Indian Oil Corporation Ltd, Mumbai

Introducing the concept of Nutri-gardens to Address Rural Malnutrition by Involving IOCL's Kisan Seva Kendras

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The Energy and Resources Institute
Western Regional Centre, Navi Mumbai

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Abbreviations

FAO	Food and Agriculture Organization
ICDS	Integrated Child Development Services
IOCL	Indian Oil Corporation Ltd.
ITDP	Integrated tribal development Project
KSKs	Kisan Seva Kendras
MAC	Medium Arm Circumference
MAM	Moderate Acute Malnourished
MoU	Memorandum of Understanding
NNMB	National Nutrition Monitoring Bureau
PHC	Primary Health Care Centre
RDA	Recommended Dietary Allowance
SAM	Severe Acute Malnourished
SHGs	Self Help Groups
TERI	The Energy and Resources Institute.
TZP	Thane Zilla Parishad.
UBI	Union Bank of India

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The Energy and Research Institute

Executive Summary

More than a third of children aged three or younger in the state of Maharashtra are stunted permanently by undernourishment, states UNICEF. Moreover, around 5,400 deaths occurred in the state due to malnourishment in 2013 alone. It is an issue of great concern, especially in the tribal blocks, since more than 60 percent of the population is malnourished.

To address this critical issue, TERI (The Energy and Resources Institute) in collaboration with IOCL (Indian Oil Corporation Ltd.) and TZP (Thane Zilla Parishad) initiated a project to address malnourishment in the tribal blocks of Maharashtra. With the help of KSKs (Kisan Seva Kendras) of IOCL, two cursory workshops were organized in Wada and Vikramgad blocks in Thane district to appropriately identify the cause and points of interventions to address malnourishment. Subsequently, Khanivali village in Wada block was shortlisted to implement a pilot project titled "*Introducing the concept of nutri-gardens to address rural malnutrition by involving KSKs (Kisan Seva Kendras)*". The pilot study included implementation and observation for eight months (June 2013 to February 2014).

The project aimed to address the prevailing issue of malnourishment among SAM (Severe Acute Malnourished) and MAM (Moderate Acute Malnourished) children, through short-term and long-term strategies. As a long-term approach, it was essential to sensitize the women in the area to tackle malnourishment, ensure tenacious impact of the interventions and develop a sustainable solution.

Only consumption of nutritious crops does not help. Appropriate dietary intake at regular intervals along with appropriate cooking methods help retain nutrition levels. Hence, TERI developed the concept of "nutri-gardens" to promote consumption of nutritious crops by cultivating them locally. Around 120 "easy-to-use "nutri kits" were designed, developed and distributed amongst the tribal women, especially mothers of malnourished children and *aanganwadi sevikas* of Khanivali village. The kit comprised the following:

- A manual elaborating their significance (in Marathi), method of cultivation using available resources and different recipes to encourage integration of the ingredients in daily diet
- Seeds/saplings of nutritious crops (mushrooms, spinach, sweet potato and papaya)

Doctors of TZP expressed an urgent need for nutrient supplements for 140 SAM and MAM children and hence, as a short-term strategy, a commercially-available protein concentrate was supplied immediately.

PHC (Primary Health Care Centre) in Khanivali under TZP caters to almost 30,000 people from 42 villages and maintains a monthly record of diet, height, weight, MAC (Medium Arm Circumference) and family history for children and pregnant women. The PHC informed there were around 80 SAM and 60 MAM children, when the project was initiated. These children were targeted on priority and provided health supplements. "Nutri-kits" were distributed amongst mothers and *anganwadi sevikas* responsible for providing mid-day meal to these malnourished children.

Awareness and training workshops were conducted regularly for mothers of the identified children to sensitize them on the use of the nutri-kits. During the feedback survey, we noted that many families had not only started cultivating spinach, papaya and sweet-potato in their backyard but had also started integrating the recommended ingredients in their regular diet through judiciously-cooked recipes.

Eight months after the project was implemented, the results began to show. Regular awareness and monitoring helped bring down the count of the malnourished children. It was recorded that in just 3 months, 68 percent children were re-designated to a normal category and 32 percent children were considered in MAM category out of targeted 140 malnourished children, as a result of short term strategy.

It can be concluded that both long-term and short-term strategies need to be integrated to effectively to address the issue of malnourishment amongst tribals. Given the ease of adopting the concept of "nutri-kits", its long-term impact and encouraging results, the concept of "nutri-gardens" has tremendous potential for replication in other areas.

Background

TERI (The Energy and Resources Institute) signed the MoU (Memorandum of Understanding) with IOCL (Indian Oil Corporation Ltd.) on January 24, 2013 to implement the project entitled, "Introducing the concept of nutri-gardens to address rural malnutrition by involving KSKs (Kisan Seva Kendras)" in the tribal regions of Thane district. The function was graced by the presence of Mr. B. Ashok, Executive Director (Retail Sales), Mr. M. Srinivas, General Manager (Retail Sales), Mr. Sandeep Sharma, Chief Manager (Retail Sales) and many other dignitaries form IOCL. Dr Anjali Parasnis and Ms Swati Tomar represented TERI on this occasion.

Picture No. 1: Mr. B. Ashok, Executive Director (Retail Sales), Mr. M. Srinivas, General Manager (Retail Sales) from IOCL and Dr. Anjali Parasnis, TERI after signing the MoU

Programme objectives

The programme objectives are:

1. To introduce an unique nutri-garden programme through IOCL's KSK
2. Determine the baseline to assess the level of malnourishment, especially amongst women and children at selected clusters/ groups (around KSK) with the help of medical practitioners
3. To provide a specialized kit comprising of selected nutrition crops, methods of its cultivation, use and preservation
4. To conduct training programmes for women on use of those kits and its components
5. To assess the impact of this programme after 6-8 months of implementation

Kisan Seva Kendra (KSK)

Kisan Seva Kendra is an award-winning retail outlet model pioneered by Indian Oil to cater to the needs of customers in the rural segment. Today, KSK outlets have emerged as dominant players in the rural markets, riding on the rapid growth of upcoming second and third tier roads in the rural areas. The KSK come with a fresh perspective, enabling dealers to tap the huge demand driven in by consumers there. In addition, non-fuel retail facilities like convenience stores have been added to the KSK to sell pesticides, vegetables, banking products and stationery items.

TERI and IOCL involved the KSK to target the remote areas. Also, KSKs have a strong network in the rural areas. Due to that bond, people have faith in the outlets.

Picture No. 2: Gurukripa KSK at Khanivali village, Wada, Thane

KSK dealers have actively participated in the project and provided all the support in terms of logistics, venue, refreshments, travel arrangements and so on. They helped TERI in successfully organizing different workshops at the project site.

Introduction

Global population increase is severely affecting the world's resources, which is ultimately leading to problems like environmental degradation, risk to health, food security and so on. It is difficult to meet the growing demands of food, clothing and shelter, the basic necessities of life for the growing population even in the developed countries. A number of scientists have argued that the current global population expansion and accompanying increase in resource consumption is threatening the world's ecosystem and straining humanity's ability to feed itself.[1]

A research states growing populations, falling energy reserves and food shortages would create a 'perfect storm' by 2030. It was estimated that food reserves in 2009 were at a fifty-year low and that the world would require 50 percent more energy, food and water by 2030[2]. According to a 2009 report by the United Nations Food and Agriculture Organisation (FAO), the world will have to produce 70 percent more food by 2050 to feed a projected extra 2.3 billion people.[3] This shortage in meeting the food demands of the population ultimately affects the nutritional status of the population. As a result, nearly 30 percent of the world's population suffer from one or the other form of malnutrition[4].

Malnourishment

Malnutrition is the condition that results from eating a diet in which certain nutrients are lacking, are in excess (too high in intake) or in the wrong proportion. The term malnutrition encompasses both over-nutrition and under-nutrition. Although under-nutrition is generally observed amongst the rural and under-developed part of the world, it is a major challenge to human and economic development. It is estimated that almost one billion people globally face hunger[5] and are unable to get enough food to meet their dietary needs. Another one billion people do not get enough vitamins and minerals which, over a period of time, can lead to complications like night blindness[6].

Malnourishment in India

With almost 42 percent children (0-6 years of age group) under-nourished, child malnutrition is one of the major concerns of India. India ranks second in the world for number of children suffering from malnutrition, states the World Bank.

Malnourishment in Maharashtra: Thane

Of the total population in Maharashtra, almost 36.7 percent of children are underweight and 27 percent population is under-nourished (2009).[7] Maharashtra ranks second in terms of tribal population in India and houses more than 10 percent (approx. 83 lakhs) of tribals of the country[8]. Out of the total tribal population in the state, approximately 14.5 percent

[1]^ "Planetary Boundaries: Specials".Nature. September 23, 2009. Retrieved February 18, 2013

[2]^ "World faces 'perfect storm' of problems by 2030, chief scientist to warn".The Guardian. March 18, 2009. Retrieved February 18, 2013

[3]"Global food production will have to increase 70% for additional 2.3 billion people by 2050". Finfacts.com. September 24, 2009. Retrieved February 18, 2013.

[4]http://www.fao.org/worldfoodsummit/english/fsheets/malnutrition.pdf

[5]FAO, 2010, The State of Food Insecurity in the World. FAO Rome 2010

[6]Government Office for Science/ Foresight, 2011, The Future of Food and Farming: challenges and choices for global sustainability. London.

[7]http://www.sathicehat.org/uploads/PastProjects/Nutritional_Crisis_in_Maharashtra_Report.pdf

[8] Statistical profile of schedule tribes in India, 2010 by Ministry of Tribal Affairs, GoI

(12.07 lakh)[9] reside in Thane district of Maharashtra (Census, 2001) spread across the talukas of Jawhar, Mokhada, Vikramgad and Wada. More than 90 percent of the total population in these talukas are concentrated with tribes of Kathkaris, Warlis, Koknas and Kolis. Hence, these regions have been classified as a tribal belt. Tribals are generally characterized by economic and social marginalization, primitive existence, geographical isolation and educational backwardness. Several studies have been conducted and reports published in the context of tribal communities, especially emphasizing on various parameters like socio-economic condition, land-related issues, health status and so on.

In Thane district alone, almost 14 percent of children (age 0-6) are moderately malnourished, while in Jawhar taluka, the percentage of malnourished children (of same age group) is as high as 30 percent[10]. This high percentage can be attributed to their dietary habits. 70 percent of the rural population, as reported by NNMB (National Nutrition Monitoring Bureau, 1978), consumes an unbalanced diet because of poverty stress.

Table No 1: Observations of some surveys conducted to assess malnourishment in Maharashtra

Year of study	Focus (Area/ST Community)	Author/ Organization	Observation
1999	Maharashtra	National Nutrition Monitoring Bureau (NNMB)	Prevalence of under nutrition in tribal population is more than 80%[11]
2004	Thane	ITDP (Integrated tribal development Project) Report	Almost 0.43% of children (0-5 years) are severely malnourished.[12]
2006	Thane	Indian Human Rights Report, 2007	Over 1,700 children reportedly died of malnutrition in Thane district in just one year (April 2005- April 2006).[13]
2008	Jawhar, Mokhada, Vikramgad and Wada/ Koli, Warli, Thakur	A. L. Khandare et.al.	The average calorie and protein intake per Consumption Unit (CU) by tribal population was significantly less by 23% and 30% respectively as against the RDA (Recommended Dietary Allowance)[14]
2007-09	Maharashtra	SATHI organization	More than 50% of tribal children are severely stunted (height for age) and more than 51% are underweight. [15]
2010	Thane,	C.J. Sonowal	The study reveals that shortage of land

[9] http://www.cinicell.org/pdf/BAIF-MITTRA%20case%20study.pdf
[10] http://hetv.org/nutritionmission/rankings/12-mission-ranking-dec-2007.pdf
[11] Report by NNMB "Nutritional Status of Tribal Population"
[12] http://www.flonnet.com/fl2219/stories/20050923006500400.htm
[13] Malnutrition claims nine kids in a week in Thane, The Free Press Journal, 8 April 2006
[14] http://www.pjbs.org/pjnonline/fin704.pdf
[15] Report by SATHI organization "Nutritional status of Maharashtra", 2009

Year of study	Focus (Area/ST Community)	Author/ Organization	Observation
	Nandurbar and Godchiroli		and forest resources, lack of suitable job opportunity at local level and exposure to non-tribal domain has made tribal people suffer from health and nutritional problems.[16]
2010	Dahanu, Jawhar, Talasari, Mokhada, Vikramgad, Murbad and Wada/ Koli, Kathkari, Warli, Thakur	Ghorude et.al. (Report published in 2011)	In just four years (2006-10) the number of children suffering from malnutrition has increased by almost three times.[17]

The observations from the above mentioned studies indicate that in the past 12 years, the status of malnourishment in the tribal population has barely changed. In fact, Ghorude et al (2011) reported increase of more than three times in the number of children suffering from malnutrition. As per the RDA (Recommended Dietary Allowance) by Food and Nutrition Board, USA, the protein consumption and the calorie intake amongst the tribal population is very poor.

According to a report by the Department of Philosophy, University of Pune,[18] Government of India has implemented several schemes to address problems like poverty, unemployment and malnutrition in tribal communities. However, TERI found a lack of understanding of these schemes amongst the tribal communities due to religious beliefs and a fixed mind set. Also, it was observed that the communities were demotivated by the complicated procedures associated with sanctioning of the schemes.

A study conducted by the Marathwada University, Aurangabad stated that tribal development programmes and schemes in Maharashtra state have not brought any perceptible changes in the life of majority of tribal population. Educational schemes like "*Ashram schools and scholarship scheme for tribal*" have a penetration of only 13-15 percent in the tribal areas.

Few studies have indicated that (Table No 2) if the project targets the women education and empowerment, it has a direct impact on the overall well-being of the family including enhanced living standard, additional income, improved nutritional status of the children and so on.

[16]C.J.Sonawal, Ethno Med, 4(1): 21-36 (2010) "Factors Affecting the Nutritional Health of Tribal Children in Maharashtra"
[17]www.irasg.com/social%20growth%201/FILES/2.pdf
[18]http://www.unipune.ac.in/snc/cssh/ResearchProjects/LataChhatre.pdf (Department of Philosophy, University of Pune)*As per the reports available on the internet.

Table No 2: Observations of some projects conducted for women empowerment in India

Sr. No.	Name of the project	Area/ State	Year	Observation/Benefits
1.	Need of Education and Awareness: A Study of Locally Made Therapeutic Food for Treatment of Malnutrition	Melghat, Amravati District (Maharashtra)	2010	Awareness or knowledge base in women results in a change of attitude and then in behavioural change. It is very important to educate women regarding healthy eating practices and utilizing available resources to the best of her ability to achieve optimum health
2.	Poultry training and general awareness about agriculture to women	Madhya Pradesh	2009	Along with improved livelihood, women had started taking agriculture-related decisions, visiting the village market to gain access to agriculture related information etc.
3.	World Bank aided National Agricultural Innovation Project (NAIP) led by ICAR to enhance rural livelihood and nutritional security through integrated approach with regard to improved animal husbandry practices	Udaipur, Rajasthan	2006	The project had made significant impact on technological empowerment of tribal women as knowledge of the beneficiaries was found to be higher than non-beneficiaries in all the components of cattle, goat and poultry rearing practices.[19]
4.	Programme to combat tribal malnourishment	Mokhada and Jawhar	2006	The percentage of low-birth weight along with infant mortality in project villages has reduced considerably. Weight gain was observed in all the target groups including children, adolescent girls and pregnant or lactating women. There was an increased awareness about hygiene, nutrition and preventive health. Additional income generation for 16 SHGs in those areas.[20]

[19] http://journal-advances-developmental-research.com/wp-content/uploads/2011/08/Technological-Empowerment-of-Tribal-Women-through-National-Agricultural-Innovation-Project-Vandana-Joshi-Dhriti-Solanki-and-Rajshree-Upadhyay-330-334.pdf
[20] http://www.mittra.org/project_details.php?pid=18

As compared to the other social societies in India, women play an important role in tribal community because of their active involvement in generating livelihood and management of their family. Be it a small task like collection of minor forest produce for cooking or labour-intensive work in industries for earning livelihood, tribal women continue to play a significant role. According to the Ministry of Tribal affairs, more than 85 percent (cultivators = 47.07% and agricultural labourers = 38.37%) of the tribal community depends on agriculture. Women and men play an equal and important role in agriculture for securing their livelihood. Hence, there is a need to introduce these tribal women to the new and healthy eating practices and teach them to utilize the available resources to the best of their ability. This will help them achieve optimum wellness and also provide new, diverse options of livelihood. Studies state that children should be made aware and sensitized about nutrition needs at an early age.

Therefore, TERI (The Energy and Resources Institute) in collaboration with IOCL conducted capacity-building programmes for the tribal women and youth and introduced them to the concept of nutri-gardens.

Nutri-gardens

The concept of farming and cultivation is not new to the tribal communities of India. However, it has remained limited to cash crop cultivation and mostly used for revenue generation. The main objective of introducing the concept of nutri-gardens was to encourage tribal women to cultivate healthy food crops in their backyards. A nutri-garden ensures an inexpensive, regular and handy supply of fresh vegetables, which are basic to nutrition. Green vegetables contain vitamins and minerals, which protect us against diseases. Tribal and rural communities have easy access to all the essential resources like land and water but they lack knowledge about the nutritional value and scientific consumption pattern of the available and easily-cultivable nutritious food products. Hence, nutri-gardens may be regarded as a simple but innovative option to:

- Bridge the gap between the available resources and its utilization in a sustainable manner
- Address issues like malnutrition
- Create additional revenue-generating opportunities for farmer communities, especially women
- Introduce healthy eating practices

Study area

To assess the feasibility of the concept during the pilot study, the syndicate has mutually shortlisted KSKs situated at Khanivali village in Wada block.

Although Wada tribal block is situated close to an urban centre, malnourishment is highly prevalent here. Hence, Wada was an ideal choice for the pilot study. Khanivali village in the Wada area is situated about 60 kms away from Thane city. The demographic details of the village are presented in Table No 3.

Table No 3: Demographic details of Khanivali village, Wada

Population	2137	**Total Literate**	1506
Male	1111	**Female**	1026
Sex-ratio	923.49	**Children (0-6 age)**	254
ST (Scheduled tribes)	507	**No. of Household**	492

Source: Census of India, 2011

The village is blessed with all the natural resources like good rainfall and water availability throughout the year, fertile land and plenty of sunshine. The main crop of the village is paddy, the staple diet of all the tribal population residing here. Some of the farmers are trying mixed cropping pattern and cultivating different crops like gram, pulses, tomatoes, watermelon and so on but it is mostly for sale and not for self-consumption.
During preliminary interactions, we noticed that the villagers have access to all the healthy food but lack knowledge about their consumption and health benefits. TERI decided to boost awareness about the selected crops available in the village and integrate it into their dietary pattern by introducing new recipes.

Importance of selected crops

The four main crops selected were spinach, sweet potato, mushroom and papaya.

The reasons for their selection are:

1. Available throughout the year
2. Easily grown in the agro-climatic conditions of Thane area
3. Highly nutritious
4. Can be easily purchased from local markets at affordable rates, if the cultivation is taking longer

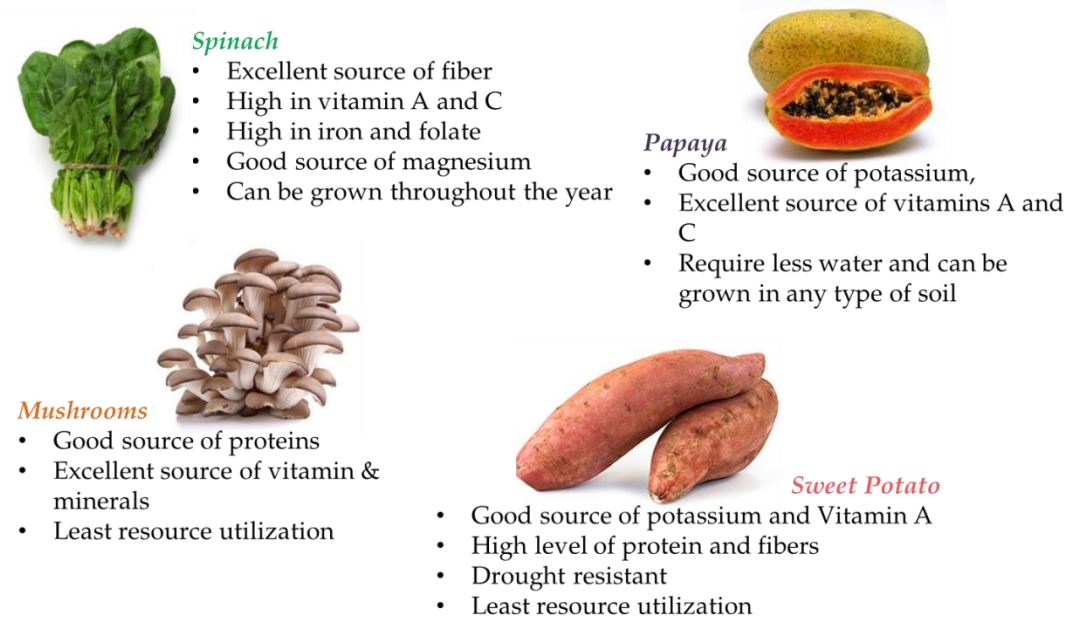


Figure No.1: Importance of selected crops

Manual

The manual prepared by TERI is a first-of-its-kind comprehensive manual in Marathi, which covers various topics related to malnutrition and its causes in a very lucid language.

The manual elaborates on the importance of consumption of nutritious crops and a balanced diet. It states the importance and source of proteins, carbohydrate, fats and various minerals and vitamins. It illustrates briefly the role these nutrients play in maintaining the health and well-being of the humans.

It highlights the importance of the selected crops, method of growth and its consumption. Various new recipes are also included in it so as to increase the frequency of the consumption of the nutritious food. The manual was thoroughly read by the participants and the target group and the beneficiaries appreciated it highly.

Programme Activities

The main objective of the project was to create awareness and impart knowledge amongst the tribal communities suffering from malnourishment. It is an irony that in spite of having easy access to all the natural resources, these communities are facing such nourishment problems. Keeping the above facts in mind, TERI adopted a unique strategy of imparting them the knowledge and building their capacity to utilize the naturally-available resources.

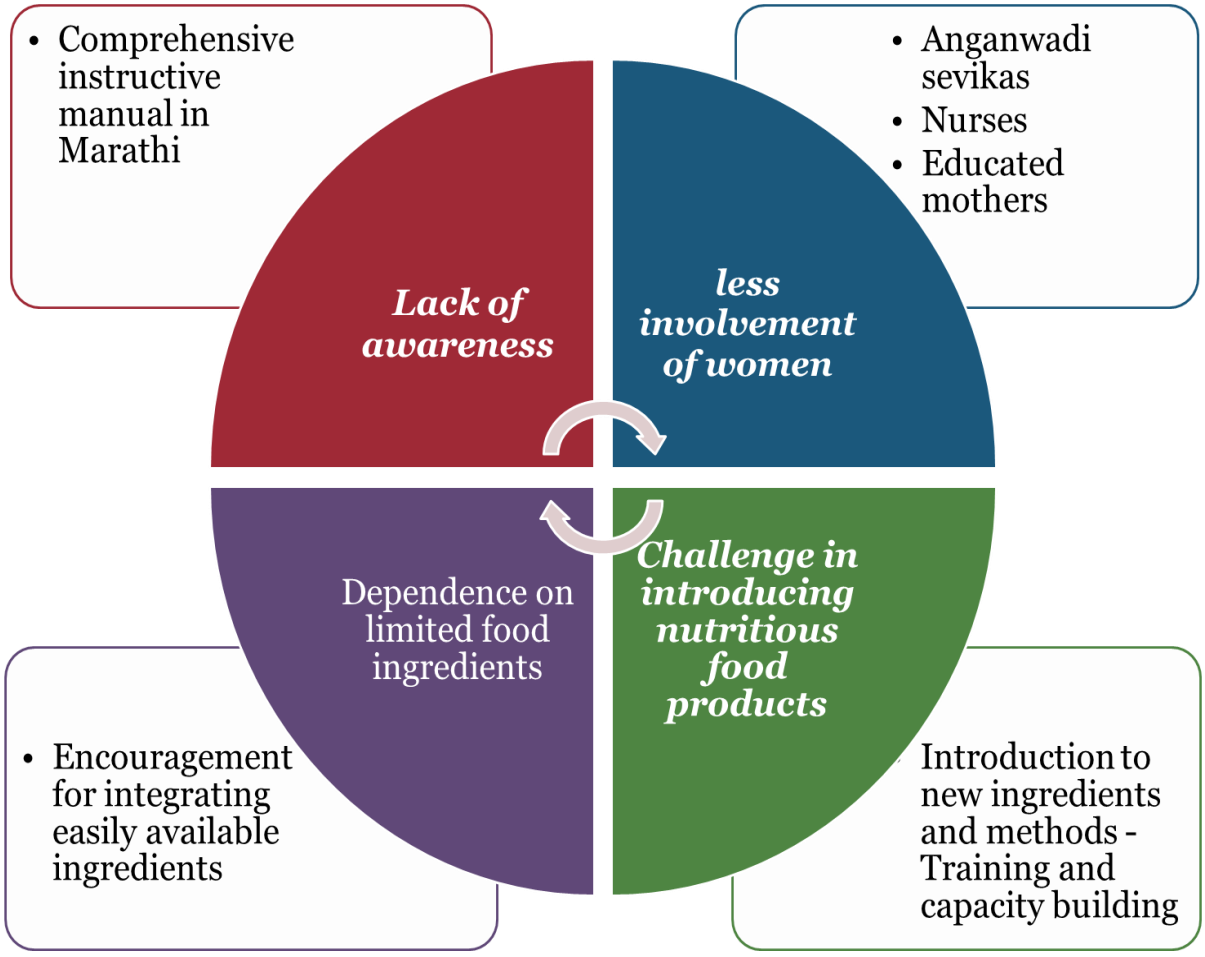


Figure No. 2: TERI's approach and types of workshops undertaken for the awareness generation and capacity building of the tribal communities

TERI conducted many workshops from time to time to involve the locals and gain their faith. The main issues of those areas and the approach adopted by TERI to address those issues are presented in Figure No. 2. TERI had adopted two different approaches, long term and short term, for the immediate effect on field.

As illustrated from the above figure, TERI had mainly focussed on two important components - awareness generation and capacity building of the local stake-holders (Table No 4). TERI targeted farmers, pregnant women, mothers of children (age 0-6), SHGs (Self Help Group) members, *anganwadi* sevikas, teachers, nursing staff of PHC (Primary Health Care Centre) and so on.

Table No 4: Listing of the various workshops undertaken by TERI in the project area

Sr. No.	Name of the Workshop	Date and Place
1.	Interaction and Analysis of Dietary patterns of the Stake-holders	June 12, 2013 and Gurukripa KSK, Khaniwali, Wada
2.	Interaction and Analysis of Dietary patterns of the Stake-holders	July 03, 2013 and Vikramgad KSK, Vikramgad
3.	Distribution of the Nutri-Garden kits	August 06, 2013 and PHC Khaniwali, Wada
4.	Interaction and Inspection Visit with the SHG members and Anganwadi sevikas	September 30, 2013 and Community Temple, Khaniwali
5.	Distribution of protein supplements like ProtineX and interaction with the SAM and MAM children's mothers	October 8, 2013 and PHC Khaniwali
6.	Workshop for easy to cook and healthy recipes	November 29, 2013 and Community Temple, Khaniwali
7.	Demonstration and training on mushroom cultivation	December 04, 2013 and Community Temple, Khaniwali
8.	Distribution of protein supplements and interaction with the SAM and MAM children's mothers	December 8, 2013 and PHC Khaniwali

The detailed description of the different workshops and other activities are presented in the following sections.

Workshop for Awareness Generation: Long term approaches

Workshop 1: Interaction and Analysis of Dietary patterns of the Stake-holders

More than 95 percent of the population in the block is tribal where it has been reported that malnutrition-related diseases in children was up to 94 percent in 2011[21]. Therefore, to assess the gravity of the issue, TERI and IOCL organized multiple visits in collaboration with the KSKs at Khanivali and Vikramgad. It was observed that an assessment of the dietary patterns of the villagers would have provided an insight into the issues related to their health status. Therefore, through a participatory approach, TERI conducted several workshops to emphasize upon integrating the selected health ingredients in their daily diet.

Upon analysing the daily dietary patterns and the portion of consumption, it was clear that the intake of oils and fat (Figure No. 4) among the participants was more than double than that recommended by FAO (Food and Agriculture Organization) and the intake of proteins, vitamins and minerals was less than half of the recommended values[22]. Similarly, vitamin consumption was almost 23 percent less than the standard values. Hence, a need to strike a balance among the dietary consumption pattern was emphasized.

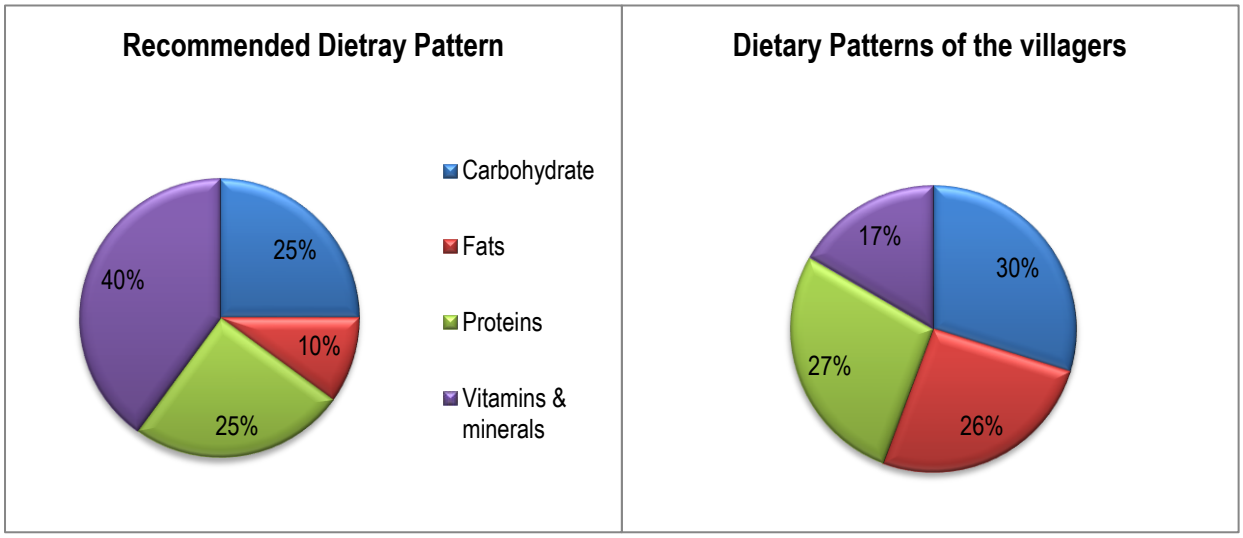
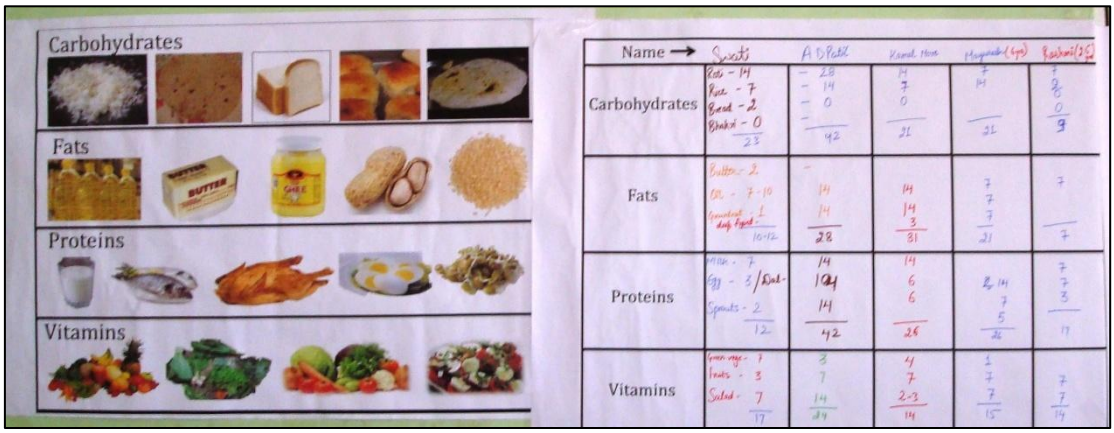


Figure No. 3: Comparison between the Recommended Dietary Pattern and Standard Dietary Pattern of the villagers of Khanivali, Wada

Most of the health problems in children can be attributed to improper diet. It was concluded that intervention in their existing diet pattern is thus necessary.

[21] irasg.com/social%20growth%201/FILES/2.pdf
[22] FAO: www.fao.org
Proteins are long chains of amino acids bound together that our body cannot absorb in their natural state. Proteases enzymes are required to break the proteins so that our body can absorb composite amino-acids. Primary proteases responsible to break down protein are pepsin from stomach and trypsin, chymotrypsin and carboxy-peptidases from pancreas.Vitamin C and B-6 are the two most important enzymes required for the proper functioning of the enzymes responsible for the protein digestion



Picture No. 3: Analysis of the daily diet of the villagers

During the programme, TERI also demonstrated how the traditional snacks could be made more nutritious just by adding commonly available ingredients. For example, in the workshop, bhel, a traditional snack was fortified by adding finely-chopped fresh vegetables like tomato, green capsicum and a large portion of sprouts in addition to the traditional ingredients such as puffed rice and tangy tamarind sauce. Sprouts are said to be rich in digestible energy, bio-available vitamins, minerals, amino acids, proteins, and phytochemicals [23], whereas fresh and raw capsicum is a rich source of vitamin C, antioxidants and fibre. The nutritious bhel was liked by the all, including the children.

It was encouraging to know that all the participants readily accepted the suggestions made by TERI and were thrilled to be a part of the project. Some of the participants expressed space crunch as a limiting factor as all of them don't possess cultivable lands or backyards. Towards this, villagers recommended conducting training courses for mushroom cultivation and its processing, since mushrooms require very less outdoor space. Moreover, paddy straw, the substrate required for cultivation of mushroom, is easily available through the year.

Picture No. 4: Healthy bhel prepared at the Gurukripa KSK with the help of locals

[23]^ "Plant-based nutrition". Spring 2002.Retrieved 2007-11-14.

The "*upa-sarpanch*" also immediately volunteered to provide access to his private land for co-operative/community cultivation of the nutri varieties recommended by TERI. The participants appreciated the idea of forming a co-operative farm and assured TERI and IOCL of complete cooperation. A "buy in" of the target group, which was a crucial milestone of the project, was thus achieved. During the subsequent inspection visits by TERI, it was heartening to know that not only the "upa-sarpanch" but also a local shop-owner and temple committee had provided their private land for cultivation of nutritious crops.

Picture No. 5: Spinach cultivated on community temple land by anganwadi sevika

Workshop 2: Distribution of the Nutri-Garden kits

Date: August 6, 2013

PHCs hold the health camps every month to check the status of the pregnant and lactating mothers along with their children. The workshop was organized as a part of the health camp to take advantage of the fact that almost all the SAM and MAM children were present with their respective parents and hence the resources reached to the most relevant target group.

More than 200 parents from 42 nearby villages with their children attended the programme. It was graced by the presence of Mr. M. Srinivas, General Manager (Retail Sales), Mr. Sandeep Sharma, Chief Manager (Retail Sales), Mr. K. Naveen Charan, Chief Divisional Manager (Retail Sales), Mr. Vijayan, Manager (Retail Sales) from IOCL, Mrs. Jyotibai Patil, Member, Panchayat Samiti, Wada, Mr. Rahul Dhoom, Block Development Officer, Dr. P. Chavan, TMO (Taluka Medical Officer), Wada, Dr. R. Patil, TMO, Vikramgad from Thane Zilla Parishad, Dr. Anjali Parasnis, Associate Director, Ms. Swati Tomar, Research Associate and Mr. Amol Handore, Project Consultant from TERI.

At the outset, Dr. Anjali Parasnis delivered the opening remarks and introduced the concept of the programme and significance of the nutri-kit. She encouraged the attendees to utilize it to the fullest to achieve tenacious impacts. She explained the importance of healthy food and its importance for proper growth as well as the selected crops and their nutritional importance in our regular diet and emphasized on the fact that these are affordable and easily available.

Picture No. 6: Dr. Anjali Parasnis, Associate Director, TERI introducing the concept of the project

Mr. M. Srinivas from IOCL highlighted the concept and importance of KSK and IOCL's commitment to improve the rural life through various measures and innovative approaches. He gave a few examples about highlighting the region specific work by KSK's across India.

Mrs. Patil addressed the issue of women neglecting their own health and giving all the attention to their families and commitments. This, she said, is the root cause of malnourishment. She appealed to the women present to look after themselves for healthy families and their future.

Picture No. 7: Mr. Srinivas, General Manager, IOCL, addressing the gathering

Mr. Rahul Dhoom appreciated TERI's unique approaches to rural development in general and the program launched in Wada area to tackle malnourishment in particular. Dr. Chavan emphasized on the need of such programmes in rural India and thanked TERI and IOCL for taking such initiatives. He informed the gathering about the various health schemes and initiatives of Govt. of Maharashtra. He also provided an overview of the types and intensity of malnourishment in the villages of Wada. While highlighting the significance of mother's milk, Dr. Chavan stated that the prime reason of malnourishment is improper diet by the women during pregnancy and post-pregnancy. . He insisted that it is necessary to join hands with the innovative approaches for a malnourishment-free Thane district.

Mr. Srinivas, Mr. Sandeep Sharma and Mrs. Patil released and distributed more than 100 nutri- kits to parents of the shortlisted SAM and MAM children, SHGs (Self Help Groups), trained nurses of the PHC and *anganwadi* teachers.

Picture No. 8: Distribution of kits to the parents and malnourished child

After the medical check-up camp and consultation with the doctors, it was decided to focus on SAM and MAM children on a priority basis as they are the most vulnerable, highly prone to infections and other diseases. Through this programme, 80 children suffering from SAM and 60 from MAM were selected. It was also discussed that some protein rich supplements should be provided to these children as an immediate action to overcome the deficiency of protein and vitamin. Once the children are pulled out in terms of their weight to the base line, they would be out of the danger zone. Beyond this stage, the SAM and MAM children would be advised to maintain their health by adopting the long term strategies of the project. Regular follow-up for the next six months helped ensure and assess effectiveness of the entire exercise. Doctors from TZP extended all their support and co-operation in this regard.

Workshop 3: Interaction and Inspection Visit with stakeholders

A meeting was conducted with the women of Self-help Groups, *anganwadis* and villagers to check if they had planted the spinach seeds and how they were referring to the manual. Interviews were conducted using a questionnaire. It was observed that the *anganwadi* sevikas had read the manual thoroughly and were elaborating the importance of healthy food and how different food items are important in our daily routine to parents and children. During the interaction, they had promised to spread the word to other women and a*nganwadi* members.

Workshops for capacity building

Building the capacity of the local women was the second important component of the project and hence, TERI organized two capacity-building workshops for the important stakeholders such as tribal women, anganwadi sevikas, SHG members and so on at Khanivali village:

1. Workshop for easy to cook and healthy recipes
2. Demonstration and training on mushroom cultivation

Workshop 1: Workshop for easy-to-cook and healthy recipes

The workshop was organised on November 29, 2013. Volunteers demonstrated how to prepare palak paratha and mushroom vegetable. The villagers took active part in the workshop. Approximately 50 participants including 40 women representing SHG's and *anganwadis*, pregnant women, mothers of SAM and MAM children participated in the workshop.

Picture No. 9: Demonstration by Mrs. Bindu Kesarkar and Ms. Swati Tomar on healthy cooking.

The resource person for the workshop was Mrs. Bindu Kesarkar. She spoke on the importance of food products and the common mistakes one makes while cooking. After the briefing, the parathas made during the workshop were distributed amongst the participants. They were amazed by the taste of both the dishes and the simplicity in its preparation. Children, especially, enjoyed the taste of paratha and demanded more (Picture No. 10). After the briefing and demonstration, the women present at the workshop enthusiastically tried making palak parathas. Villagers tasted Mushroom masala and also took it home for their family members to taste.

Picture No. 10: Women practising palak paratha (Left) and children enjoying the parathas (Right)

At the end of the workshop, villagers promised to read the manual and prepare recipes from the manual for their children.

Workshop 2: Demonstration and training on mushroom cultivation

Date: December 4th, 2013

TERI in association with IOCL's Gurukripa KSK, Khanivali organised a hands-on training and demonstration of mushroom cultivation for the villagers. The main objective of the workshop was to train people for mushroom cultivation in order to meet the basic needs of nutrition and ultimately address the issue of malnourishment in the village. (Picture No. 11)

Picture No. 11: Mr. Yatish Lele briefing the participants about the technique of mushroom cultivation

At the end of the presentation, information leaflets and plastic bags for mushroom cultivation along with the spawn (seeds) of mushroom were distributed to the villagers.

In the next phase, villagers followed a step by step procedure under the guidance of TERI's experts. The steps included sterilization of the spawn, preparation of mushroom bed, inoculation of the spawn and packing of the bed and so on.

Further instructions were given to the participants about maintaining and preserving the bed from catching any infection. Experts also taught them how to pluck mushroom fruits with the help of an already inoculated and fully-matured bed, which TERI had prepared before the workshop for the demonstration. They also promised to encourage other women to cultivate mushrooms as it will help to improve not only the nutritional value of the diet but also enable generate livelihood options.

Picture No. 14: Sterilization of paddy straw under TERI's guidance

Picture No. 13: Preparation of spawn bed

Picture No. 12 : Participants with the spawn bed

Project outreach

As a part of the project, TERI had collaborated with the PHC and the *anganwadi* centers, who are responsible to implement various ICDS (Integrated Child Development Programme) to combat child hunger and malnourishment. A typical *anganwadi* centre also provides basic health care in Indian villages, which includes contraceptive counselling and its supply to the village women, nutrition education and supplementation to the children and pre-school activities. At each *anganwadi*, there are almost 10-15 children who may or may not be malnourished but as a basic health care, centres provide supplementary nutrition, immunization, health check-up to the children, nutrition and health education to their mothers.

For the pilot project, TERI had prepared 120 nutri-kits, of which 90 kits were distributed amongst the *anganwadi sevikas* and nurses of the PHC and 30 were distributed to the educated parents [24] of the SAM and MAM children. In these 90 centres, there are approximately 900 children monitored by the *anganwadi sevikas*. The project outreach is depicted below (Figure No. 4).

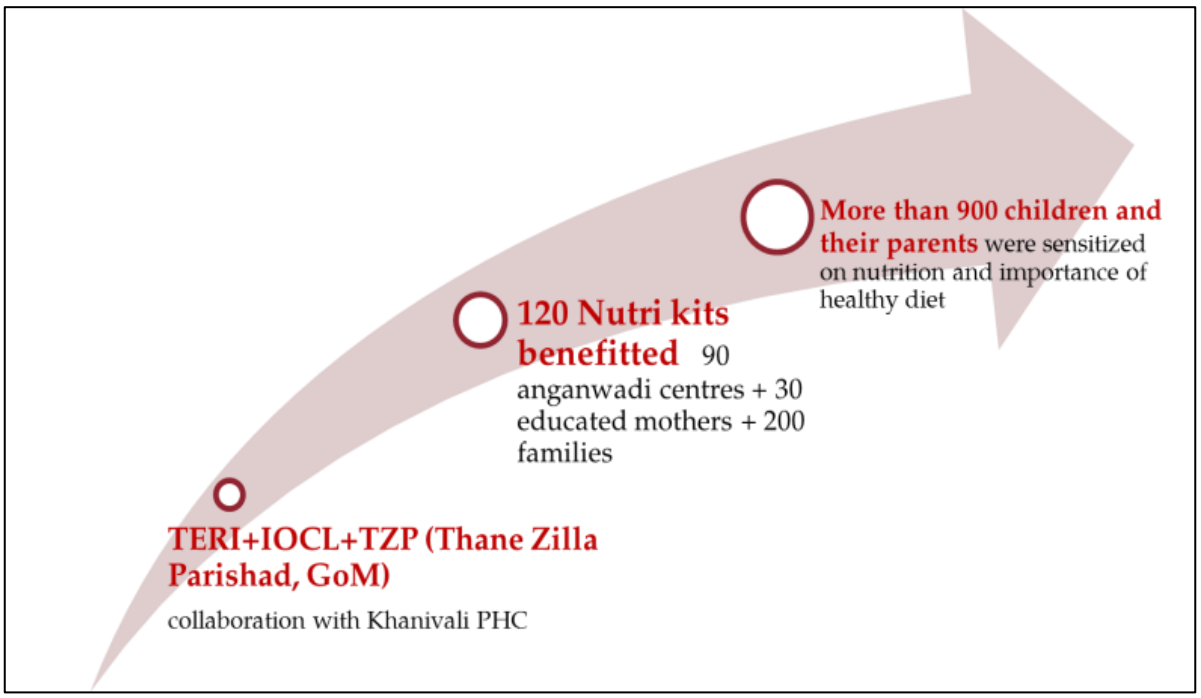


Figure No. 4: Project outreach in the Wada block

Results: Long term sustainable approaches

The following impacts have been noted.

1. Around 80 families started cultivating nutri varieties for domestic consumption which includes, spinach, sweet potato, other green leafy vegetables and so on.

[24] Literacy rate of the women in tribal area is very less. In the pilot project village, the literacy rate is only 65.06% as per the census, 2011.

2. Around 100 papaya trees were planted at community level in the village and proper tree-guards have been installed for their protection.
3. More than 50 villagers including educated parents, anganwadi sevikas, nurses and so on, were trained for mushroom cultivation

TERI has received the following feedback upon survey and interaction with the women, who received the kits during the workshop:

1. *Anganwadi* mentors, teachers and some of the educated parents were referring to the manual frequently and were able to elaborate the significance of healthy food to other un-educated parents of SAM and MAM children.
2. Many of the parents informed that they have not only sown seeds of spinach, saplings of papaya and tubers of sweet potato in their backyard but also integrated it their diet.
3. The recipes explained in the manual have actually been tried out by the enthusiastic mothers and liked by their children.
4. Few mothers informed that there is a noticeable improvement in the health of their children. Mrs. Prajakta, a regular participant of all the workshops, informed that the weight of her daughter had increased in the past two months from 7 kg to 9 kg as she was following instructions and willingly eating the newly introduced recipes.

Picture No. 15: Mrs. Prajakta with her daughter during the workshop

After four months of distribution of the seeds and saplings, TERI visited the villages to check the status of plantation. It was very encouraging to note that cultivation of spinach and sweet potato had been undertaken at many locations in the village. (Picture No. 16 and Picture No. 17)

Picture No. 16: Women with the plantation of spinach in their backyards

Picture No. 17: Woman with the papaya tree in her backyard and sweet potatocultivation

The villagers admitted that they had papaya trees in their backyards but realized its importance only after the workshops and awareness programmes. (**Picture No. 17**)

They had also planted sweet potato tubers and informed TERI that they have started consuming it twice a week and were trying new recipes by reading the manual.

Additional activities of the project: Short term strategies

On August 6, 2013, doctors of these areas informed that there are 60 SAM affected children from 42 villages of Wada block, who were susceptible to infections and other diseases. The doctors appealed that if the appropriate tonics and food supplements are provided to the SAM children, they would be able to overcome the deficiency of protein and vitamins.

Given the severity of the issue, TERI approached other corporate organizations and appealed for help. Union Bank of India, Mumbai and Nutricia graciously agreed to immediately sponsor the **ProtineX** cans for these children.

TERI and IOCL, in collaboration with TZP and UBI (Union Bank of India), distributed 140 ProtineX powder cans (200 gms), a nutri-supplement along with the milk powder, to the SAM and MAM children of the Wada taluka, which were shortlisted by the PHC and the *anganwadi* members.

Picture No. 18: Distribution of ProtineX cans to the SAM children

The observations and results after 2 months of the distribution of the ProtineX cans were as follows:

1) Anganwadi members reported that all children were regularly supplemented with ProtineX and milk powder distributed to them.
2) They observed an improvement in their health due to its regular consumption.
3) Weight of malnourished children increased. For instance, Roshan from Gorapur village gained weight to almost a normal range due to the intake of ProtineX and milk power, as claimed by Gorapur Anganwadi sevika Mrs. Shobha.
4) They have also informed that they are using the manual for teaching the parents of SAM and MAM children to encourage them to prepare new recipes and consume it appropriately.

5) After the distribution of the nutri-kit and protineX supplements to 80 SAM and 60 MAM children, it was encouraging to note that, in just 3 months, 68 percent children were re-designated to a normal category and 32 percent children were considered in MAM category, which is an improvement over the SAM[25] condition. (Figure No. 5).

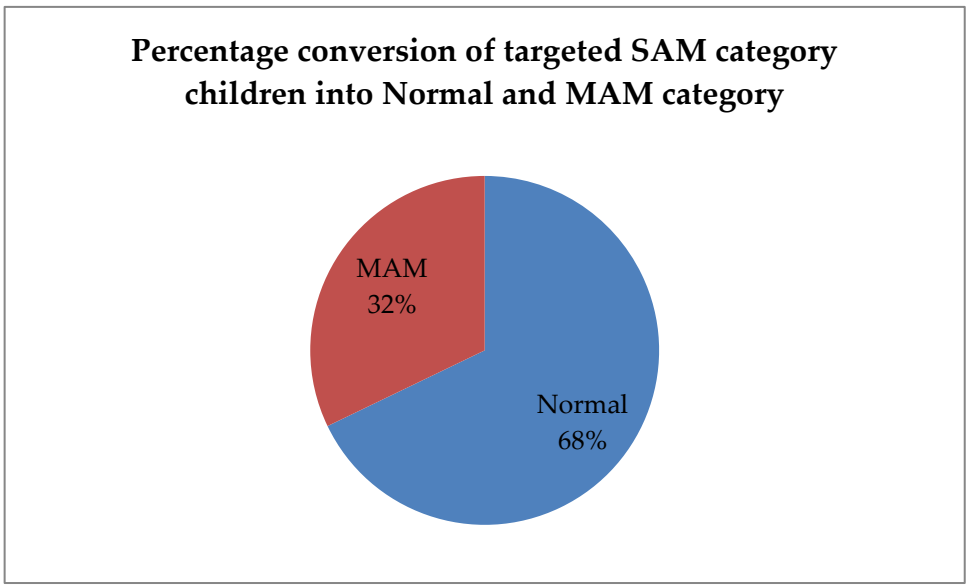


Figure No. 5: Percentage conversion of total 140 targeted SAM category children into Normal and MAM category

Increase in weight of the malnourished children is an important indicator to judge the status of the improvement in their health status. As a part of the program TERI had collected the data and analysed the weight gain of the targeted children. The weight gain of a sample of 11 children under study is represented in Figure No. 6.

[25] As per WHO, Severe acute malnutrition is defined by a very low weight for height (below -3z scores of the median WHO growth standards [Annex-2]), by visible severe wasting, or by the presence of nutritional oedema and MUAC (mid-upper arm circumference) cut-off of 115 mm. In India, diagnostically, malnutrition cases are divided into four grades, Grade I, or mild malnutrition, occurs when the body weight of the person is between 70 and 80 per cent of the expected weight for that age. In Grade II, representing moderate malnutrition, the body weight is between 60 and 70 per cent of the average. Both Grade III, where an individual's body weight is 50 to 60 per cent of the average weight in a particular age-group, and Grade IV, where the body weight is 50 per cent of the average, are referred to as stages of severe malnutrition. Grade III and IV children fall under SAM category.

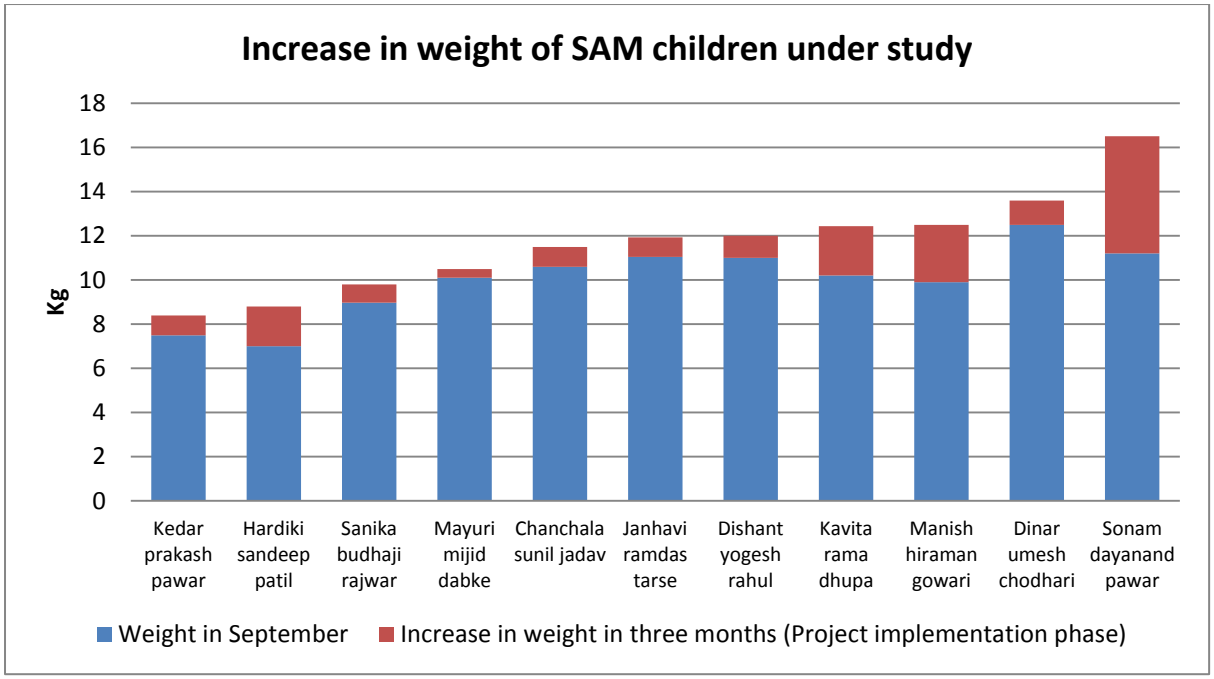


Figure No. 6: Increase in weight of SAM children under study

Photo Gallery

Picture No. 19: Dr. Anjali Parasnis, Associate Director, TERI explaining the importance of healthy and balanced diet to the villagers at Khanivali at IOCL's Gurukripa KSK

Picture No. 20: Dr. Anjali interacting with the mothers of malnourished children at Vikramgad KSK

Picture No. 21: Ms Swati Tomar, Research Associate, TERI interacting with *aanganwadi sevikas* and getting their feedback

Picture No. 22: Dr. Milind Chavan examining a six-month old SAM child

Picture No. 23: Release of the Nutri-kit at the hands of Mr. Srinivas

Picture No. 24: Officials of IOCL, TERI in discussion with the Sarpanch and Doctors of Khaniwali village at PHC

Picture No. 25: Regular monitoring of the malnourished children during the program period

Picture No. 26: *Anganwadi* workers and mothers of SAM and MAM children at Khanivali PHC attending the ProtineX distribution workshop

Annex 1: List of the SAM and MAM Children

Table No 5 : ProtineX distribution in September

	Village/ Aanganwadi Kendra	Name of Child	Age	Height (Cm)	Weight (Kg) September	Type
1	Abirghar	Babyprakash Marade	5.3	70	6	SAM
2	Bawli	Disha Dinesh Wagh	2.08	75	6.6	SAM
3	Bawli	Swadesh Gyaneshwer Margan	3.75	86	9	SAM
4	Saverkhand	Sainath Santosh Mali	5.25	105	12.55	SAM
5	Saverkhand	Sanika Budhaji Sanwar	4.3	88	8.98	SAM
6	Saverkhand	Ankita Santosh Hadal	4.25	93	10.25	SAM
7	Saverkhand	Mahesh Nitin Dhum	2.75	87	9.93	SAM
8	Saverkhand	Onkar Ramesh Chowdhary	1.8	70	6.9	SAM
9	Saverkhand	Sushant Sangram Hadal	2.8	90	10	SAM
10	Sarsi	Akshay Somnath Pawar	5.75	101	12.2	SAM
11	Khindichapada	Ashish Balkrishna Khajode	4	91	10.55	SAM
12	Khindichapada	Vishal Bandhu Khajode	1.8	73	6.8	SAM
13	Pimproli	Nisha Ramesh More	5.16	103	13.7	SAM
14	Pimproli	Nikita Santosh Bhotkada	5.08	93	10.7	SAM
15	Pimproli	Sarita Santosh Varkhanda	4.4	89	10.1	SAM
16	Kone	Rupali Sunil Varkhanda	3.5	89	8.4	SAM
17	Kone	Prachi Amol Jadhav	4	90	9.5	SAM
18	Shirishpada	Aniket Vishnu Wagh	2.1	89	9.4	SAM
19	Jamunpada	Jhanvi Ramdas Tarse	4.25	98	11.04	SAM
20	Jamunpada	Gijai Eknath Dupare	3.75	94	10.2	SAM
21	Jamunpada	Pratiksha Kiran Hilim	1.6	72	6.7	SAM
22	Gandhre	Prathmesh Laxman Marade	4	94	10.6	SAM
23	Gandhre	Ashok Sunil Jadhav	4	94	10.5	SAM
24	Gatesh	Chanchla Sunil Jadhav	4.3	96	10.6	SAM
25	Gatesh	Tanvi Ram Pandre	2	78	7.8	SAM
26	Gatesh	Kedar Prakash Tarse	1.8	75	7.5	SAM
27	Tilgaon	Dinar Umesh Chowdhary	5		13.6	SAM
28	Tilgaon	Lalit Gurunath Diva	5		10	SAM
29	Thakrepada	Kavita Rama Dhadpa	4	102	10.2	SAM
30	Babli	Roshni Mahendra Yeke	1		9.6	SAM
31	Saverkhand	Vaishali Naresh Chowdhary	3		11.61	SAM
32	Saverkhand	Shivam Rajesh Babar	4		9.95	SAM
33	Tilgaon	Ganesh Ananta Bhoir	5		13.6	SAM
34	Gorapur	Priya Ankush Bhor	2	95	10.2	SAM
35	Gorapur	Snehal Vaibhav Padiyar	1	91	9.6	SAM
36	Hattichapada	Pratiksha Ambadas Jamadar	3	92	9.5	SAM

	Village/ Aanganwadi Kendra	Name of Child	Age	Height (Cm)	Weight (Kg) September	Type
37	Hattichapada	Mayuri Milind Dabke	5	93	10.1	SAM
38	Hattichapada	Chandni Milind Dabke	4		6.2	SAM
39	Hattichapada	Hardiki Sandeep Patil	5.5	82	8.8	SAM
40	Hattichapada	Karan Sunil Bhoer	2	57	5.5	SAM
41	Chorghepada	Dishant Yogesh Rahul	2.3	99	11	SAM
42	Chorghepada	Rekha Ankush Jadhav	2.1	99	13.2	SAM
43	Chorghepada	Vishal Mahesh Sunar	2.6	97	8.5	SAM
44	Chorghepada	Nelesh Madhukar Dighe	5	89	9.6	SAM
45	Chorghepada	Kalpesh Ramesh Pawar	5	89	9.5	SAM
46	Chorghepada	Sonam Syam Pawar	6	92	11.2	SAM
47	Vasurikhurd	Adesh Ananta Bhoer	6	90	10.1	SAM
48	Kharivali	Riya Bharat Mukne	1.5	102	12.5	SAM
49	Kharivali	Bala Vijay	1.5	92	10.6	SAM
50	Varlipada	Vaishnavi Prakash Wagh	2	95	11.3	SAM
51	Varlipada	Prashant Prahlad Vaje	3	79	9.4	SAM
52	Bilavali	Rohit Sunil Wagh	3	90	8.9	SAM
53	Nehroli	Slok Pudlik Mukne	4	94	10.8	SAM
54	Nehroli	Baby Bharat Mukne	5	64	5.5	SAM
55	Nehroli	Chinmay Kumar Jadhav	4	88	10.4	SAM
56	Nehroli	Ajay Rajesh Jadhav	5	83	8.5	SAM
57	Dongarpada	Amin Avinash Ghida	4	92	10.6	SAM
58	Dongarpada	Shrikant Namdev Vajre	6	80	8.9	SAM
59	Bibotipada	Puspak Kailash Korde	5.6	75	8.5	SAM
60	Vavrepada	Akshay Abhay Veez	5.2	90	10	SAM
61	Lakhmapur	Rohit Rajesh Misad	3.2	100	12	SAM
62	Bibotipada	Manish Hiraman Gavari	3.2	101	12.5	SAM
63	Chikhle	Darshan Vilash Wargade	3	55	4.3	SAM
64	Konsaye	Jai Sanjay Mokashi	2		10	SAM
65	Konsaye	Karuna Ganpat Wardi	2.1		10.1	SAM
66	Khaniwali	Ishan Manoj More	2	12.5	99	MAM
67	Khaniwali	Sadiya Mumtaj Aalam	5	10.2	91	MAM
68	Khaniwali	Swara Santosh Patil	4	10.5	99	MAM
69	Khaniwali	Priyanka Vitthal Patil	3	12.9	101	MAM
70	Khaniwali	Mayuri Chandrakant Patil	2	13.4	102	MAM

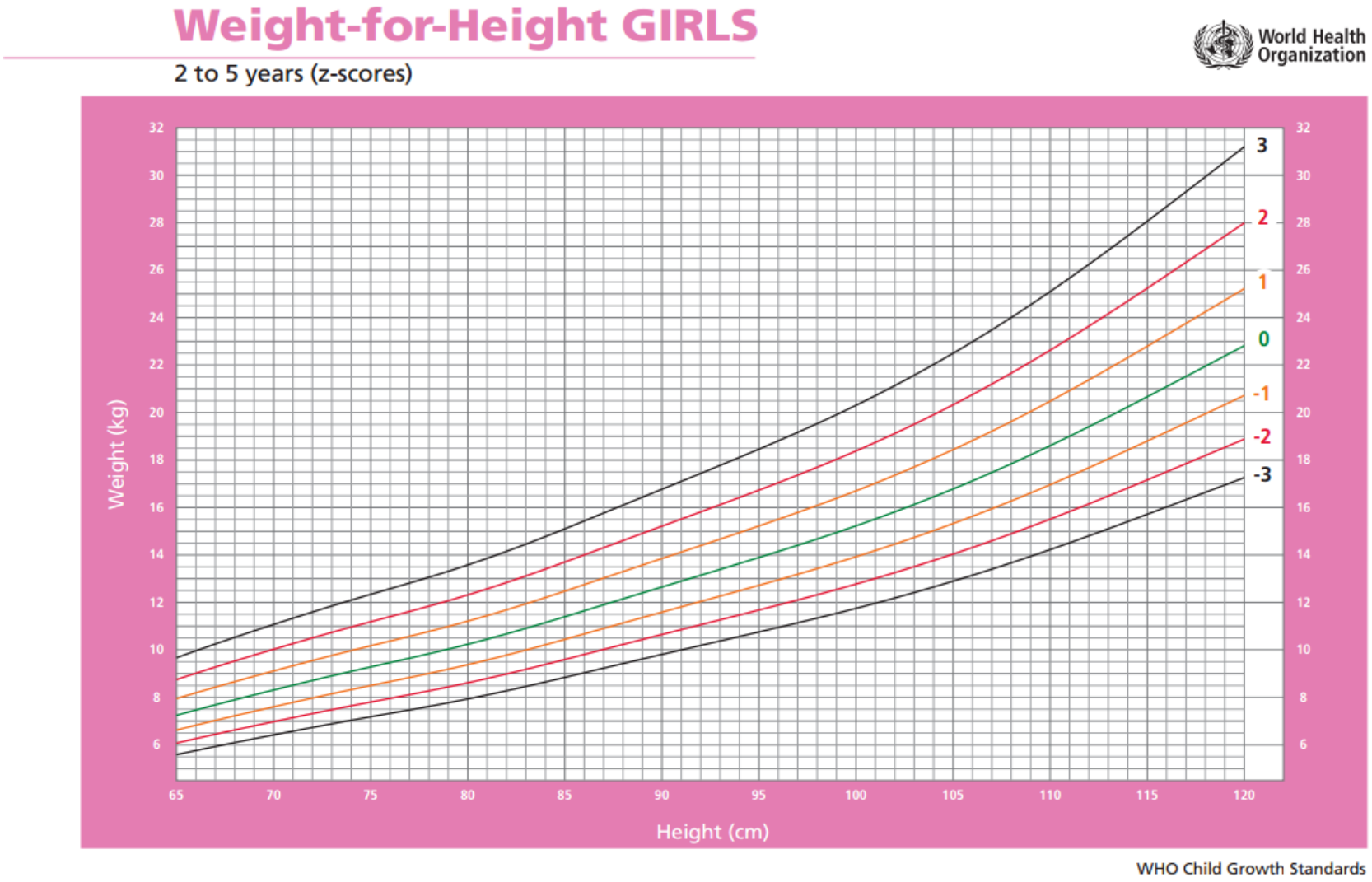
Table No 6: ProtineX distribution in December

Sr. No.	Name of Child	Age	Weight (Kg) Dec	Height (Cm)	Type	Weight (Kg)	Height (Cm)	Type
1	Aakash Bharat Paalvi	1	5	60	MAM	5.3	60	MAM
2	Akshay Jitin Dolari	1	7.73	75	MAM	7.67	75	Normal
3	Alka Birender Ram	2	8.84	83	MAM	9.1	83	Normal
4	Anish Jagan Pawar	3	10.4	90	MAM	10.6	90	MAM
5	Ankit Baban Jadav	2	9	85	SAM	10	90	MAM
6	Ankita Ajeet Megha	3	9.5	90	SAM	9.7	90	MAM
7	Anuskha Kapil Gotarane	4	11.2	93	MAM	11.3	93	MAM
8	Aradhna Naamdev Ughde	3	10.4	90	MAM	10.6	90	MAM
9	Arti Rajendra Salker	5	13	104	MAM	13.1	104	MAM
10	Asmita Suresh Waghe	5	13.7	104	MAM	14	105	Normal
11	Baby Krishna Waghe	1	6.5	70	MAM	7	75	Normal
12	Bharat Sandesh Pawar	5	12.6	98	MAM		Transfer	
13	Chanchala Sunil Jadav	4	11.5	100	MAM	114.6	100	MAM
14	Chiu Tushar Bhoye	2	7.7	66	MAM		Transfer	
15	Diksha Govind Gayker				MAM		Transfer	
16	Dinar Umesh Chodhari	5	13.6	99	MAM	12.9	99	Normal
17	Disha Dinesh Toke	2	6.3	72	SAM	6.5	72	Normal
18	Dishant Yogesh Rahul		12	102	MAM	12	102	MAM
19	Divya Ajeet Patil	3	11.56	99	MAM	11.72	99	Normal
20	Gayatri Vinod Pakwade	3	10.5	92	MAM	11.5	97	Normal
21	Goutam	1	6.5	70	MAM	7	75	Normal
22	Hardiki Sandeep Patil	2	8.8	82	MAM	8.9	85	MAM
23	Iswari Pandu Wagh	4	13.5	104	SAM	14	104	Normal
24	Janhavi Ramdas Tarse	4	11.93	100	MAM	11.61	100	MAM
25	Kavita Rama Dhdpa	4	12.43	102	MAM	12.5	102	Normal

Sr. No.	Name of Child	Age	Weight (Kg) Dec	Height (Cm)	Type	Weight (Kg)	Height (Cm)	Type
26	Kedar Prakash Pawar	2	8.4	80	MAM	8.5	80	Normal
27	Kirti Sudam Dabke	2	11.7	100	SAM	12	100	MAM
28	Kushbu Birender Ram	2	8.85	84	MAM	90.11	84	Normal
29	Manish Bharat Patil	4	12.5	99	MAM	13	99	MAM
30	Manshvi Bajrang Kagde	4	11.19	94	MAM	11.3	94	MAM
31	Mayuri Mijid Dabke		10.5	95	MAM		Transfer	
32	Mukta Bhiva Salker	5	12.2	95	MAM	11.8	98	MAM
33	Neel Vinod Wagh	1	7.3	71	MAM	7.3	72	MAM
34	Nidisha Bhai Tokte	2	8.4	80	MAM	8.5	80	Normal
35	Nisha Bafaram Raputade	2	11.7	100	SAM	12	100	MAM
36	Pirya Ankush More	2	8.85	84	MAM	90.11	84	Normal
37	Pooja Prakash Mukne	2	7.4	75	MAM	7.5	76	MAM
38	Pragya Santaram More	4	165	92	MAM	10.6	92	MAM
39	Pratiksha Damu Thakre	5	14.4	108	MAM	14.5	110	MAM
40	Purnima Dattatray Jadav	2	8.4	80	MAM	8.5	80	Normal
41	Purnima Ramesh Patil	2	11.7	100	SAM	12	100	MAM
42	Rashika Dasrath Bhoir	2	8.85	84	MAM	90.11	84	Normal
43	Reshma Ravindra Dwabe	5	12.3	98	MAM	12.3	100	MAM
44	Rewa Chandrakanta Patil	3	11.4	92	MAM	11.5	95	MAM
45	Ruchita Santosh Patil	3	9.6	85	MAM	9.6	85	Mam
46	Samiksha Damu Thakre	3	11.4	92	MAM	11.5	95	MAM
47	Samiksha Digamber Thakre	5	14.24	108	MAM	14.9	108	MAM
48	Sandeep Ratnaker Warwade	5	11.23	99	MAM	11.32	99	MAM
49	Sanika Budhaji Rajwar	4	9.8	88	MAM	9.9	88	MAM
50	Sanika Suresh Marge	4	11.4	5.3	MAM		Transfer	

Sr. No.	Name of Child	Age	Weight (Kg) Dec	Height (Cm)	Type	Weight (Kg)	Height (Cm)	Type
51	Sankhet Govind Gayker	2	11.7	100	SAM	12	100	MAM
52	Sanskar Bharat	2	8.85	84	MAM	90.11	84	Normal
53	Sanskriti Krishna Varghane	5	12.3	98	MAM	12.3	100	MAM
54	Santosh Uttam Raputade	2	7.24	94	SAM	7.4	94	MAM
55	Sayali Sanjay Kuwra	3	8.8	85	MAM	9	85	MAM
56	Sidhi Seetaram Dhanwe	2	8.1	78	MAM	8.6	80	Normal
57	Sonam Dayanand Pawar	4	16.5	73	MAM	16.5	73	Normal
58	Spra Santosh Patil	1	6.5	70	MAM	7	75	Normal
59	Srawani Kishor Wange	5	11.23	99	MAM	11.32	99	MAM
60	Suraj Subhash Gawit	2	8.1	78	MAM	8.6	80	Normal
61	Suraj Sumit Diva	2	8.1	78	MAM	8.6	80	Normal
62	Sweeta Nitin Dalvi	2	7.24	94	SAM	7.4	94	SAM
63	Ushar Ram	5	12.6	98	MAM		Transfer	
64	Varthik Ragendra Rajkwar	4	11.5	100	MAM	114.6	4	11.5
65	Vedika Praveen Gnesker	4	16.5	73	MAM	16.5	73	Normal
66	Vedika Yogesh Bhoir	5	13.8	105	MAM	13	105	MAM
67	Vidhe Jayram Dhangar	1	6.8	82	MAM		Transfer	
68	Vijay Arjun Kendra	5	12.8	98	MAM	13	98	Normal
69	Viraj Raju Wagh		9	77	MAM	9	77	MAM
70	Viran Kapil Bhoir	5	10.5	86	MAM	10.5	86	Normal

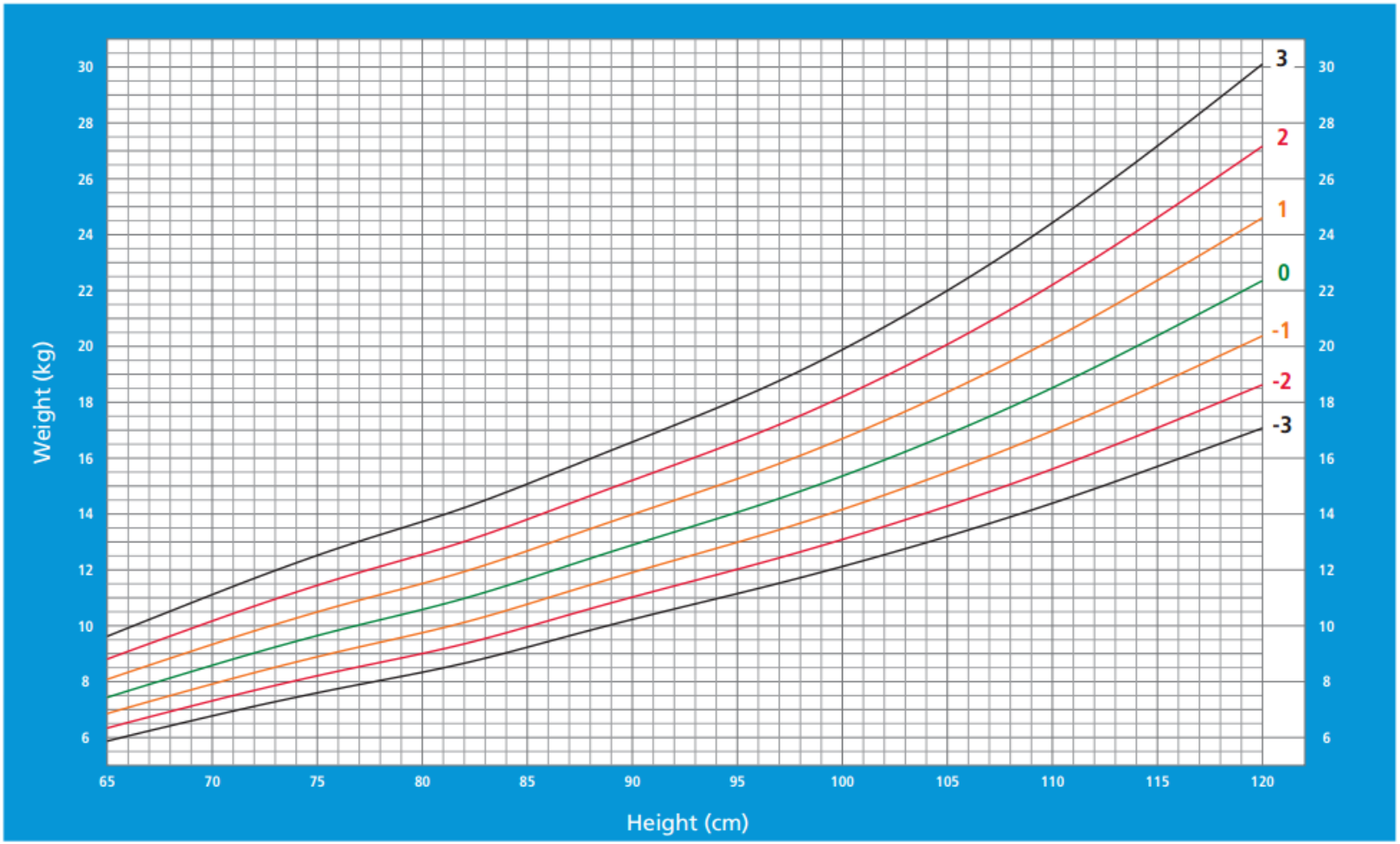
Annex 2: WHO growth standards



Weight-for-height BOYS

2 to 5 years (z-scores)

World Health Organization



WHO Child Growth Standards

The Energy and Resources Institute, commonly known as TERI (formerly Tata Energy Research Institute), established in 1974, is an independent, not-for-profit, research institute is a research institute based in New-Delhi. TERI's research activities are focused on energy, environment and sustainable development, devoted to efficient and sustainable use of natural resources. In its 38 years of existence, TERI has completed more than 2600 projects and has about 20 divisions

According to Think Tanks and Civil Societies Programme (TTCSP) at the International Relations Programme, University of Pennsylvania, TERI was ranked 20 in the list of top global think tanks on environment and 16 in top global think tanks on science and technology.

Western Regional Centre, Mumbai

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