FARMING SYSTEM FOR NUTRITION

Farming is the primary source of livelihood for the majority of the population in India and South Asia. The region is also home to a large population of undernourished people.

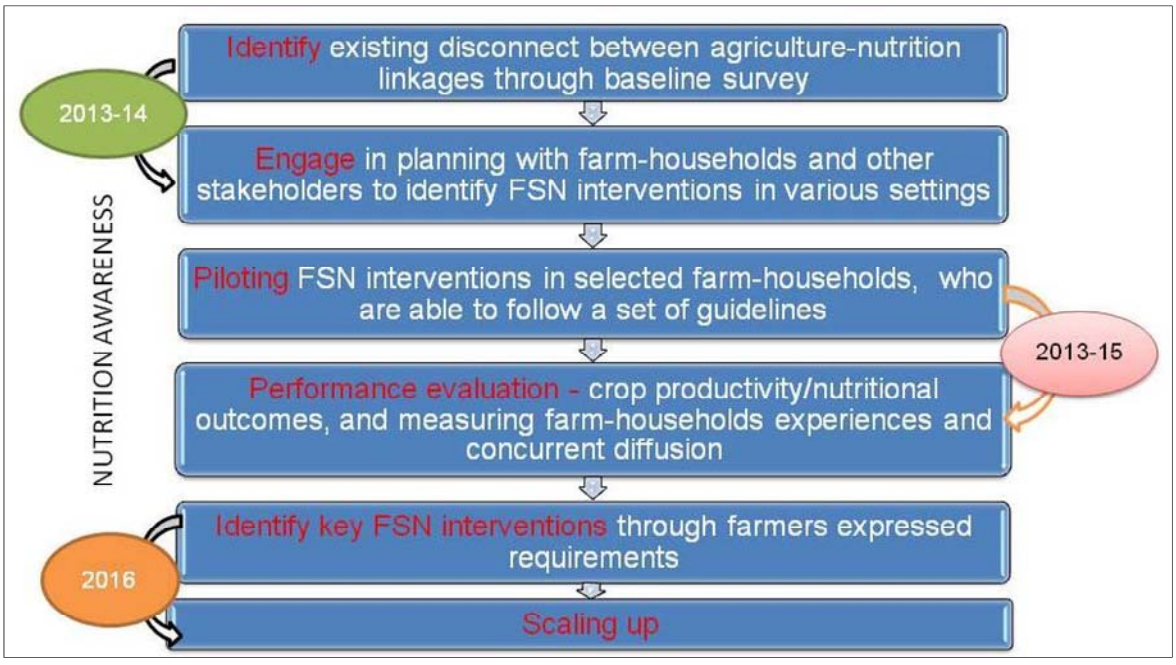
A Farming System for Nutrition (FSN) approach to address the problem of undernutrition is an ongoing feasibility study by the M. S. Swaminathan Research Foundation under the research consortium programme on 'Leveraging Agriculture for Nutrition in South Asia' - LANSA (www.lansasouthasia.org). The core research question underlying the study is: ***How strong is the evidence that agricultural interventions can be pro-nutrition***?

FSN as defined by Professor M S Swaminathan, envisages 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). It is an interventional approach that includes a combination of sustainable measures including advanced crop production practices, bio-fortification, promotion of nutrition gardens of fruits and vegetables, livestock and poultry development, and setting up of small-scale fisheries, combined with nutrition awareness, as stimulant for rendering consistent output of higher income and better nutrition. The objective is to address malnutrition in all its forms, viz. calorie deprivation, protein deficiency and "hidden hunger" (i.e. micronutrient deficiencies).

Study Locations

The study is underway in a core set of seven villages (658 households with population of 2,845) of Koraput District of Odisha and five villages (556 households with population of 2,254) of Wardha District in the Vidarbha region of Maharashtra (see map). Although agro-ecologically the two study intervention locations are different, both of them are characterized by rain-fed farming and high burden of malnutrition. The starting point was a detailed baseline survey of households (Fig 1).

Fig 1: Steps of FSN Approach



At both the locations, more than 40 per cent of children under age five were underweight (low weight for age), 35 per cent stunted (low height for age) and 27 per cent wasted (low weight for height); about 33 per cent suffered from vitamin A deficiency. 39 per cent adult men and 47 per cent women were undernourished; High levels of anaemia (>60%) prevails among children under five, adolescent girls and women (18-45 years). The diet of people is cereal dominated with consumption of all other food groups being less than the recommended levels. Based on the resource base and nutrition status, the FSN interventions were designed in discussion with the community (Fig2).

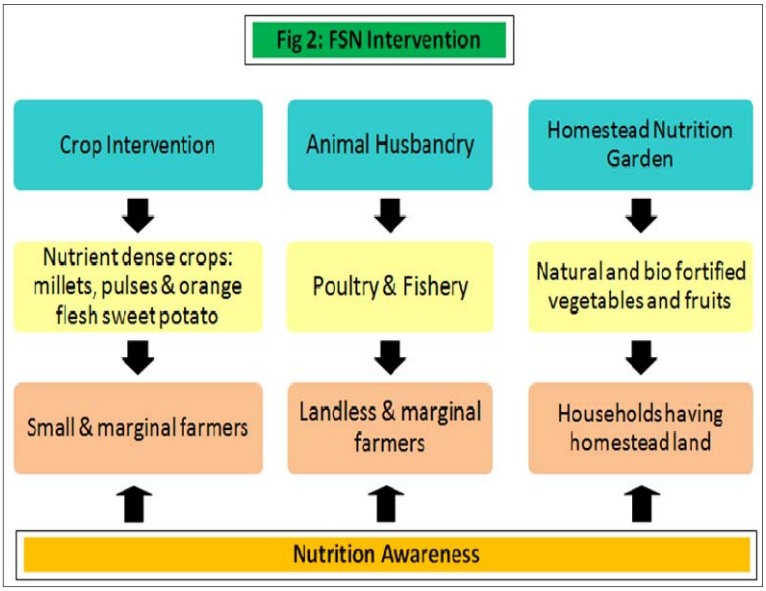


Table 1: Details of crop based FSN interventions (2015-16)

Component	Area (ha)	Improved variety	Yield (kg ha^{-1})	±Additional nutrient harvested (kg ha^{-1})	Total expenditure (Rs. ha^{-1})	Gross return (Rs.ha^{-1})	Net return (Rs.ha^{-1})	B: C ratio
Koraput								
Pre summer								
Green gram	5	SML-668	486	15	12,587	27,360	14,773	2.17
Black gram	3	TK94-2	351	12	11,500	24,570	13,070	2.14
Kharif								
Finger millet	4.4	GPU-67	2067	35	20,800	34,110	13,310	1.64
Maize + Pigeon pea	4.4	NHM-51(maize) NTL-724 (pigeon pea)	7729	3669	27,600	77,303	49,703	2.80
Wardha								
Kharif								
Sorghum	16.4	CSV-20	330	34	17,655	6600*	-	0.37
Red gram	8.8	NTL-900	1533	16	25,070	1,22,600	97,530	4.89
Rabi								
Wheat	35	AKAW-4210	1560	28	22,980	28,080	5,100	1.22
Chick pea	8	Jackie-9218	898	20	23,123	49,363	26,240	2.13
Onion	2	Bhima super	6320	55	21,500	94,800	73,300	4.41

± additional nutrients harvested (mainly in terms of protein) indicates the additional amount farmers will get from cultivation of improved varieties as compared to the traditional varieties
*crop loss due to dry spell during germination phase

Crop Husbandry:

The crop based interventions under FSN basically focus on promotion of nutrient dense crops like millets (sorghum in Wardha and finger millet in Koraput) and pulses; crop diversification through varietal substitution and crop intensification for small and marginal landholders. Varietal substitution through introduction of nutrient dense improved varieties of predominant crops at both the study sites is being carried out with improved package of practices in order to increase the production and productivity, thereby increasing nutrient availability per farm household (Table 1). Likewise, crop intensification through intercropping systems such as maize and pigeon pea aims at increasing land use efficiency and generating higher monetary income.

Finger millet crop, Koraput

Farmer with sorghum harvest, Wardha

Household and school Nutrition Garden

Nutrition Garden:

The basic principle of nutrition garden intervention is to create awareness about importance of consuming fruits and vegetables and ensuring their availability. Seed kits consisting of different leafy, fruit and root vegetables based on a seasonal calendar along with planting materials of tubers and fruit bearing plants have been distributed at household level. Where backyard land is limited, some households grow the vegetables on their farm land. Produce from school nutrition gardens in the villages goes into the midday meal prepared for the school children. Among tuber crops, **Orange Flesh Sweet Potato** is being specially promoted to help address vitamin A deficiency.

Animal Husbandry:

Regular animal health camps to improve health and productivity of livestock and fodder for livestock are an important component of the approach. Poultry farming has been introduced for landless and marginal farmer households to provide livelihood support and enhance nutrition intake in Wardha; in Koraput, household and community based fish farming is being promoted based on availability of farm ponds.

Farmers with their fish harvest, Koraput

Poultry Farmer, Wardha

Nutrition Awareness:

Underlying the entire approach is creating awareness in the community on leveraging their main source of livelihood, i.e. agriculture to improve their nutrition status along with attention to aspects of WASH and health of women and children in particular. This is a continuous effort being undertaken at individual, household and institutional levels. A participatory research is underway to build capacity of selected members of the community to be champions at the village level, to ensure sustainability.

Recipe demonstration at Wardha

Residential training workshop for Community Resource Persons

Guidance and support from agriculture and veterinary research institutes/universities in the region are being leveraged. The ongoing study of area specific FSN approach offers an opportunity to capture the extent of productivity and profitability enhancement in the farming system; coupled with greater nutrition awareness, this should contribute to more intake of nutritionally rich food, greater dietary diversity and enhanced spending by the household on a balanced diet.

From 2016-17, the interventions have moved beyond the core set of villages in each study location to reach out to more farmers and increase the production and availability of nutrient dense crops. This is expected to lead to greater acceptance and adoption of nutrition sensitive agriculture practices. Emerging evidence on effectively linking agriculture to nutritional outcomes could be the basis for replication in other agro-ecological regions of the country.

References

Das P K, R V Bhavani, M S Swaminathan (2014) *A Farming System Model to Leverage Agriculture for Nutritional Outcomes* Agricultural Research, September 3:193-203 DOI 10.1007/s40003-014-0119-5

Nagarajan S, R V Bhavani, M S Swaminathan (2014) *Operationalizing the concept of Farming System for Nutrition through the promotion of nutrition-sensitive agriculture* Current Science, 107, No.6 25 Sept 2014

http://lansasouthasia.org/content/farming-system-nutrition

March 2017

Credits: This Brief was written by Aliza Pradhan, Coordinator FSN Study, R V Bhavani, Programme Manager, and Akshaya Kumar Panda, Coordinator FSN Study, Koraput, of the LANSA Research Programme Consortium at M.S. Swaminathan Research Foundation, India.

This study is part of ongoing research under the LANSA Research Programme Consortium and is funded by UK Aid from the UK Government. The views expressed do not necessarily reflect the UK government's official policies.