from market and from own production; to examine alternative avenues the households have to improve dietary diversity in the present scenario either from home consumption or market.
- (2) Examine the association between enterprise diversification, dietary diversification and nutritional outcomes especially among women and children.
- (3) Examine the association of enabling factors such as water, sanitation and hygiene (WASH) and nutrition outcomes.

Based on this analysis, it is proposed to prepare a paper for publication in a peer reviewed journal by the year-end.

**Table 1 Population of FSN and Non-FSN Study Villages**

<b>Wardha District, Maharashtra</b>				
<b>Block</b>	<b>Panchayat</b>	<b>No. of Villages</b>	<b>No. of Households</b>	<b>Population</b>
<i>FSN Villages</i>				
Arvi	Saheli	3	337	1331
Karanja	Borgaon	2	219	923
	<b>Total</b>	<b>5</b>	<b>556</b>	<b>2254</b>
<i>Non-FSN Villages</i>				
Seloo	Ridhora	<b>3</b>	<b>266</b>	<b>1033</b>

**Table 2: Distribution of Adult Men & Women according to Body Mass Index (BMI)**

<b>BMI</b>	<b>Nutritional Status</b>	<b>FSN</b>		<b>NON-FSN</b>	
		<b>MEN (n:739)</b>	<b>WOMEN (n:702)</b>	<b>MEN (n:333)</b>	<b>WOMEN (n:300)</b>
<b>&lt; 16.0</b>	<b>CED III</b>	5.4	10.7	6.5	14.1
<b>16.0 - 17.0</b>	<b>CED II</b>	10.5	11.0	10.8	12.4
<b>17.0 - 18.5</b>	<b>CED I</b>	23.4	21.7	21.8	23.2
<b>&lt; 18.5</b>	<b>Overall CED</b>	<b>39.3</b>	<b>43.3</b>	<b>39.1</b>	<b>49.7</b>
<b>18.5 - 23.0</b>	<b>Normal</b>	49.9	43.7	50.9	39.6
<b>23.0 - 27.5</b>	<b>Overweight</b>	9.9	10.0	8.4	8.4
<b>≥ 27.5</b>	<b>Obesity</b>	0.9	3.0	1.6	2.3

*CED: Chronic Energy Deficiency*

**Table 3: Prevalence of Undernutrition among 0–5 year Children according to SD Classification using WHO Stds (%): Boys + Girls**

Age Group (Months)	INDICATOR												
	Total n	UNDERWEIGHT (Weight for Age < Median – 2 SD)				STUNTING (Height for Age < Median – 2 SD)				WASTING (Weight for Height < Median – 2 SD)			
		n	% Preva- lence	95 % CI		n	% Preva- lence	95 % CI		n	% Preva- lence	95 % CI	
				LL	UL			LL	UL			LL	UL
<b>FSN VILLAGES</b>													
<b>0 – 12</b>	10	<b>1</b>	<b>10.0</b>	8.6	28.6	<b>0</b>	<b>0.0</b>	0	0	<b>3</b>	<b>30.0</b>	1.6	58.4
<b>12 – 36</b>	48	<b>22</b>	<b>45.8</b>	31.7	59.9	<b>19</b>	<b>39.6</b>	25.8	53.4	<b>18</b>	<b>37.5</b>	23.8	51.2
<b>36 – 60</b>	62	<b>29</b>	<b>46.8</b>	34.4	59.2	<b>29</b>	<b>46.8</b>	34.4	59.2	<b>12</b>	<b>19.4</b>	9.6	29.2
<b>0 – 36</b>	58	<b>23</b>	<b>39.7</b>	27.1	52.2	<b>19</b>	<b>32.8</b>	20.7	44.9	<b>21</b>	<b>36.2</b>	23.8	48.6
<b>12 – 60</b>	110	<b>51</b>	<b>46.4</b>	37.0	55.7	<b>48</b>	<b>43.6</b>	34.3	52.9	<b>30</b>	<b>27.3</b>	19.0	35.6
<b>0 – 60</b>	120	<b>52</b>	<b>43.3</b>	34.5	52.2	<b>48</b>	<b>40.0</b>	31.2	48.8	<b>33</b>	<b>27.5</b>	19.5	35.5
<b>NON-FSN VILLAGES</b>													
<b>0 – 12</b>	4	<b>2</b>	<b>50.0</b>	1.0	99.0	<b>1</b>	<b>25.0</b>	17.4	67.4	<b>1</b>	<b>25.0</b>	17.4	67.4
<b>12 – 36</b>	24	<b>9</b>	<b>37.5</b>	18.1	56.9	<b>5</b>	<b>20.8</b>	4.6	37.0	<b>10</b>	<b>41.7</b>	22.0	61.4
<b>36 – 60</b>	21	<b>6</b>	<b>28.6</b>	9.2	47.9	<b>6</b>	<b>28.6</b>	9.3	47.9	<b>3</b>	<b>14.3</b>	0.7	29.3
<b>0 – 36</b>	28	<b>11</b>	<b>39.3</b>	21.2	57.4	<b>6</b>	<b>21.4</b>	6.2	36.6	<b>11</b>	<b>39.3</b>	21.2	57.4
<b>12 – 60</b>	45	<b>15</b>	<b>33.3</b>	19.6	47.1	<b>11</b>	<b>24.4</b>	11.9	36.9	<b>13</b>	<b>28.9</b>	15.7	42.1
<b>0 – 60</b>	49	<b>17</b>	<b>34.7</b>	21.4	48.0	<b>12</b>	<b>24.5</b>	12.5	36.5	<b>14</b>	<b>28.6</b>	15.9	41.3

*LL: Lower Level*

*UL: Upper Level*

**Table 4 Distribution of Households based on Income**

Income Distribution	NON-FSN			FSN		
	% of H.H	Avg. PCI (Rs.)	% of tot. In	% of H.H	Avg. PCI (Rs.)	% of tot. In
> 800	12.0	530.5	4.3	24.1	468.2	9.2
800 -1250	26.7	1013.4	18.4	25.0	1017.8	18.9
1250 -1750	23.3	1500.8	21.5	25.7	1462.3	26.9
< 1750	37.9	2753.3	55.9	25.2	2874.8	44.9
<b>Total</b>	100	1769.9	100	100	1467.3	100

**GINI:** non-FSN = 0.22, FSN = 0.28

**Avg. PCI** = Average per capita income

**MPCI** = Monthly per capita income class

**% of tot. In** = Percentage to total income

**Table 5: Distribution of Households with and without Homestead Land (No.)**

Livestock	Land Class	FSN		non-FSN	
		With Homestead	Without Homestead	With Homestead	Without Homestead
<b>With Livestock</b>	No Land	12	39	12	43
	<2.5	11	26	-	13
	2.5 to <5	24	72	9	25
	5 to <10	16	74	9	20
	>=10	6	31	2	10
<b>Without Livestock</b>	No Land	15	109	10	73
	<2.5	3	24	-	7
	2.5 to <5	6	49	2	19
	5 to <10	4	27	3	5
	>=10	-	8	1	3
	<b>Total sample</b>	<b>97</b>	<b>459</b>	<b>48</b>	<b>218</b>



## List of Baseline Household Surveys

Sl.	Particulars	Purpose	Administered on
1	Detailed baseline household survey on demography, agriculture and socio-economic aspects	To document the baseline demographic, occupation and socio-economic profile of households	All households in FSN and non-FSN villages
2	Baseline food & nutrient consumption survey (three seasons)	To understand seasonal variations in consumption at household level	All households in FSN and non-FSN villages
3	Baseline employment survey (including seasonal migration survey – three rounds)	Profiling the current occupation and migration pattern	All households in FSN and non-FSN villages
4	Baseline status of agriculture, animal husbandry and home garden	To plan FSN interventions	All households in FSN and non-FSN villages
5	Baseline income and expenditure survey	To capture different sources of income and production and consumption expenditure	All households in FSN and non-FSN villages
6	Baseline health & nutrition survey (anthropometric and history of morbidity)	To collect information on height, weight and morbidity (preceding fortnight) of all members	All individuals from each of the households in FSN and non-FSN villages
7	Baseline Time Use survey	To capture time spent by both men and women on farm, non-farm and household activities	Sub sample across all categories of households in FSN and non-FSN villages
8	Baseline survey on access to resources and decision making	To collect information on gender roles and responsibilities	Sub sample across all categories of households in FSN and non-FSN villages
9	Baseline intra-household dietary survey (24 hour recall)	To document existing dietary pattern within the household	Sub sample across all categories of landed households in FSN and non-FSN villages
10	Biochemical indicators through collection of blood sample	To assess level of iron and vitamin-A deficiency	All children 1-5 yrs, adolescent girls 12-17 yrs and women 18-45 yrs in FSN and non-FSN villages
11	Baseline cost of cultivation survey	To collect information on cost of cultivation of major crops	Sub sample across all categories of households in FSN and non-FSN villages