



INPARD

## Integrating Nutrition Promotion and Rural Development in Sri Lanka



**Funded by : South Asia Food and Nutrition Security Initiative (SAFANSI)**



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Cover photo : An agriculture officer conducting a training session in a school on gardening during the dry season. Ampara. July 2015.

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# INTEGRATING NUTRITION PROMOTION AND RURAL DEVELOPMENT

## Final Report 2016

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## Abbreviations

CRP	Community resource persons (CRPs)
DNAP	District Nutrition Action Plan
EC	European Commission
FFQ	Food Frequency Questionnaire (FFQ)
GSHS	Global School Health Survey (G
INPARD	Integrating Nutrition Promotion and Rural Development
NFSI	Nutrition-friendly school initiative
NCD	Non Communicable Disease
PHM	Public Health Midwife (PHM)
MOH	Medical officer of Health (MoH)
Rap	Re-awakening Project
SAFANSI	South Asia Food and Nutrition Security Initiative
SES	Socio Economic State
SDGs	Sustainable Development Goals
VDO	Village Development Organisations (VDO)
WHO	World Health Organization

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## Executive Summary

‘Integrating Nutrition Promotion and Rural Development’ (INPARD) is a multisectoral approach to delivering nutrition-related interventions in rural development programmes in Sri Lanka. Although multisectoral approaches to health promotion are widely recommended, barriers to collaboration across sectors were identified in the INPARD study described in this document. These include a lack of clarity among stakeholders regarding their respective roles, communication gaps between those working in different sectors, and resistance by some who consider health outside the purview of the sector they work in. Improved collaboration will also require training for all concerned.

The INPARD study was undertaken to investigate how effectively a rural development programme could be employed to deliver improved human nutrition outcomes – an objective not typically included in traditional rural development interventions in the past. The intervention considered was a large rural development project known as the Re-awakening Project (RaP), which carried out operations in 112 villages in the districts of Ampara and Moneragala. The villages were selected in part on prevailing

poverty levels, and 20 of them were randomly selected for evaluation by the INPARD study as it was carried out alongside the larger RaP. 20 other villages in Ampara and Monergala were selected as the control group representing non-RaP villages. Finally, ten villages were selected from outside the RaP area altogether, in Kurungala district.

Activities included developing a curriculum on promoting nutrition by project officers working in different sectors, organizing training sessions for stakeholders in the villages, and identifying and prioritizing solutions. New businesses were established with the support of the micro-finance arm of the rural development programme to increase the consumption of fruits, vegetables and protein. School level interventions were organised around the World Health Organization's nutrition-friendly school initiative (NFSI) criteria. These included developing nutrition school nutrition policies, school gardening programmes, education programmes for children and parents, and changing the food items available at the school canteen.

The study found that multisectoral work can be facilitated by creating a common objective for all stakeholders, balancing activities between sectors, developing evaluation criteria, and providing a common location for meetings. Although broader multisectoral approaches are encouraged, improvements can also result from collaboration between a smaller number of stakeholders.

A quantitative evaluation of the intervention showed that vegetable consumption among both men and women increased in INPARD areas. Increases in the percentage of men and women classified as 'healthy weight' and those with a healthy waist circumference was recorded in INPARD areas. Because they were identified by participating communities, INPARD interventions and their targets varied from one village and district to the next. In areas where high salt consumption was prioritised for instance, the percentage of people adding salt to rice declined substantially.

Villages in INPARD areas exhibited a widening awareness of health issues and a deepening understanding of nutrition,

including a higher premium placed on local food sources and recognition of the crucial role of children in promoting healthy behaviours within the household. These outcomes were well served by an expansion of the health- and nutrition-related vocabulary that villagers use when thinking of and discussing these issues.

School principals helped to identify barriers to healthy dietary choices as school-level interventions were being planned. Educational and agricultural policies, local food production, employment, social and cultural conventions and beliefs, and individual preferences were all pointed to as playing a role in promoting less healthy dietary decisions by consumers.

Quantitative evidence showed varied impacts of INPARD on school children. The number of NFSI policies and practices for school nutrition programmes that schools were implementing increased in INPARD schools, with more schools using written or informal nutrition policies, capacity building activities, supportive school environments and school nutrition and health services. The number of students consuming fast food declined and the number consuming milk increased.

Findings from the INPARD study demonstrate how sectors can work together to promote nutrition and the importance of the development agenda in which health is considered an outcome.

# Introduction

## Current nutrition status in Sri Lanka

Sri Lanka is a lower middle-income country with a total population of 21 million people and a per capita income of US\$3,924 in 2015. Following a 30-year civil war that ended in 2009, Sri Lanka's economy grew steadily, and the country transitioned from a predominantly rural-based agricultural economy towards a more urbanized economy (1).

Sri Lanka aspires to become a higher middle-income country and has experienced some promising outcomes, including a fall in poverty rates from 22.7 percent in 2002 to 6.7 percent in 2012/13. At the same time living standards continue to improve (1). Many rural development projects have been implemented by the government and development partners such as the World Bank, which have played a key role in reducing poverty, living standards and overall well-being of Sri Lankans.

The overall health of a population is an important element in a country's prospects for economic growth, and poor health leads to a range of adverse social and financial impacts. Sri Lankan health sector developed steadily since its independence in 1948. With government sponsored universal health coverage, it has achieved better health statistics compared to countries with a similar socioeconomic state. It is currently at a stage of epidemiological transition facing a double burden of communicable as well as non-communicable diseases (NCDs). Similarly, Sri Lankan population is currently faced with a dual burden of over-nutrition and under-nutrition.

The proportion of Sri Lankan children reported as being overweight is around 5 to 9 percent, whereas about 25 percent are reported to be underweight (3, 4). Current trends suggest that Sri Lanka is facing some urgent nutritional challenges. According to a study conducted by Katulanda et al in 2005, one in four Sri Lankan adults are overweight and one in ten are obese (5). These data indicate that more than a quarter of adults are centrally obese, defined as having a waist circumference above 90 cm for a man and 80 cm for a woman, reflecting high abdominal fat.

The significance of public health and good nutritional outcomes for economic development points to the need for economic development operations to coordinate in practical ways. The nutrition related health outcomes that are the focus of the health sector are also vital determinants of the state of human capital and labor market prospects in the country (6).

Although undernutrition and overnutrition co-exist in families and communities, most policies and programmes address these issues separately. Rural development programmes and livelihood development programmes provide an opportunity to address this double burden of malnutrition by tackling both issues simultaneously. Findings from the INPARD project provide policy-makers and researchers concerned with the double burden of malnutrition and rising NCDs in LLMICs with practical insights and key areas for future work.



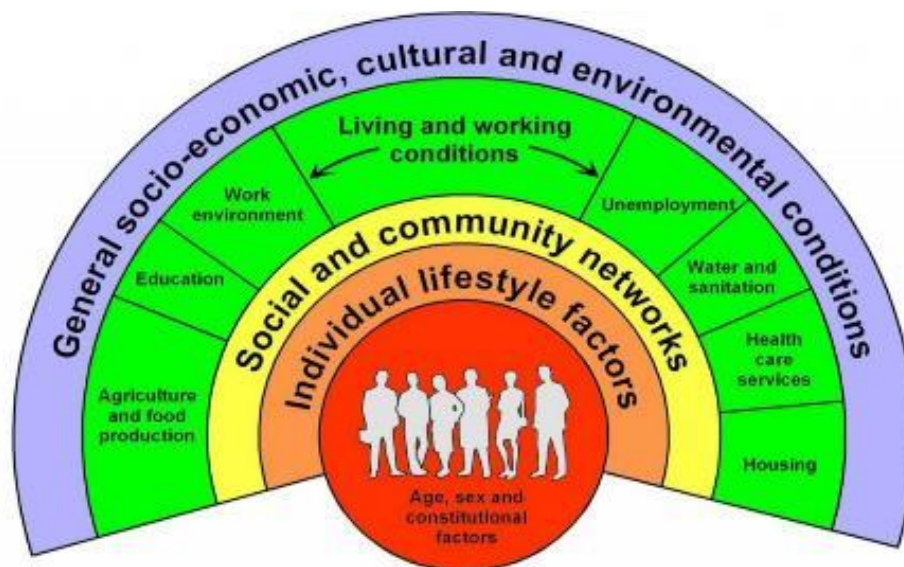
## Determinants of nutrition

A number of factors that help to determine human health and nutrition outcomes play outside the direct purview of the field of health and result from developments in other fields such as education, agriculture, trade, and the rural economy. These sectors have different levels of impact in treating and prevention of malnutrition. Some address more immediate causes and others more underlying ones. Nutrition experts have appealed to governments to assume leadership in bringing them together to achieve improved nutrition outcomes (7-9).

The guide to District Nutrition Action Plan (DNAP) and the multi-sector action plan for nutrition (7) in Sri Lanka prescribe interventions that involve both health and other sectors. Agencies administered by the ministries responsible for agriculture, livestock, rural development, finance and planning, education, and other areas of Sri Lanka's economy and society are all likely to have a more or less direct bearing on nutrition outcomes. The recently launched national multi sectoral action plan on non-communicable diseases (NCDs) (6) likewise reflects the government's commitment to promoting nutrition through multiple sectoral channels.

Although improvements in socioeconomic status result in better nutritional outcomes generally, evidence of how interventions in non-health sectors bear upon nutrition is lacking and the contributions of each sector towards various dimensions of health and nutrition is poorly understood. Nutrition outcomes arise from a complex set of influences and their interactions. Their interplay is expressed through the socio-ecological model (figure 1) which emphasises the interaction between, and interdependence of, factors within and across all levels of health behaviour. It highlights people's interactions with their physical and socio-cultural environments. Individuals are not viewed in isolation from the larger social units in which they live. There are two key concepts of this approach. The first is that behaviour affects and is affected by multiple levels of influence. The second is that individual behaviour shapes and is shaped by the social environment (reciprocal causation).

Figure 1.1: Socio-ecological model



Source: Dahlgren and Whitehead, 1991

Source: Dahlgren G, Whitehead M. (1991). Policies and Strategies to Promote Social Equity in Health. Stockholm, Sweden: Institute for Futures Studies

## Sustainable Development Goals and Future Agenda

In 2015, member countries of the United Nations adopted a new sustainable development agenda embodied 17 Sustainable Development Goals (SDGs)(9). Sri Lanka established a new unit at the national planning department to incorporate the SDGs into national policies.

The 17 SDGs are closely interrelated and the achievement of most are highly interdependent. Goal number one for instance is *no poverty*, while number two is *zero hunger*, and number three is *good health and well-being*. The final SDG, Goal number 17, stresses the need to revitalize and enhance global partnerships that bring together governments, civil society, the private sector, the United Nations system, and other actors and to mobilize all available resources (9,10)

Achieving the SDGs will entail substantial communication and collaboration between the respective disciplines and professional areas whose work bears upon the goals. Policies and programmes require an understanding how operations in one field or sector affect, and is affected by operations in another. Eradicating poverty will have an impact on agriculture, food security and nutrition, but these factors will also have an impact on targets related to Goal number 3, ensuring healthy lives and promoting well-being, including NCDs.

It is important, therefore, to develop methods to measure the impact of individual programmes on other areas, as well as undertaking case studies on best practices that enable work in different sectors to achieve co-benefits.



## **Linking rural development and nutrition promotion**

In 2013, Sri Lanka had several rural development projects implemented by the government. Although most of these projects would have impacts on one or more determinants of nutrition, a number of them did not include nutrition related indicators. Most of these rural development projects have co-areas on which to focus, including economic development, infrastructure development, and the promotion of micro-finance schemes.



An example of one such development project is the Re-awakening project (RaP), which is funded by the World Bank with US\$140 million and implemented by the Government of Sri Lanka. RaP has



implemented several activities in participating districts, such as “net houses” provided by the RaP project to protect home gardens from extreme weather conditions and stray cattle (Figure 1.2). As a result of this intervention, people in Moneragala district were able to grow fruits such as grapes for the first time. These then became available locally, in place of costlier imported grapes.

***Figure 1.2 (b) new shop outside the village school.***

The RaP project also provides microfinance loans, some of which have been used to build shops, including those situated in front of schools (Figure 1.2). Shops such as these lead to greater accessibility of foods for school children, but include unhealthy food items which government regulations prohibit in the school canteen.

The examples demonstrate how such projects can have an impact on nutrition, sometimes positively, sometimes negatively. Rural development projects can employ survey techniques and purposefully monitor nutrition related indicators to gauge the impacts they have on health outcomes. The information is also highly useful in informing future policy planning and development and health promotion approaches.



## **Aim of the INPARD study**

The aim of the INPARD study was to investigate whether a rural development programme, the Re-awakening Project – (RaP) could be utilized to deliver multi-sectoral nutrition promotion interventions within rural Sri Lanka and whether this was effective in improving nutrition outcomes.

*Traditional fishing boats in Sri Lanka. A village in Ampara near a fresh water tank, where the INPARD project determined that children had low protein intake. The fish harvested were sold and contributed to increased protein consumption.*

*Photo credit: Nick Townsend*





## **INPARD study overview**

INPARD supports collaboration between a number of government agencies and non-governmental organizations. Villages in RaP areas are represented by Village Development Organisations (VDO) consisting of community members. The VDOs served as the focal points to coordinate INPARD activities in intervention areas. The INPARD team organised workshops and advocacy sessions for these stakeholders at the divisional secretary and district levels. INPARD activities were regularly discussed at meetings where coordination and support were arranged as needed. Alongside this regional support, workshops with national level stakeholders were arranged to design the project and to review it regularly. These workshops were used to inform project design and implementation strategy.

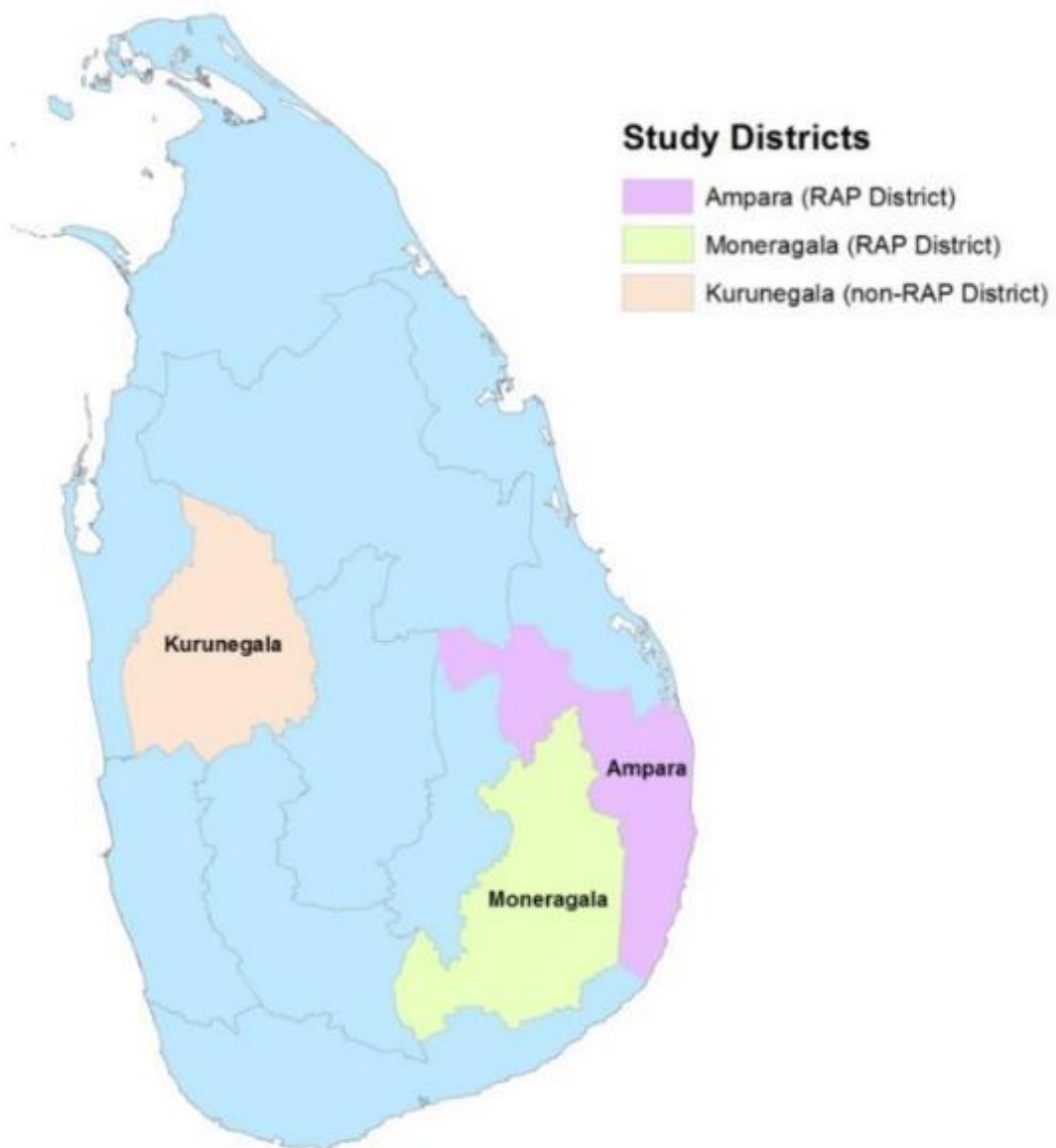
### INPARD study areas

The INPARD intervention covers more than 60,000 households in 112 villages in two districts in Sri Lanka, Moneragala and Ampara, as well as a control group of otherwise similar villages outside the areas covered by Rap for comparison. In addition to control villages in Moneragala and Ampara, villages in Kurungela were selected because they were sufficiently distant to rule out any possibility of exposure to nearby intervention villages (Figure 2.1, Table 2.1).

*Table 2.1: INPARD study areas and population coverage*

District	No. of villages covered	Total households	Population covered by INPARD	
			Female	Male
Ampara	57	16,332	31,549	33,057
Moneragala	55	16,183	35,053	30,148

Figure 2.1: INPARD Study Districts

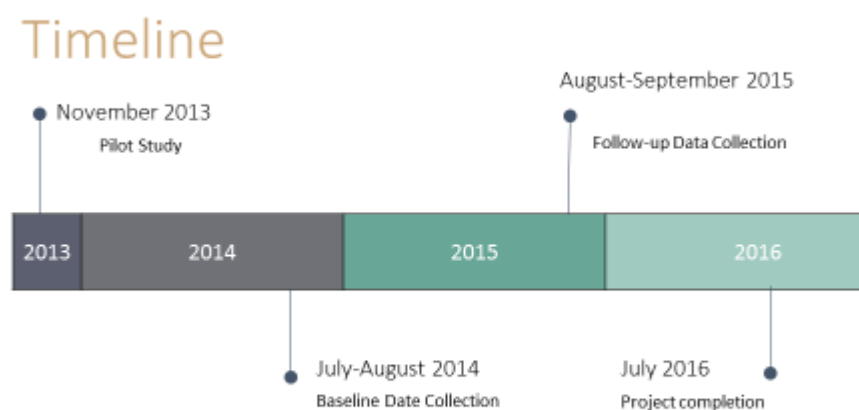


## Ethical clearance

The INPARD study began in November 2013. Ethical clearance was obtained from the Faculty of Medicine, University of Colombo and Oxford Tropical Medicine Network Ethics review committee, University of Oxford, UK. Initial steps that were needed to obtain ethical clearance included developing tools for data collection and translation of tools to Sinhala and Tamil.

## Timeline

*Figure 2.2 : Timeline of the project*



Once ethical clearance had been obtained, INPARD investigators began data collection training and pilot testing. Once complete baseline data collection could be carried out. Data were collected at schools and households in villages from July to August 2014.

The same individuals from whom baseline data were collected were then recruited in August 2015 for follow up data collection. These data from two points in time were then used to evaluate which indicators

had changed over time, and whether any differences had emerged between intervention and control areas.

Interventions started immediately after the baseline survey in 2014. The first step was a training programme for VDO members and other stakeholders in villages. The training focused on how their day-to-day work affected nutrition and how they could work collaboratively to improve nutrition status. It was framed around a curriculum and a course handbook on capacity building developed by the INPARD team. After completing the training programme, the INPARD project organised workshops in each village with the multi sectoral team to review the nutritional issues in the village, identify and prioritize problems, and develop action plans accordingly. Multi sector teams then implemented interventions in villages and schools. These interventions ranged from education campaigns to promote knowledge and awareness of nutrition issues to creating new businesses that improved village food environments. At the same time, the INPARD team organised capacity building for school staff and connected them with the multi sector team members and the VDO in the villages to improve nutrition among school children.



**Figure 2: INPARD data collectors**



Figure 3  
INPARD data  
collection



## Household data collection

Inclusion criteria for the household sample involved residing in the household during the study period. Exclusion criteria were any secondary school students living in the household (because these were sampled in schools), individuals who had been diagnosed with chronic health conditions, individuals who live mostly outside the house for work or studies, individuals who are not capable of giving informed consent, and any institutionalized individuals.

### Household sample size calculation

In order to collect data from a sufficient number of individuals, sample size calculations were completed using the proportion of adults eating five or more portions of fruits and vegetables a day (17.6 percent) from the 2006 Sri Lankan national STEPwise survey (8), a margin of error of 5 percent, a significance level of 0.05 percent. This resulted in a required sample size of 223 adults.

### Household sampling

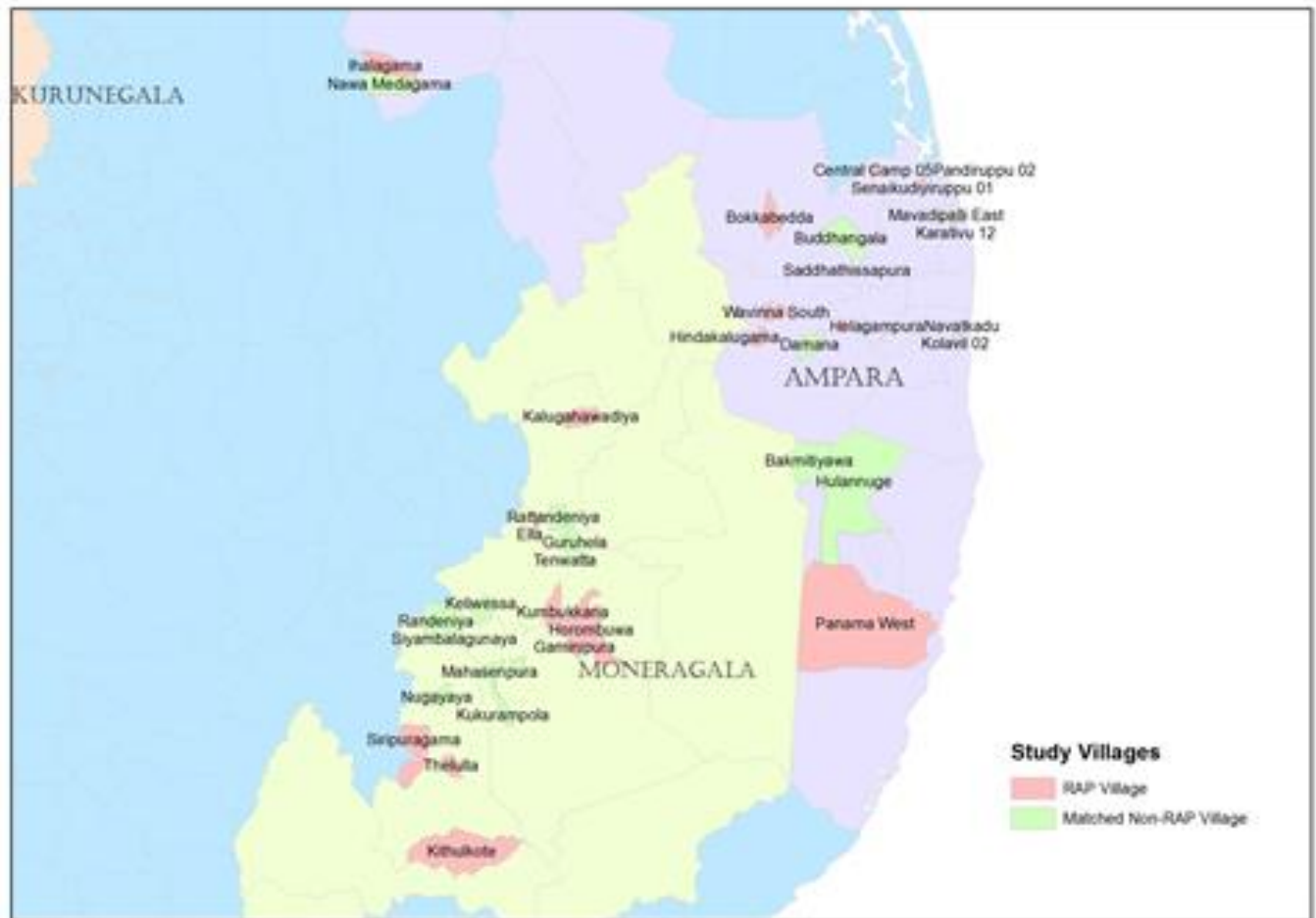
A cluster randomised/systematic sampling technique was used to select households, with five strata. As INPARD districts, Moneragala and Ampara contained both RaP and control villages. District and RaP village were used to stratify data collection (Figure 2.4).

*Figure 2.4: Household sampling strata*

District	Ampara		Moneragala		Kurunegala
Rap village	RaP	Non RaP	RaP	Non RaP	Non RaP

Ten villages were selected from each stratum, resulting in fifty villages in total. Twenty households were then selected from each village, with two adults and one child less than 12 years old, leaving a total minimum sample of 2,000 adults.

Figure 2.5 – data collection villages






## Household data collection


Data collectors interviewed participants to complete the Sri Lankan Food Frequency Questionnaire (FFQ) (validated for use in Sri Lanka) and the World Health Organization STEPwise survey (Sri Lankan version) from each individual. Data collectors also measured the height, weight, waist circumference, and hip circumference of adults.

Figure 2. 5 Food Frequency Questionnaire


1. පිටු කෝෂයකට තබනු ලබන, කුඩා ප්ලාට් කුඩා ප්ලාට්.



ප්ලාට් A




ප්ලාට් B



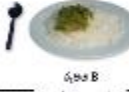
ප්ලාට් C

A හිදී බඩ අඩුයි A හි B හි අතර B හි C හි අතර C හිදී බඩ වැඩියායි


2. පිටු කෝෂයකට තබනු ලබන, කුඩා ප්ලාට් කුඩා ප්ලාට්.



ප්ලාට් A




ප්ලාට් B




ප්ලාට් C

A හිදී බඩ අඩුයි A හි B හි අතර B හි C හි අතර C හිදී බඩ වැඩියායි


3. පිටු කෝෂයකට තබනු ලබන, කුඩා ප්ලාට් කුඩා ප්ලාට්.



ප්ලාට් A




ප්ලාට් B




ප්ලාට් C

A හිදී බඩ අඩුයි A හි B හි අතර B හි C හි අතර C හිදී බඩ වැඩියායි


4. පිටු කෝෂයකට තබනු ලබන, කුඩා ප්ලාට් කුඩා ප්ලාට්.



ප්ලාට් A



ප්ලාට් B



ප්ලාට් C

A හිදී බඩ අඩුයි A හි B හි අතර B හි C හි අතර C හිදී බඩ වැඩියායි

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## Village level data collection

As well as collecting household level data in each village, village level information was collected from the main shop in each village. The data included food availability and price for main food items shown in the Sri Lankan food frequency questionnaire,

## School data collection

School level data collection included all students between 12 and 18 years of age attending secondary schools. The WHO advises that 12 years of age is the cut off for a child to provide independent informed consent. Students under 12 years of age, any child who was diagnosed with a long term medical condition, and students attending private schools were omitted.

To select students, a cluster randomised sampling technique was used. As in the household sampling, there were five strata in three districts and a further stratification was added to select from different Department of Education school categories. This resulted in 15 strata (Figure 2.6), with at least 3 schools selected from each, using probability proportionate to size. A class with at least 30 students was selected from each school, resulting in a total sample of 1,350 students.

Figure 2.6: School sampling strata

Region	Ampara						Moneragala						Kurunegala		
Rap village	RaP			Non RaP			RaP			Non RaP			Non RaP		
School	1AB	1C	2	1AB	1C	2	1AB	1C	2	1AB	1C	2	1AB	1C	2

### School data collection

Selected schools were contacted via the education zone directors. Research teams visited each school and explained the project, arranging a date for data collection. Self-completion food frequency questionnaires and Global School Health Survey (GSHS) questionnaires were given to children in the exam style, ensuring confidentiality. Height and weight measurements were taken by trained researchers.

### School level data

The INPARD team developed a new tool to collect school level nutrition environment data using the World Health Organization nutrition friendly school initiative (NFSI) criteria (9). This tool collects information on topics such as school nutrition policies to create nutrition-friendly environments and includes questions about capacity-building activities (such as staff training and activities for families and communities), environmental features (such as the availability of healthy food, sporting facilities, toilets, safe drinking water, soap, and taps) and supportive school nutrition and health services.

### School neighbourhood data

Information was also collected on the retail food environment surrounding schools, including the presence of shops located within 10 minutes walking distance of schools and the products available within.

## Tools for data collection.

The INPARD team reviewed available tools and finalised the list of tools for data collection. Some tools were already available and were validated for Sri Lanka, while others were developed for the first time by the study team to be used in this study (Table 2.2).

*Table 2.2: Study population groups and tools used for data collection*

Age group/ Level	Outcome category	Tool/ Data source
<b>Children 12-18 years of age</b>	Diet and health behaviours	WHO Global School-based Health Survey (GSHS) and Food Frequency Questionnaire (FFQ)
	Anthropometric	Anthropometric measurements taken by trained researchers following standard protocol
<b>Adults</b>	Diet	WHO STEPwise Approach to Chronic disease Risk Factor Surveillance (STEPS) and FFQ
	Anthropometric	Anthropometric measurements taken by trained researchers following standard protocol
	Physical Activity Smoking Alcohol	STEPS STEPS STEPS
<b>Area level measures</b>	School	NFSI Assessment Tool for researchers, GIS data
	Village	Food availability and price data collected by researchers

Abbreviations: **GSHS**: Global School-based Health Survey; **FFQ**: Food Frequency Questionnaire; **NFSI**: Nutrition-friendly Schools Initiative; **GIS**: Geographic Information Systems

## INPARD qualitative methods

Qualitative data collection was also collected in addition to the quantitative data described above. Qualitative data provided richer and more detailed information on individual perceptions and how respondents thought about issues related to the INPARD project. The aims of the qualitative data collection in the INPARD study included the following.

1. To identify the knowledge, practices and attitudes on promoting nutrition among households and schools in rural communities
2. To explore the practices, beliefs, and attitudes on inter-sectoral collaboration for nutrition promotion among key policy makers and local workers
3. To evaluate the impact of an integrated nutrition promotion and rural development program

### Methods

Qualitative methods were used to learn about aspects of social life of the community and to supplement quantitative data collection, relying mainly on a phenomenological approach to the real-life experiences of the participants. The conceptual framework for aim 1 was framed around the 'Social determinants of Health' model. Aim 2 was explored through multiple theoretical perspectives related to teamwork and program planning. For aim 3, the views of key informants in the participating village and school communities were explored post intervention. The main methods of data collection were interviews and focus group discussions which are described in more detail below.

### Focus Group Discussions

The focus group discussions were carefully planned to identify prevailing knowledge, attitudes, and practices related to nutrition. The INPARD team sampled school principals, key persons in villages and schools and grass-roots level workers involved in nutrition promotion, as appropriate to each aim, until data saturation was

achieved. Focus groups were homogenous and the discussions conducted in the participants' communities, which

provided greater in-depth understanding of context and social fabric. These techniques illuminated the ways that attitudes and knowledge were created and shared within the various communities.

*Table 2.3 Number of groups and participants in Group in one of the data collection rounds*

Stakeholder	Number of Groups	Number of Participants in a Group
School principals (aim 1 only)	11	4 to 6
Community Members	4	6 to 10
Officers	2	7 to 8
School Children	4	10 to 12

### **Key Informant Interviews**

To address aim 2, semi-structured interviews were carried out with executive level state and non-governmental sector stakeholders who are directly or indirectly involved in promoting nutrition. Twelve such interviews were conducted with the executive level officers of the Eastern and Uva local ministries of health and nutrition, agriculture, education, and planning, the World Bank and WHO, Sarvodaya, and DS/ GA. Informant interviews were also conducted with two school principals gauge how accepted the project and its objectives were (aims 1 and 3).

### **Analysis**

The data was audio-recorded and transcribed (and translated as necessary). Thematic analysis methods were used where consensus among the researchers was reached. At the community level, this analysis was supplemented by network analysis.

Intervention arms of the INPARD program focused on enabling communities and individuals to identify determinants of their health in order to take appropriate action to improve it. One of the prime objectives was to study the existing governance, administrative and service delivery platforms of the provincial, district and village level to mediate intersectoral coordination among different sectors to achieve the common goal of good health through nutrition development.

The interventions consisted the following components (table 3.1):

1. In-depth situation analysis to understand the existing organizational structure of service delivery by the government and non-government sector workers/institutes that are linked to social development and health. The hierarchical structure along with duty lists of each institute/individual officer was mapped to develop a matrix that can link the national setup to the smallest administrative structure at the Grama Niladhari divisions.
2. Focus group discussions and key informant interviews were conducted from national to village levels to better understand the situation on the ground in more detail. A detailed mapping process using qualitative data was used to study the interactions between different sectors of the communities and understand their perception of what good nutrition is and how they feel about taking control over their nutrition.
3. Advocacy workshops, interviews, meetings, official communications and many other advocacy tools were utilized to gain support of all the important stakeholders identified by the above matrix.

4. Key stakeholders, authorities and experts in different fields of social development contributed in developing a curriculum aimed at creating a common platform for village level multi-sectoral stakeholders to work towards nutrition improvement in their respective geographical and administrative areas.
5. Delivery of training to the stakeholders was a key component of the INPARD program. Pilot training programs were carried out and the curriculum was refined based on the experience. The next step was facilitating the involvement of experts in medical education and health education. They developed a strategy to deliver this curriculum and carry out training of trainers. Medical doctors and other resource persons employed by the INPARD were trained extensively by the researchers including nutritionists and medical education and training experts. They later delivered the training program, which was regularly monitored by principle investigators.
6. This inter-professional training module was developed and delivered at MOH level to teams comprising Grama Niladhari, public health midwife, agrarian officer, economic development officer, social services officer, and the village development organizations. Village level teams that were never brought under a single training module were given the opportunity to identify nutritional issues in their area and find solutions based on the knowledge and skills developed at the training workshops. The role of the INPARD team was mainly in mediation, advocacy, and capacity building throughout the interventions.
7. After completing the training modules, stakeholders visited the villages and developed interventions to address the specific nutritional problems they found there. They prioritised these interventions with the help of community members and created action plans for schools and villages.

## **Description of activities**



## Curriculum development

An outcome-based approach was used to develop the curriculum. It is a need-based approach to curriculum development reforming and managing education. The approach is useful in curriculum planning and offers a framework for teachers designing (or planning) and implementing education programmes, for assessing the participants' performance, and for participants to ultimately have the responsibility for learning. Curriculum development in Sri Lanka needs rigorous planning to identify community needs, develop course outcomes and competencies, identify content areas, and plan teaching, learning and assessment. The first step in an outcome-based approach is to identify the exit outcomes.

A stakeholder analysis was conducted to identify outcomes and core competencies to develop the curriculum. The health needs were identified using surveys, focus group discussions, workshops, interviews, and feedback. The RaP is one of the main community driven development projects in the country. INPARD has collaborated with the RaP by selecting two districts of Sri Lanka to implement and evaluate nutrition promotion activities. The baseline survey was used in the RaP areas to identify community needs of the INPARD study. Baseline and post intervention surveys collected information on diet, physical activity, alcohol consumption, and smoking. Anthropometric data, demographic information, and area level measures of food availability, food prices, and poverty were also collected. Focus group discussions were held with RaP village community members who were identified as the key grass-root level stakeholders (school principals, community resource persons (CRPs), midwives, Gramaseva Niladari (administrative officers) and others)). These individuals participated in a dialogue to identify barriers for nutrition promotion and successful measures to tackle them.

Workshops were conducted with specialists in nutrition, health services delivery, rural development, agriculture, and education. Interviews with focal points on inter-sectoral actions such as WHO, World Bank, Sarvodaya, the Ministry of Health, and others were also conducted to get an idea about needs related to fostering collaboration. The INPARD team collected additional feedback from a core group of specialists.

After triangulation of the data which were collected by qualitative and quantitative methods, core competencies and outcomes were developed through a series of meetings using expert inputs from a range of different fields. The course content was developed to achieve these core competencies and outcomes.

Exit outcomes that were developed included:

- Analysing common nutrition issues of the area and their health implications
- Critically evaluating nutrition related implications of rural development interventions in the area
- Planning and implementing health promotional activities including health education
- Working effectively in collaboration with health and other sectors
- Promoting community empowerment to improve basic nutrition.

### **Training of stakeholders**

The programme that was developed was mainly based on three modules:

- Module one - Linking rural development and nutrition
- Module two - Health promotion through rural development
- Module three - Inter-sectoral collaboration

Content areas for the first and second exit outcomes were as follows. Common nutritional issues such as malnutrition, micronutrient deficiencies, misconceptions on nutrition, controlling the use of alcohol and tobacco and nutrition related implications were identified. Nutritional assessment, dietary supplementation, breast feeding, and supplementary feeding were also recognized as matters with health implications. Positive and negative impacts were considered to evaluate nutrition related implications of rural development interventions in the area. Positive impacts on nutrition included increased food production, improved quality of life due to increased income, and new self-employment options. Negative impacts on nutrition included low quality, mass produced food, environmental pollution from fertilizers, and food waste.

Based on these discussion points, the need for an upward reporting mechanism for multi-sectoral action was identified. The need for collaboration was identified by all the sectors based on minimizing waste, and sharing knowledge and resources. In the training and development stage, understanding the role of the health sector and other sectors and programme objectives in nutrition promotion was highlighted.

Content area for intersectoral collaboration module was as follows. Regarding planning and implementing health promotional activities, the stakeholders involved in nutrition such as the ministries of health, education, agriculture, and district secretariats played major roles. The program cycle consisted of strategy setting, programme development, resource mobilization, monitoring implementation, and evaluation. Leadership, team working and interpersonal communication skills were recognized as requirements for effective collaboration.

The promotion of community empowerment in order to improve basic nutritional needs was the last content area of the programme. Developing self-awareness about their community, identification of causes and solutions, improving knowledge about laws and legislations to create a supportive environment and creating a plan to achieve the targets for improving the community's access to basic nutritional requirements were the main components of the above objective.

This multi-sectoral group of participants was taught how to collaborate in promoting nutrition. These leaders were trained to play a key role in designing and delivering interventions in their respective settings.

Lectures, group discussions, demonstrations, workshops and case scenarios were used for all three modules to convey the messages to the grass root level officers.

Lectures were used to convey critical background information and theories. Lectures conducted in the nutrition module were about common nutrition issues of the area and their health implications as under nutrition and over nutrition and risk factors for obesity and non-communicable diseases.

Group discussions allowed active involvement by all participants. Participants learnt from each other, using two-way discussions which are almost always more creative than individual thoughts. Discussions in the nutrition module considered ways of eliminating misconceptions about dietary practices, and how mass production often reduces food quality. The intersectoral collaboration module focused on skills required for teamwork and completing interventions on time and within budget. Discussions in the rural development module were about creating a vision plan to achieve the targets for basic nutritional needs.

Demonstrations in the nutrition module were organized to recognize the importance of dietary supplementation such as to identify common clinical signs of malnutrition, micronutrient deficiencies, new agricultural techniques of increasing food availability, health services available on local hospitals etc.

Workshops are a popular format for creative meetings that elicit participants' creative drive and motivation. Workshops and some demonstrations in the nutrition module dealt with anthropometric data and calculating BMI, recognizing quality food, family income management, and increased food production and availability. Workshops in intersectoral collaboration module were conducted on bringing people together in groups to address common issues, encouraging groups to participate and influence decision making.

Case scenarios and role play provided opportunities to discuss the purposes of particular activities, reflect on the specific needs of learners, and develop new teaching skills. Dramas addressed the skills needed to respond with appropriately to common misunderstandings.

Baseline survey results were then shared with community stakeholders. Rural development staff organized meetings to discuss the findings relevant to their village/school and to prioritize interventions. The rural development project staff was trained to understand the impact of their decisions on nutrition (e.g. approval of micro-finance loans for food related businesses and the impact on local dietary behaviour). Other sectors including agriculture and education also attended this training. Multi-sectoral committees discussed how each sector could contribute to address identified nutritional problems and achieve common goals. Nutrition related

technical knowledge was provided by the local health staff and the INPARD team. Details were recorded about interventions in each school and village to measure their effectiveness.

Possible entry points to carry out the interventions were identified by the stakeholders. These included

- School health clubs
- Children Societies
- Cooking sessions
- VDO meetings
- Capacity building of officers

These were used to develop interventions that addressed the nutritional problems in these villages and were contributed to by stakeholders of multiple disciplines including the health sector. The leadership role was carried out by officers of different sectors in different areas, mainly based on the type of intervention and their enthusiasm and interest. When required, INPARD facilitated and guided these interventions and obtained further linkages with local, regional or national level expertise.

Several interventions that reflect the scope and spectrum of activities of INPARD program are briefly described in the following section.

**Figure 3.1 Multi-sectoral team at a training workshop and the training module handbook.**



# Nutrition Promotion Through Rural Development

A Handbook on health promotion for grassroot-level officers



INPARD  
Integrating Nutrition  
Promotion and Rural  
Development  
Sri Lanka



SAFANSI  
South Asia Food and  
Nutrition Security  
Initiative,  
World Bank

Figure 3.2 : INPARD training course handbook

The interventions were created by the multi-sectoral teams in the village and they were context specific. Therefore different villages had different combination of interventions. They can be categorised in to five main categories

The table one shows the main categories of interventions and sub-categories.

*Table 3.1 Categorisation of interventions.*

No	Category	Sub-categories
1	Agricultural Programmes	1. Awareness programmes on home gardening 2. Training on home gardening 3. Home gardening competitions 4. Production of compost fertilizer 5. Production of bio pesticides and organic agriculture
2	Nutrition Promotion Programmes	1. Awareness on nutrition 2. Training on preparation of nutritional foods 3. Programmes to identify nutrition deficiency 4. Awareness on small children's nutrition
3	Health Promotion Programmes	1. Awareness on health 2. Programmes on exercise 3. Sports programmes 4. Programmes on hygiene 5. Programmes on infant health
4	Health Food Production & Marketing Promotion Programmes	1. Healthy and nutritional food production 2. Healthy nutritional food promotion 3. Marketing healthy nutritional food and creation of new markets 4. Self-employment in healthy nutritional food production
5	Social Development Programmes	1. Children's social activities 2. Youth social activities 3. Adults social activities 4. Sport social activities 5. Prevention programmes on use of drugs & smoking 6. Other - New year celebrations, Vesak celebrations, meditation, organizing alms giving

The following section describes several case studies from these interventions. The case studies demonstrate how officers working in different sectors can address nutrition related issues in a village.



## Case study 1

### Kithulkotte, Moneragala District



Problem: Low intake of protein has been recognised as a problem in this area. This was brought forward by the school teachers and confirmed by the Public Health Midwife (PHM) and Medical officer of Health (MoH). The Re-awakening (RaP) project and previous development projects have distributed cow's milk to address this issue, but this has not been successful (for several reasons outlined below). Community members shared their experiences and highlighted some of the problems they have encountered:

*"Even though we have an excessive production of fresh milk in the village, people do not consume milk because of the myths around it such as fresh milk causes phlegm and cough. Milk producers sell their produce to businesses outside the village for a very small price"* – **A milk farmer, Female (52 years)**

Intervention: At the INPARD workshop, the village's multi sectoral team discussed this issue and identified yogurt production as a possible solution to increase the availability and consumption of dairy products in the village. Yogurt production has been attempted before by several individuals, but it was not successful due to a lack of demand, lack of

technical knowledge, failing to complete business registration and lack of financial support. However, after identifying these barriers, the wide range of officers involved with the INPARD were able to identify potential solutions to address these barriers.

The Agriculture Instructor provided the training to a group of community members and several individuals wanted to start yogurt production as a small business in the village. The following table shows the contribution from each officer to increase the availability and access of yogurts (Table 3.2).

*Table 3.2 : Contributions of different stakeholders for the INPARD intervention*

<b>Stakeholder</b>	<b>Role</b>
Agriculture Officers	Provided technical knowledge on yogurt production
Community Resource Person of the VDO	Organized community training sessions, Provided advice on financial support through a micro finance livelihood village fund
Grama Niladhari (Administration Officer)	Assisted with business registration, Created a network to expand the market
Sanurdhi Development Officer	Provided financial support to eligible candidates
Public Health Instructor	Helped achieve public health standards to complete the registration. Linked shops with yogurt producers Assisted producers with the business registration
Public Health Midwife	Created awareness of the project within the village Provided access for producers to sell their products at the health clinic
Principal/Teacher	Provided access to the school canteen Created awareness of the scheme within schools among students, teachers and families.





15.00 and 20.00 within school canteens and village shops (normal price Rs 30.00). Sustainability of the business is now being studied.



## Case study 2

### Abhayapura village, Ampara District

**Problem:** Low intake of protein was prioritised by stakeholders discussing possible solutions. There is a large water tank in the village from which members of the fisheries society catch fish. However, community members did not typically consume the most common fresh water fish (Rohu) caught in this tank and therefore did not benefit from this potential protein-rich food source. Further discussions revealed that although this fish is not popular when it is served fresh, it is very popular as a smoked fish. After identifying this as a possible way to increase the consumption of fish within the community, the stakeholders invited the local authorities for a discussion.

**Intervention:** The regional director of the fisheries department arranged a training session for community members on how to make smoked fish. Several individuals decided to start this enterprise as a small business. They bought fresh fish from the village tank and made smoked fish to sell at the village shop. This arrangement benefits both the smoked fish producers and the school meal provider who now gets smoked fish for wholesale price, which enables provision of extra fish in free school meals. As explained in table 2, the establishment of this business was made possible through the involvement of all the village officers. The Administration Officers arranged a location to start the business and Public Health Inspector arranged the registration of the business. The Public Health Midwife conducted the health education sessions in the village and encouraged the consumption. Rural Development Officers arranged the financial support through micro-finance programmes.

***Figure 3.3 Training on smoked fish production***





Photo credit: Chamil Senevirathne

**Figure 3.4 locally produced Smoked fish in the village grocery**

## Case Study 3

### Wewinna village, Ampara District

Problem: Low intake of fruits and vegetables has been recognised as a problem in many villages. Home gardening has been recognised as one of the best interventions to address this issue, but Ampara district has a long dry season which discourages many people from attempting to grow home gardens.



Intervention: Multi sectoral teams decided to provide the necessary technical knowledge and promote home gardens. Officers built the capacity of community members to support each other and identified ways to successfully navigate the obstacles associated with water scarcity. For example, they demonstrated ways to plant seeds in bags with very minimal water use (which could be provided from waste water from home consumption). Agriculture Instructors initiated the programme in villages and schools. School children learned these techniques at school and worked with their parents to start and successfully maintain home gardens during the dry season in this area. Public Health midwives have been promoting the importance of adding these vegetables to one's diet. The VDO has helped to buy the initial tools and water hoses for schools and selected households.

***Figure 3.5 (insert and continued overleaf)  
home gardening by  
school children in  
Ampara District***

Figure 3.5: School garden at Abhayapura School with a new technique for dry season and agriculture officer training school children on how to make compost





## Case study 4

# Moneragala

Problem: High intake of “ice packets” which are produced from artificial colourings, artificial flavours and with high amount of added



sugar, by school children. This is a very popular product among school children in all areas. But in this village the multi-sectoral team prioritised this as an issue to tackle. They also recognised that their children eat less than recommended level of fruits per day.

Intervention: The agriculture officers highlighted that a lot of fruits are wasted, without being picked during the season and they can provide the technology to preserve them as dried or frozen products. They also said they can train some community members to make an alternative product with frozen fruits. Since this production is based on fruits from the village, without any added sugar or artificial chemicals, it could compete well with the traditional ice packets. The school principal and other shop owners really valued this idea, saying this would allow them to sell a healthy product, at the same cost.

**Training programme to  
produce “ice packets”  
from fruits**



***Figure 3.5 (Left) Production of iced fruit juice from locally available fruits. (Centre and right) New fruit based products to replace unhealthy sweet products in schools***

## Interventions to improve awareness

INPARD organised several interventions in schools and villages to improve the nutrition related awareness. They were aimed at changing the knowledge, attitude and practices related to health and nutrition.



*Figure 3.6 “healthy cooking session” conducted by school children.*



*Figure 3.7: School children measuring Body Mass Index (BMI) of children and parents*







**Figure 3.8**  
**Managing the**  
**budget and**  
**shopping for**  
**healthy foods.**  
**Awareness sessions**  
**in schools and**  
**villages.**



**Figure 3.9**  
Healthy  
cooking  
sessions in  
the  
community

## **Multi-sectoral support for interventions**

In all the cases studies presented above the multi-sectoral team supported the initiative. Generally agriculture officers provided technical knowledge to choose ingredients and make the product, village development organisations and economic development officers provided micro-finance support for trained community members to start the small business, administration officers supported the business registration, Public Health Inspectors helped to achieve the health and hygiene standards and certificate, public health midwives created the awareness in the village about nutrition problems and new solutions, they also provided the opportunity to introduce new products at clinics. School Principles also promoted the healthy products in school canteens and promoted them at the school. These examples clearly show the role of individual stakeholders for nutrition promotion at the village level and could be used for future training programmes.

## **Advocacy for middle level managers and senior officers**

The different stakeholders described above are attached to different ministries or organisations. They have their own work schedules and managers to report to. They do not have the freedom to completely decide their timetable and activities. It is important to conduct advocacy sessions for area level manager/ middle level managers and senior officers in each sector, to secure continuous support for the programme. INPARD conducted workshops from the early stage of the project to get their inputs and to provide regular feedbacks. Some officers such as divisional secretaries and agriculture directors included INPARD activities as a regular item in their monthly meetings to discuss the progress.



## Training for journalists

Sri Lankan media give prominence for news related to health and nutrition, but it was observed that they mostly report the situation, and there is very little media reporting which examines the upstream factors which influence nutrition. This workshop trained journalists from mainstream newspapers and television channels to understand the upstream determinants of nutrition, taking rural development as an example.

**Figure 3.6 Training workshop for journalists**



*This section presents results from the quantitative and qualitative components of the study.*

*The qualitative component includes findings from the in-depth interviews with policy makers about intersectoral collaboration for nutrition promotion. This section presents gaps and challenges in current practices and areas for improvements.*

*The quantitative component is divided into two main sections. They are household survey and school survey. The school survey covers children 12-18 years old. In both of these components individual level socio-economic status (SES), diet and anthropometric data (height, weight etc.) were collected with other relevant information including smoking, physical activity and alcohol consumption. Each participant completed a food frequency questionnaire which provided details about their diet in last 30 days.*

*In addition to the individual-level data, school level data was collected by using the nutrition friendly school initiative (NFSI) tool for researchers. This is a new questionnaire developed by the INPARD team using the WHO's nutrition friendly school initiative criteria.*

*As described in the methods sections, the INPARD study had intervention areas and control areas. Baseline characteristics and outcomes are presented by intervention and control areas.*



#### **4.1 Qualitative findings - Intersectoral collaboration for nutrition promotion: policy makers**

Based on the understanding of the existing intersectoral collaboration mechanism for nutrition promotion, several themes on barriers for collaboration were identified. These are: lack of role clarity; communication gaps; negative attitudes; and training requirements.

Identification of roles and accountability: The importance of identifying the roles of each sector in a multisectoral nutrition intervention was recognized. Many sectors recognized the Health Ministry as the lead ministry on nutrition related activities whereas a major role was also identified for the Ministry of Planning. However, there was limited accountability on the non-health sector to deliver nutrition related outcomes and a limited recognition of their role. Therefore, from the non-health sector, the Economic Development Ministry was identified for its capacity to implement projects at the grass root level.

*“The lead ministry in the grass-root level is the Economic Development Ministry. At that level, there is a graduate, Samurdhi Officer, KUPANESA officer and under the government administration there is Gramasewaka officer.”*

Negative attitudes - The need for collaboration identified by all the sectors was based on minimizing waste, and sharing knowledge and resources. However, there was a lack of commitment to achieve a common goal related to nutrition due to individual institutional objectives that limit intersectoral collaboration. In addition, the capacity of the non-health sector was constantly being questioned by experts of the health/ nutrition sector.

*“If there is a common objective - for an example, improving nutrition in a given period of time – it is often seen as a goal of the Health Ministry. It is not a shared goal and therefore the developmental agenda is not being shared. Many have the attitude that it is outside their aims and objective and duty - because they do not have the accountability to achieve that goal.”*

In relation to role contribution participants identified that duties and activities identified for each sector did not clearly recognize their

nutrition-related objectives or the indicators to evaluate the contribution. Participants agreed that sufficient funds were received to promote nutrition but no consensus was reached on what need to be done to make an impact.

Communication gaps - The National Nutrition Council with inter-sectoral participation was identified as a good existing structure for communication and coordination. However there was a lack of knowledge on the local structure, which limits collaboration.

*“Most of the officers do not know the bottom level structure...They need to know the government administrative structure. Then they can understand with whom they have to work to achieve their objectives.”*

Participants identified that most decision making takes place at the top level without engagement of villages. At the grass root level, instructions are followed (e.g. circulars) for assigned activities, but bottom-up contributions to the decision making process is minimal.

Training requirements – Understanding the role of the health sector and other sectors and programme objectives in nutrition promotion was highlighted as a training need. The emphasis should be on not duplicating the roles in the process but supplementing the roles to get a better outcome. Such support would reverse the current increased workload for health care workers as well.

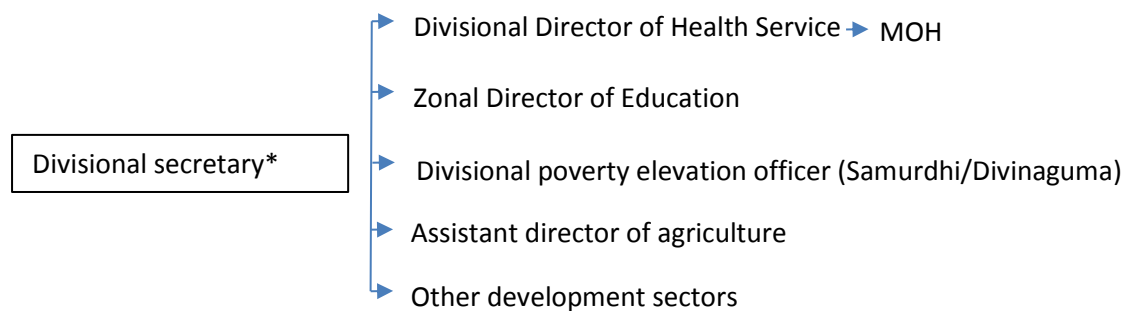
*“What has happened now is that we are releasing our health sector worker who has a particular job to deliver other services in other sectors.”*

Participants emphasized that operational guidelines should promote intersectoral collaboration, and that the existing structure at the grass root level should be better utilized by promoting training on a multi-sectoral approach to nutrition promotion.

*“We lack coordination in higher level but at the grass-root level there is a good mechanism. There is GA, AGA and at the Economic Development Department there is a good workforce.”*

There is no standard pathway for sectors to coordinate with each other at field level. The most proximal level where official

intersectoral communication takes place is at Divisional secretariat level. The divisional secretary regularly convenes these sectors and create a platform for communication. Outside this, coordination amongst different sectors is minimal. Communication pathways are as follows.



Based on this study recommendations include: National multi-sectoral planning to promote nutrition including necessary technical input in planning; Flexibility in operational guidelines of different ministries; Specifying objectives of each sector related to nutrition and making each sector accountable to deliver those objectives; Implementation to be monitored, evaluated and cross-communicated to all sectors through a proper mechanism; Broader discussion on nutrition indicators and identifying indicators to measure the contribution of other sectors in promoting nutrition; health sector to genuinely support activities led by non-health sector institutions/individuals; and Need for other sectors to identify necessary interventions to promote nutrition and evaluate them appropriately. Specifically in relation to the INPARD, this study identified the ways in which training for officers in the different sectors should be conducted through a common programme.

## 4.2 Results/Villages

### Sample

Fifty villages were selected from three districts, in intervention and control areas. Twenty households were selected from each village, with data collection attempted for two adults in each. This resulted in a total of 698 adults for whom we collected baseline and follow-up data in INPARD areas and 1030 adults in control areas. Control areas included villages not included in INPARD in Ampara and Moneragala and all villages in Kurunegala (Table 4.1).

*Table 4.1 Sample size for data collection baseline and follow up*

	Ampara		Moneragala		Kurenagala		Total
	Female	Male	Female	Male	Female	Male	
INPARD	189	158	207	144	-	-	698
Control	209	161	188	135	219	141	1030

Similar behavioural measures were found in INPARD and control areas at baseline, using STEPwise survey tools. This indicates that cluster randomised sampling procedures followed were successful in obtaining comparative groups at baseline (Table 4.2).

Table 4.1 : Sample characteristics of INPARD study

	Intervention (n=1038)	Control (n=601)
Age		
Mean	45.85	45.23
Range	21-81	20-79
Sex		
Percentage of males	38.15	38.94
Highest education (%)		
Primary school*	3.86	6.50
Secondary school*	15.44	21.33
Passed Ordinary Level*	44.02	39.67
Advanced level and above*	23.46	19.83
Ethnicity (%)		
Sinhala*	86.87	76.17
Tamil	11.49	11.17
Moor*	1.54	12.17
Others*	0.10	0.50
Employment (%)		
Employed	48.79	44.33
Unemployed*	48.60	54.50
Retired	2.61	1.17
Income category - by LKR/month (%)		
<10,000	29.55	32.39
10,00-19,999	38.16	36.99
20,000-29,999	19.84	21.95
>30,000	12.45	8.67

*\*indicates statistically significant difference at a level of  $P<0.05$  between the intervention and control groups*

*Table 4.3 Behavioural measures at baseline*

	Pre-intervention	
	Intervention	Control
Smoking (%)		
Ever smoked tobacco	14.55 (3.52)	15.31 (3.60)
Current smokers	8.19 (2.74)	10.32 (3.04)
Alcohol (percentage)		
Currently using alcohol*	23.7 (4.25)	19.13 (3.93)
Problem drinker	8.96 (2.85)	8.15 (2.73)
Physically inactive(IPAQ) (%)	59.93 (4.90)	57.07 (4.95)

Values reported as percentage or mean value (standard deviation).

\*statistically significant difference at  $p < 0.05$  level.

*Table 4.4: Dietary characteristics before and after the intervention*

	Pre-intervention		Post intervention	
	Intervention	Control	Intervention	Control (n=601)
Fruit consumption				
Days per week	3.25 (1.93)	3.41 (1.96)	3.38 (1.92)	3.72 (1.96)
Portions per week	7.45 (7.06)	7.1 (6.54)	8.82 (7.06)	7.05 (6.54)
Vegetable consumption				
Days per week	5.77 (1.66)#	5.79 (1.63)	4.92 (2.49)#	5.50 (2.24)
Portions per week	8.24 (7.44)#	7.58 (5.26)#	11.00 (6.30)#	9.13 (7.32)#
Adding salt to rice	94.03 (23.71)	90.85 (28.86)#	61.37 (48.71)	56.41 (49.63)#
	7.4 (1.78)	9.4 (2.01)	8.62 (3.27)	12.25 (4.02)

Values reported as percentage or mean value (standard deviation).

# statistically significant difference between pre- intervention and post intervention value at  $p < 0.05$  Fruits and vegetables consumption is presented as the mean number of days of eating at least one portion of fruits/vegetables

Medical measures collected through the STEPwise survey also demonstrated similar distributions between INPARD and control areas at baseline (Table 4.4).

Table 4.4 Medical measures at baseline

	Intervention (n=1038)	Control (n=601)
BMI (mean) kgm <sup>-2</sup>	22.7 (4.43)	22.7 (4.48)
Waist (mean) cm	80 (11.44)	79 (11.66)
Hip (mean) cm	89 (8.39)	88 (8.53)
Diabetes <sup>1</sup> (%)	7.4 (2.61)	7.4 (2.66)
Hypertension <sup>1</sup> (%)	12 (3.29)	12 (3.04)
CVD <sup>1</sup> (%)	22 (2.67)	23 (2.58)

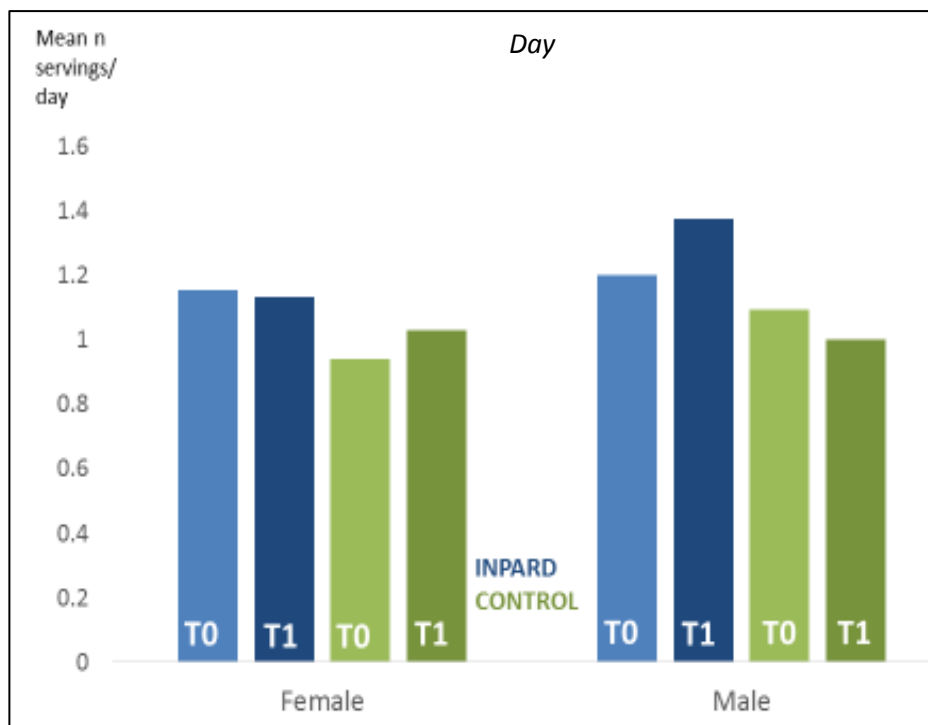
All conditions measured above did not have a significant difference between the control and intervention groups. 1 Diabetes, hypertension and cardiovascular diseases (ischaemic heart disease or cerebrovascular accident) are self-reported

### Diet outcomes

The STEPwise survey collects information on the number of fruit servings individual eat each day. One standard serving is defined as 80 grams. This is described as one medium piece of a whole fruit such as a banana or orange; half a cup of chopped, cooked or canned fruit; or half a cup of fruit juice if taken just from the fruit and not artificially flavoured. The mean number of fruit servings per week changed little between baseline (T0) and follow-up (T1) ( $p>0.05$ ).

Seasonality could, however, be an issue in the consumption of fruit, as although follow-up data collection was planned for a year after baseline it was delayed due to national elections being run during planned data collection dates (Figure 4.1).

Figure 4. 1 Mean number of fruit servings per



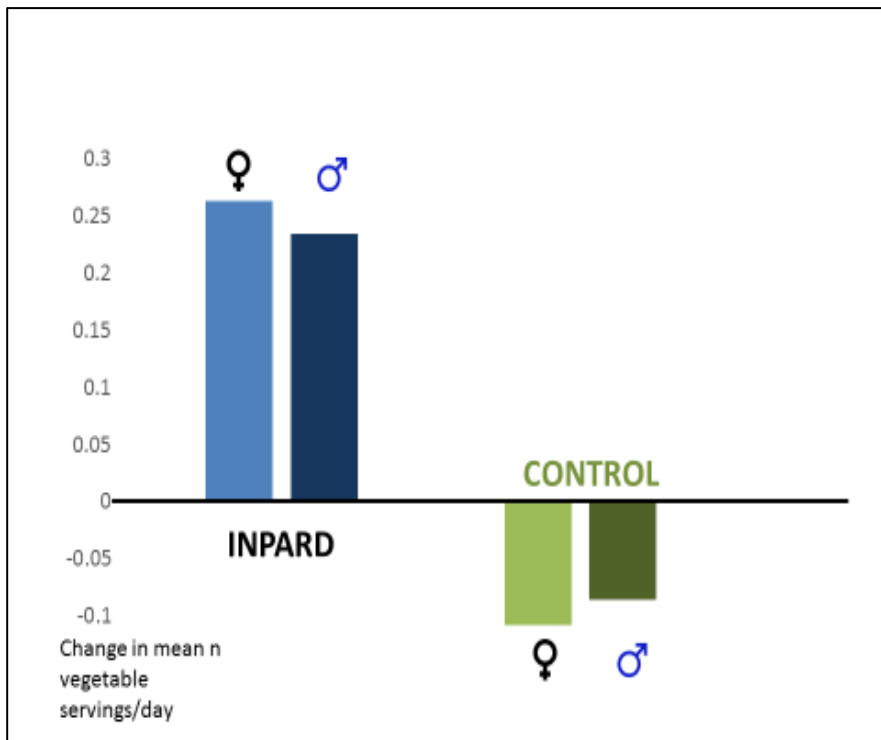
Similarly, vegetable intake was measured in number of vegetable servings, also defined as 80 grams of vegetables. This was equivalent to one cup of raw leafy green vegetables, such as spinach; half a cup of other vegetables cooked or chopped raw, such as carrots, tomatoes and onions; or half a cup of vegetable juice.

In our sample the mean number of vegetable servings consumed by women increased by around one quarter of a serving a day in both men and women in INPARD areas. In control areas, however, it decreased in both by around 0.1 of a serving.

Although these seem like small changes, they are a daily mean. The increase in INPARD areas is the equivalent to around an extra two servings a week on average for all individuals. It must also be remembered that these servings are an average for the sample so can represent large changes at a population level (Figure 4.2).

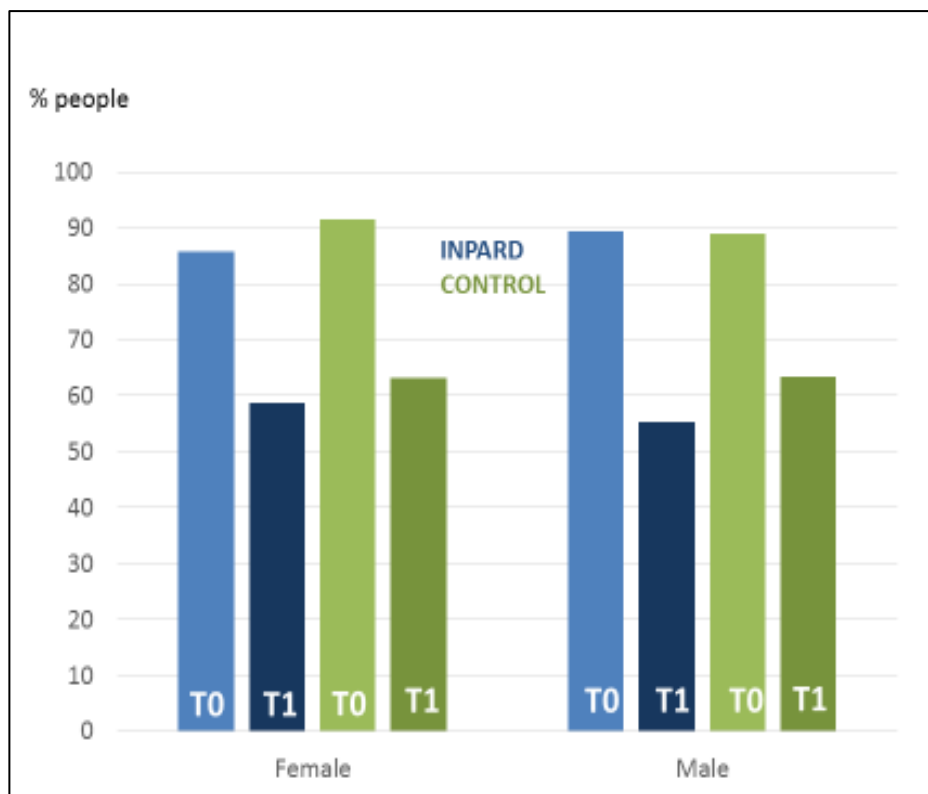


Figure 4.2 Mean number of vegetable fruit servings per day



One of the strengths of INPARD is that it was community-led. This meant that there were some differences in the focus on nutrition promotion between communities and districts. One example of this is the use of salt in cooking. Although the percentage of people adding salt to rice was very high in both control and INPARD areas at baseline, (over 85 percent for both men and women), it was much lower in both at follow up (Figure 4.3).

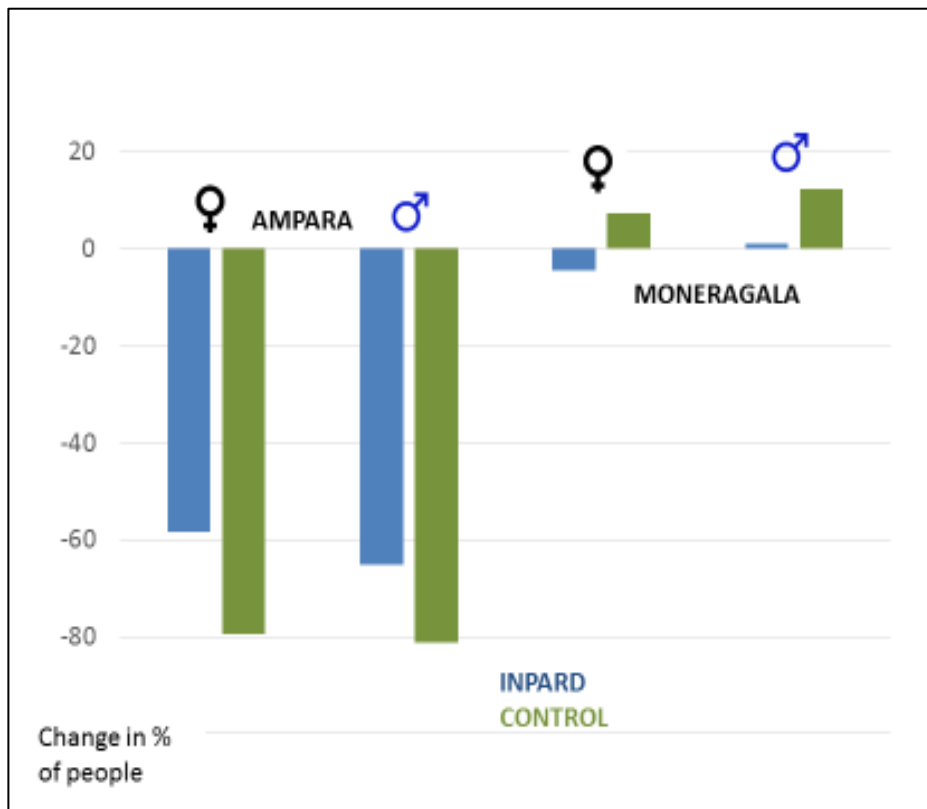
Figure 4.3 Percentage of people who always add salt to rice



However, communities in the district of Ampara identified salt intake as an issue they needed to combat. This led to a number of events being carried out through INPARD, focusing on reducing the amount of salt people add to their food.

When we consider changes in the percentage of people who always add salt to rice, by INPARD district, we find large decreases in both INPARD and control areas in both men and women in Ampara. In Moneragala, where there was no such effort to reduce salt use there was very little change in the percentage of people adding salt to their rice at baseline and follow-up (Figure 4.4).

Figure 4.4 Change in percentage of people who always add salt to rice



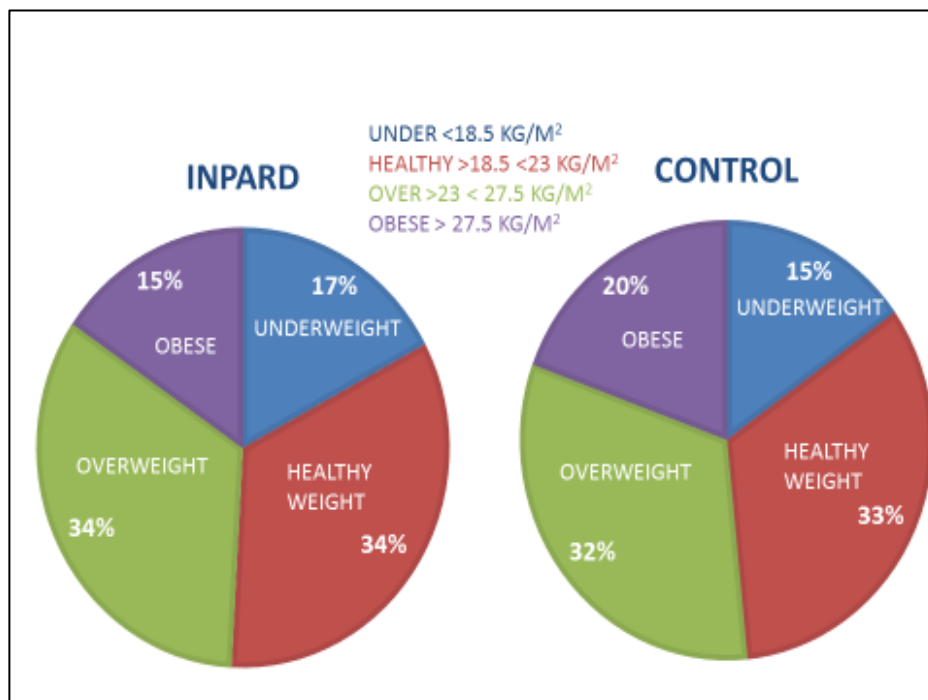
### Medical risk factors

As part of the household survey, height and weight measurements were taken from adults using trained data collectors. These measured data are important because subjective, self-reported measures of height and weight can be affected by recall bias where individuals do not know their measurements accurately, or reporting bias, in which individuals do not wish to report their true measurements. Together recall and report bias generally lead to an underestimation of Body Mass Index (BMI) in individuals who self-report height and weight.

Although in many countries the definition of overweight and obesity is taken as 25 kg/m<sup>2</sup> and 30 kg/m<sup>2</sup> respectively, this study used the recommended cut offs for Sri Lankans and other South Asians, who suffer a greater risk of ill health at lower BMIs than western populations.

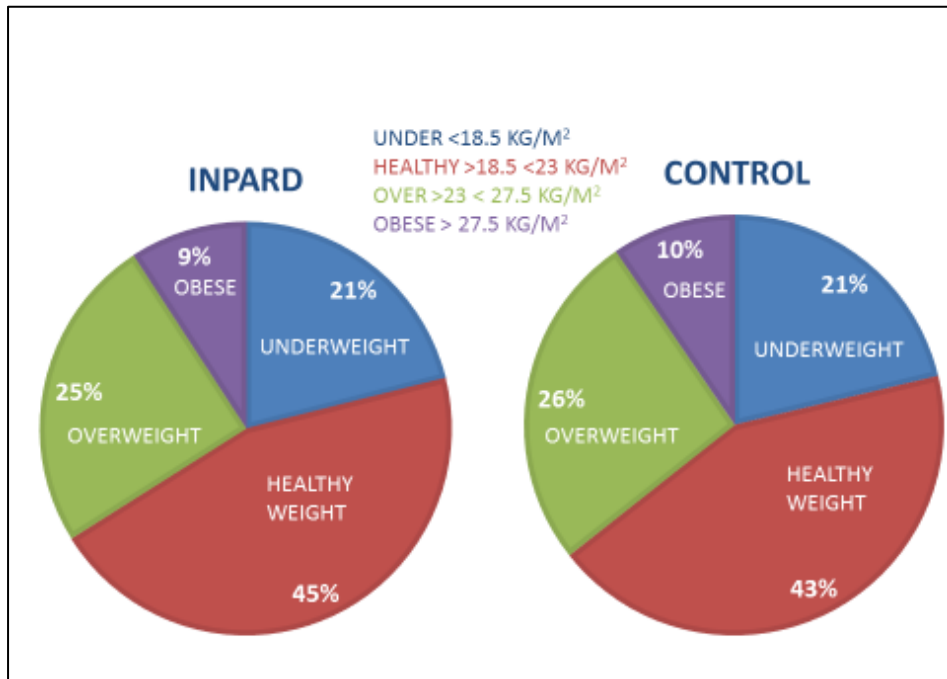
BMI measurements collected at baseline demonstrate the double burden of BMI related disease found within the study areas, with large percentages of women in both INPARD (17 percent) and control (15 percent) areas measured as underweight and around half measured as overweight or obese (Figure 4.5).

*Figure 4.5 BMI status at baseline, women*



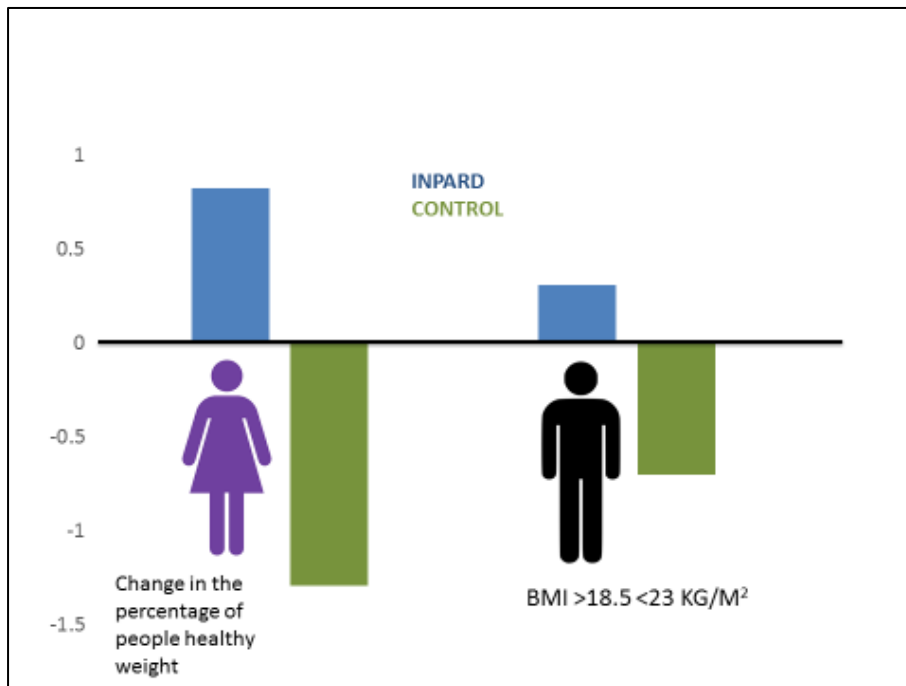
Men displayed similar distributions, although there was a higher prevalence of underweight amongst men, there was a lower prevalence of overweight and obese, when compared to women. Similar percentages were found between INPARD and control areas for both sexes (Figure 4.6).

Figure 4.6 BMI status at baseline, women



Although small changes were seen in the percentage of people classified as 'healthy weight' in both men and women, increases were seen in INPARD areas, compared to decreases in control areas (Figure 4.7).

Figure 4.7 Change in percentage of people classified as healthy weight from BMI

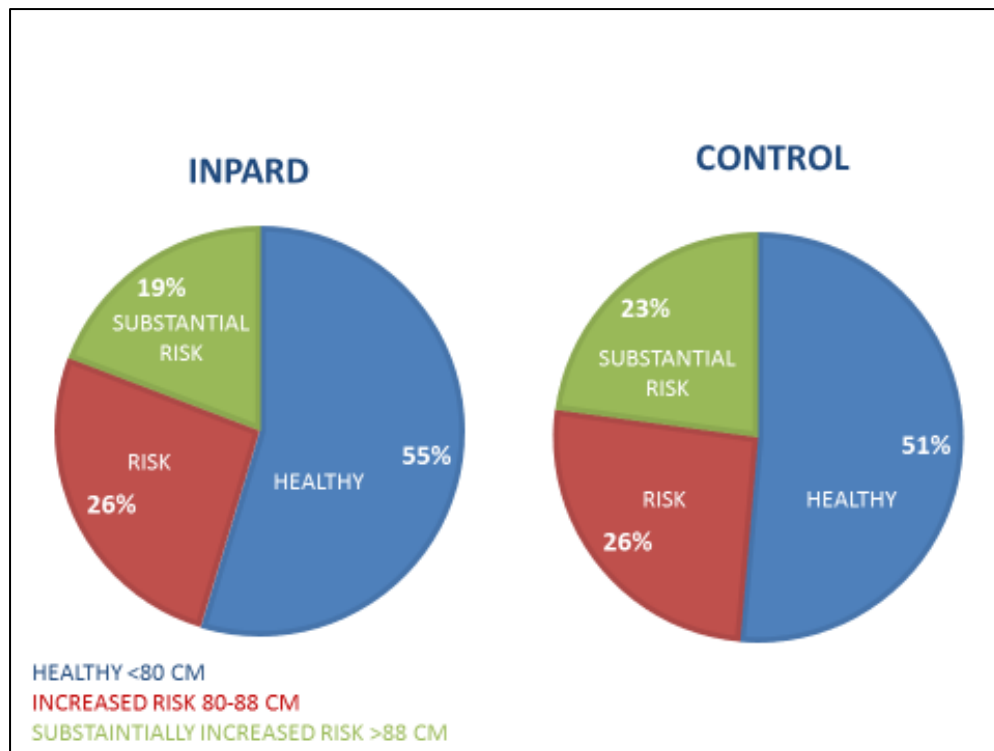


Although BMI is commonly used to estimate the adiposity and weight related health of individuals, it does not control for body fat, as mass cannot distinguish between different types of body tissue. Visceral fat, which is stored within the abdominal cavity and surrounds a number of important internal organs, is a major concern. Visceral fat is associated with a greater chance of ill health. Although taking accurate measurements of visceral fat is very challenging and expensive, requiring advanced technological expertise and equipment, waist circumference is often used as a proxy for visceral fat, as waist circumference is correlated to the amount of fat stored viscerally within the body.

Waist circumference measures were taken alongside height and weight measurements, in all adults, with Sri Lankan cut offs used to determine healthy waist circumference. Those with a waist circumference less than 80 cm were classified as 'healthy', those with a waist circumference between 80 and 88 cm classified as at 'increased risk' and those above 88cm as at 'substantially increased risk.'

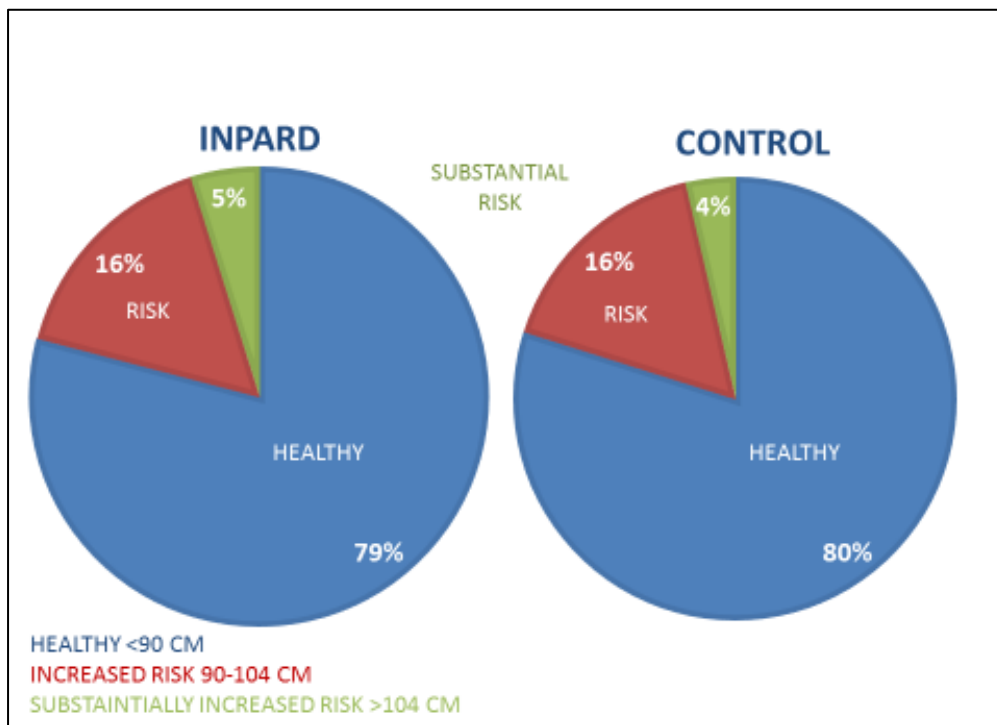
At baseline just over half of all women, in INPARD and control areas, were classified as having a healthy waist circumference, with around a quarter in each classified as having an increased risk due to a high waist circumference. The remaining individuals classified as at substantially increased risk, 19 percent in INPARD areas and 23 percent in control areas (Figure 4.8).

*Figure 4.8 Waist circumference classifications at baseline, women*



A larger prevalence of healthy waist circumference was found amongst men, with around three quarters of individuals in both INPARD and control areas ( $p>0.05$ ) classified as having a healthy weight circumference (Figure 4.9).

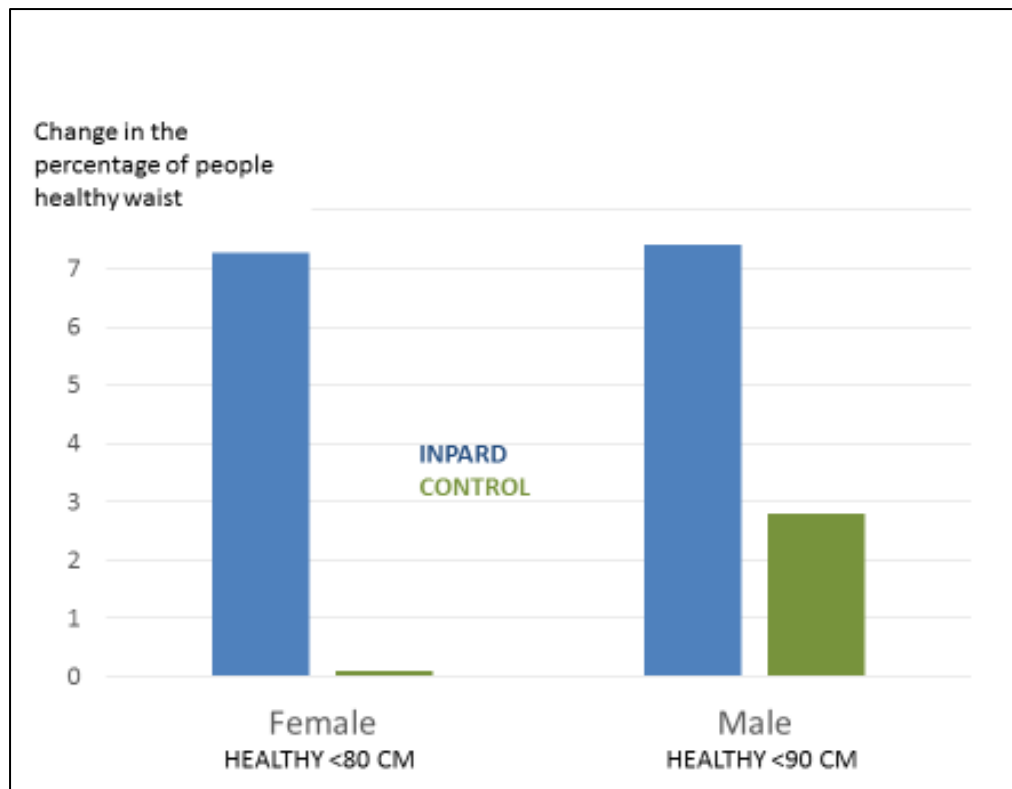
Figure 4.9 Waist circumference classifications at baseline, men



An increase in the prevalence of individuals with a healthy waist circumference was found in INPARD areas for both sexes. Much smaller increase was found in control areas amongst men with little change amongst women in control areas (Figure 4.10).



Figure 4.10 Waist circumference classifications at baseline, men



Qualitative findings - Knowledge, attitudes and practices related to nutrition among the community members

#### 01. Expand of the vocabulary related to nutrition

The group discussions had with school children and community members revealed that their knowledge of nutrition had increased during the project period. Participants' vocabulary related to nutrition was observed in the baseline interviews in the project area and the control area. The subsequent data collection indicated the improvements in the vocabulary related to nutrition among the school children and the communities. This expanded vocabulary greatly facilitates improved knowledge, attitudes, and practices.

Some of the repetitive words used by the participants were 'Balance Diet', 'BMI', 'Local Food' and 'Innovative Recipes'.

*"Through the activities organized by this project; now we have good understanding of nutrition and balanced diet. The way we learnt those is different to class room learning". –Student*

*"Members of the children club went door to door in the village and measured the BMI of villages frequently, also they explained us what is BMI" – Community member*

*"We learnt how to make a balanced diet; sometimes we could make it by getting things from our own home garden. We learnt the correct combination to make balanced diet" – Community member*

The above comments reveal the impact on the community with regard knowledge enhancement pertain to the nutrition aspects of their lives.

#### 02. Understanding the concept of health in a wider perspective

Participants' understanding of the concept of health expanded and deepened. According to the respondents a healthy person is an outstanding and enthusiastic person. Further, s/he lives in a clean environment and follows hygienic practices. As per community understanding food and nutrition provide the basic requirements for a person to be healthy, however being healthier related to many other aspects of the life.

The activities carried out by the government officers in the villages and the nutrition club activities in the schools had created this perception among the community.

*"We were told by Midwife how to create a hygiene environment in the house; I think all those help to be healthier" – Community member*

*“Anti-Alcohol and Smoking campaign organized by the children helped the villagers to think about healthier lives: - Teacher*

It was observed that different government officers have contributed to raise the knowledge among community members from their respective scopes.

#### 03. Greater emphasis on ‘local food’

According to all participants, fresh produce and local food that available locally (backyard cultivation and local market) are healthier. Community members use these items to make a balanced diet. It is necessary to assess the nutritional value of the food that the community generally consumes.

#### 04. The role of children highlighted

The project functioned in three main social spaces: family, school, and village community. In all these arenas, children played an active role when interacting with mothers, teachers and villagers respectively. Adult community members were willing to accept the children’s initiatives, recognizing their role as agents in the community. The implication for projects of this type is the practical value of children’s involvement, especially in disseminating messages to the community.

*“Backyard cultivation really makes the family relationship stronger, as my daughter started cultivating. All my family members engaged it with great pleasure” – Mother*

#### Collaboration of the Officers

##### 01. Creating a common objective for all the officers

Networks among the officers are instrumental in providing functional values for them. Because all the officers work at a common geographical area and most of their beneficiaries are the same, networks form in large part to ease their daily workloads. Passing messages and arranging meetings are the most common functions that the officers performed together. It is necessary to upgrade these relations into a network that exists for a common objective. Group discussions suggested that for the most part these networks were not enlisted on behalf of INPARD. The reasons for that can be transfers of the officers, lack of officers (Grama Niladharies for certain GN) and lack of integration.

##### 02. Check and balance of the activities

According to the officers, the work performed by them is being monitored by the colleagues due to INPARD. This has positive impact on the beneficiaries as well as on the other community projects in the area. The INPARD network among the officers performs as an informal social controller.

*“Whatever the project we do, now well visible to the other people [officers], so we cannot do any wrong, we have to be fair and active in everything” – Officer*

03. Even

The number of officers assigned to areas was similar in all the locations where data were collected. There were however disparities from one area to another in the number of officers who actively engaged in work on behalf of INPARD.

In some locations only a minimum number of officers were actively engaged. Yet even where just one or two officers engaged, INPARD could have a substantial impact despite limited or no contributions by their peers.

04. No evaluation criteria for the officers

Officers were disappointed that there was no way to evaluate or recognized their contributions to INPARD. Most of them consider this as an additional work to their specified job description. According to them their commitment to the project should be recognized by their immediate supervisors and reflected in their performance evaluations.

*“No one in my office knows that I’m engaging with this project, for my supervisor this is irrelevant, so what is the benefit I’m getting for this, even if I cannot have the simple recognition?” - Officer*

05. Suggestion for a common location

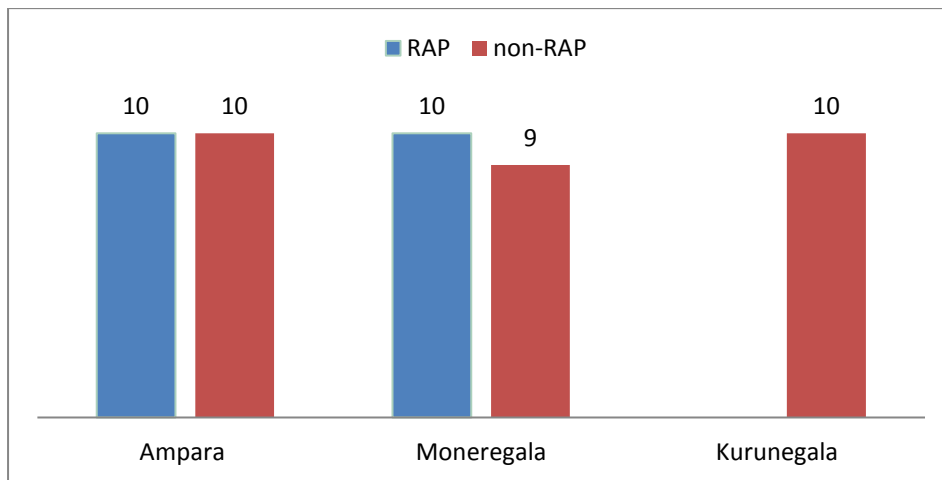
All officers agreed that they can perform well in this type of work if all of them can work at the same premises. According to them, the community will benefit the most if the officers work from the same place and this would create the basis for the linkages.

## Results of the schools

### Sample

49 schools participated from all three districts, including intervention (n=20 schools) and control areas (n=29 schools).

*Figure 4.11 Number of schools by intervention, district and language*



### Nutrition-friendly schools initiative (NFSI) school survey

To learn about school policies and practices related to nutrition promotion, we conducted a semi-structured interview of head teachers and senior staff from within schools and a wide range of experience working within schools (from 0-25 years) (Fig 4.12).

Figure 4.12. Position of participants involved in the NFSI school survey

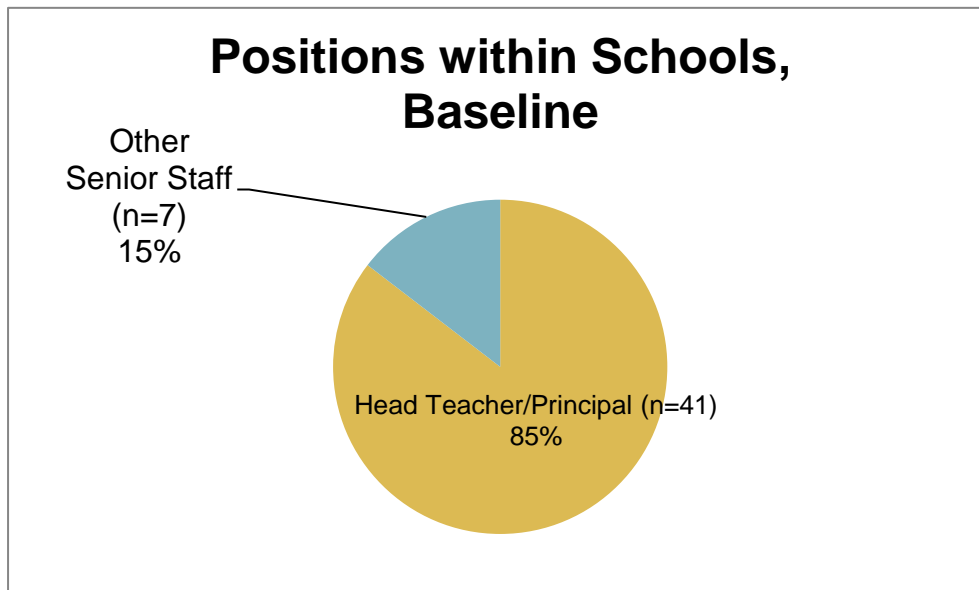


Table 4.5 Number of years participants had been working at the same school that was included in the NFSI school survey

	Mean	SD	Min	Max
Ampara	1.9	1.9	0	7
Moneragala	8.9	7.9	0.5	25
Kurunegala	4.5	3.4	1	12
Overall:	5.2	6.1	0	25

## Description of schools

To gain contextual information about the schools, we asked principals to report if students received free school meals from the government. Most of the schools (n=82.8% control, n=90.0% intervention) received free school meals at baseline and this did not change significantly over time.

*Table 4.6 Percentage of schools receiving free school meals by district, intervention and time point*

District	Intervention / Time							
	1 Intervention				2 Control			
	Baseline		Follow up		Baseline		Follow up	
	n	%	n	%	n	%	n	%
Ampara	9	90.00%	9	90.00%	8	88.89%	8	88.89%
Moneragala	9	90.00%	9	90.00%	10	100.00%	8	80.00%
Kurunegala					6	60.00%	5	50.00%
Grand Total	20	100.00%	20	100.00%	29	100.00%	29	100.00%

At baseline, the average intervention school had around 290 pupils and the average control school had around 430 450 pupils. However, there was a wide range, with school student populations ranging from 44 to 1,700 pupils per school. Similarly, there was a wide range in the number of teachers in each school, with values ranging from 10 to 82 teachers per school. At baseline, the average intervention school had 22 teachers and the average control school had 30 teachers. Broken down by control and intervention status, the ratio of students to teachers per school was 12.23 (SD 5.38) in the intervention group and 13.27 (SD 5.24) in the control group. The highest number of students per teacher was among control schools in Moneragala and the lowest ratio was among intervention schools in Ampara.

## School Policies and Practices: Findings from the NFSI Tool For Researchers

Using the NFSI tool for researchers, we asked principals about policies and practices outlined in the WHO NFSI framework.

We asked if schools had a policy related to healthy eating (in addition to the canteen policy which is distributed nationally) and at baseline, around half of intervention schools (n=10, 52.6 percent) and around a third of control schools (n=9, 31.03 percent) did not have any additional policies, but the remaining half of intervention schools and the remaining two thirds of control schools had either an informal or written policy related to nutrition and healthy eating.

*Tale 4.7 Percentage of schools with policies related to healthy eating or health promotion*

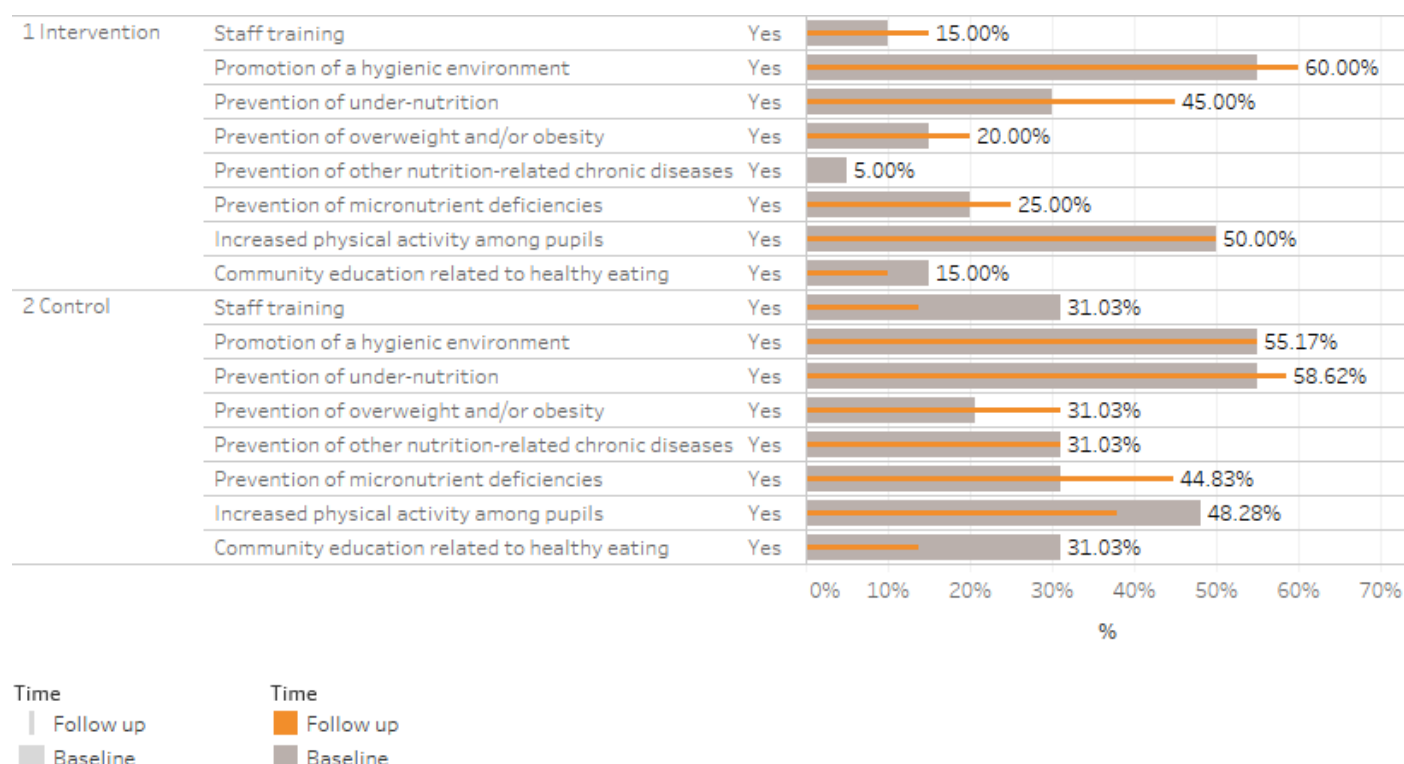
District	Response (group)	Intervention / Time							
		1 Intervention				2 Control			
		Baseline	Follow up	Baseline	Follow up	Baseline	Follow up	Baseline	Follow up
		n	%	n	%	n	%	n	%
Ampara	No policy	5	50.00%	4	40.00%	3	33.33%	3	33.33%
	Yes informal	4	40.00%	5	50.00%	5	55.56%	5	55.56%
	Yes written	1	10.00%	1	10.00%	1	11.11%	1	11.11%
Moneragala	No policy	5	55.56%	3	30.00%	3	30.00%	2	20.00%
	Yes informal	2	22.22%	1	10.00%			1	10.00%
	Yes written	2	22.22%	6	60.00%	7	70.00%	7	70.00%
Kurunegala	No policy					3	30.00%	2	20.00%
	Yes informal							4	40.00%
	Yes written					7	70.00%	4	40.00%
<b>Grand Total</b>		<b>19</b>	<b>100.00%</b>	<b>20</b>	<b>100.00%</b>	<b>29</b>	<b>100.00%</b>	<b>29</b>	<b>100.00%</b>

Schools were asked to report the aims of their policy aims. At baseline, the most common policy aims were related to the promotion of a hygienic environment, increasing physical activity,



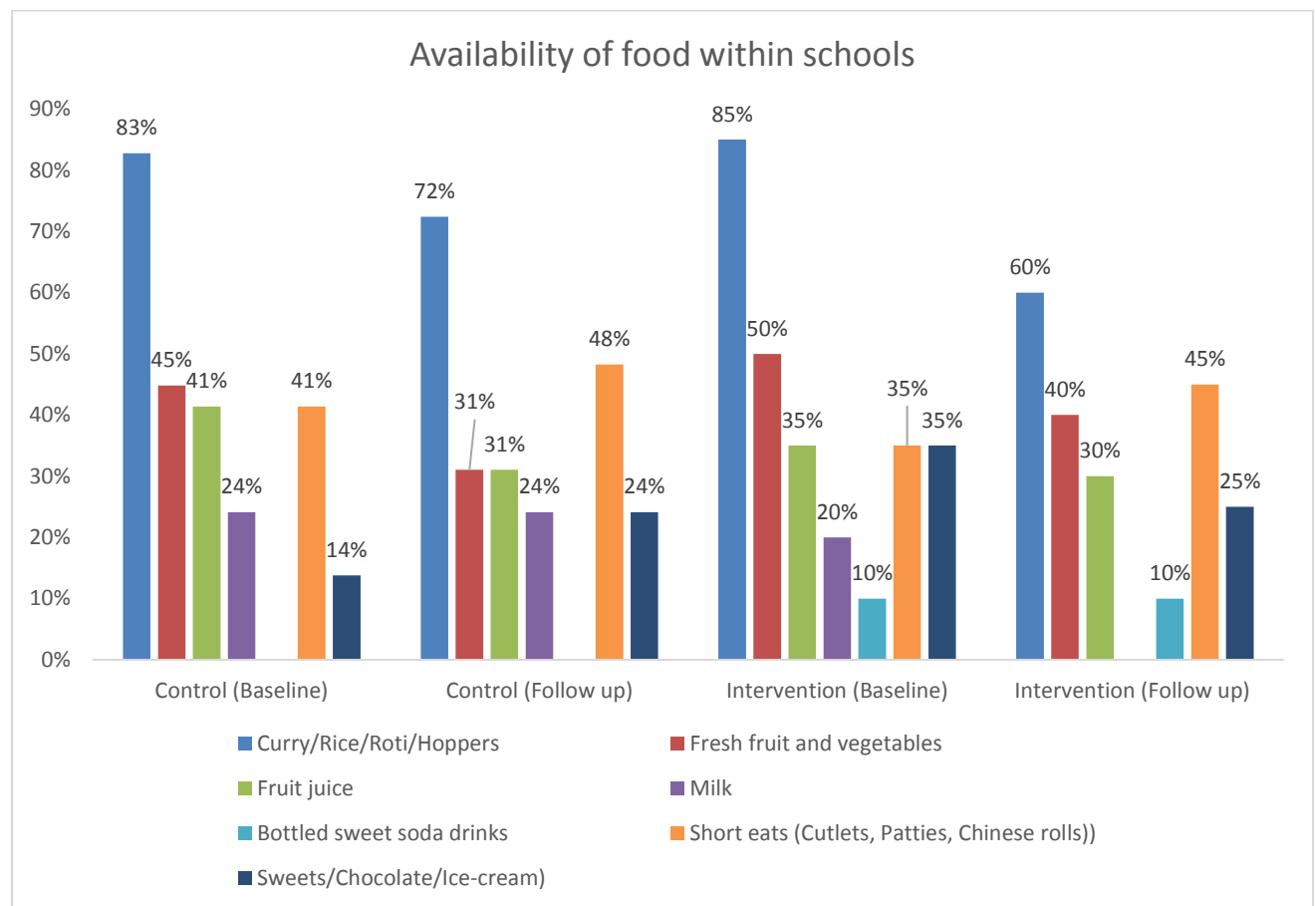
preventing undernutrition, and preventing micronutrient deficiencies. At follow up, the aims had remained relatively consistent, although there was an increase in the proportion of schools focusing on ‘preventing undernutrition’ in the intervention group from 30 percent (n=6 schools) to 45 percent (n=9).

*Figure 4.13 Aims of the school policy over time, by intervention status*



We asked about the availability of food within schools. At baseline, around a third (35 percent, n=7) intervention schools had sweets, chocolate or ice cream available within schools for students to purchase. At follow-up, this had dropped to a quarter of schools (25 percent, n=5). In the control group, the proportion with these foods increased from 13.8 percent (n=4 schools) to 24.1 percent (n=7 schools). At both baseline and follow-up, fewer than half of the schools in both intervention and control groups had fresh fruit and vegetables available for students and fewer than a quarter had milk available.

Figure 4.14 Availability of food within schools



We asked if schools measured students to monitor their growth and development and at both baseline and intervention, more than 90 percent of schools (n=19 intervention, n=18 control) confirmed that they measured and weighed pupils regularly. At baseline in the intervention groups, 75 percent of schools (n=15) made the results available to parents. At follow-up, this had increased to 95 percent of schools (n=19). In the control group, it also increased from 51.7 percent (15 schools) to 72.4 percent (21 schools). Most control and intervention schools made results available to pupils and this was relatively consistent over time.

*Table 4.8 Number and percentage of schools who measure children to monitor their growth and development and make results available to parents and pupils.*

		Intervention / Time							
		Intervention				Control			
		Baseline		Follow up		Baseline		Follow up	
		n	%	n	%	n	%	n	%
Are pupils measured to monitor their growth and development?	No	1	5.0	1	5.0	1	3.4	2	6.9
	Yes	19	95.0	19	95.0	28	96.6	27	93.1
Are the results made available to parents?	No	5	25.0	1	5.0	14	48.3	8	27.6
	Yes	15	75.0	19	95.0	15	51.7	21	72.4
Are the results made available to pupils?	No	2	10.0	3	15.0	6	20.7	7	24.1
	Yes	18	90.0	17	85.0	23	79.3	22	75.9

## Summarizing School Policies and Practices: Number of NFSI Actions

In order to see how INPARD schools changed over time (in terms of following NFSI recommendations), we created a school-level NFSI variable which described the number of actions that schools were following in terms of having nutrition-friendly school policies, enhancing awareness and capacity building within the school community, creating a supportive school environment, and providing supportive school nutrition and health services. We also asked extensive questions related to school curriculum, but these were excluded in the summary variable excluded, due to the lack of between-school variation and the fact that in Sri Lanka, curricular decisions are tightly regulated according to a national central mandate and leave little room for schools to make individual curricular choices.

*Table 4.9 Description of the NFSI components and actions for the summary variable*

NFSI Component	Actions for summary variable
Having a written nutrition-friendly schools policy	Having a policy on nutrition or healthy eating (written or informal)
	Having a policy which included NFSI-recommended components (objectives, timelines and milestones)
	Including a monitoring or evaluation plan in the policy.
Enhancing Awareness and Capacity Building of the School Community	Sharing the nutrition- or healthy-eating policies with parents, pupils, staff and the community
	Holding activities for families and the community in the area of health and nutrition
	Holding training sessions for staff on healthy eating or related issues
Creating a Supportive School Environment	Promoting the availability of healthy food within schools. Schools were given credit for this action if they provided fresh fruit, vegetables and milk within schools and if they banned the sale of sugar-sweetened soft drinks or sweets from the school premises.
	Providing school children with access to safe drinking water, handwashing facilities (taps and soap) and clean, separate toilets for boys and girls.
	Providing school children with access to sporting facilities for physical activity (inside and outside of curriculum).
Providing Supportive School Nutrition and Health Services	Feeding back the results of the regular monitoring and evaluation to school children
	Feeding back the results of the regular monitoring and evaluation to parents
	Offering a referral system for medical support

### Summarising school actions

Each school was given a score (ranging from 0-12) indicating the number of NFSI actions that they reported for each of the four areas of NFSI recommendations relating to nutrition policy, enhancing awareness and capacity building, creating a supportive environment and providing supportive health services.

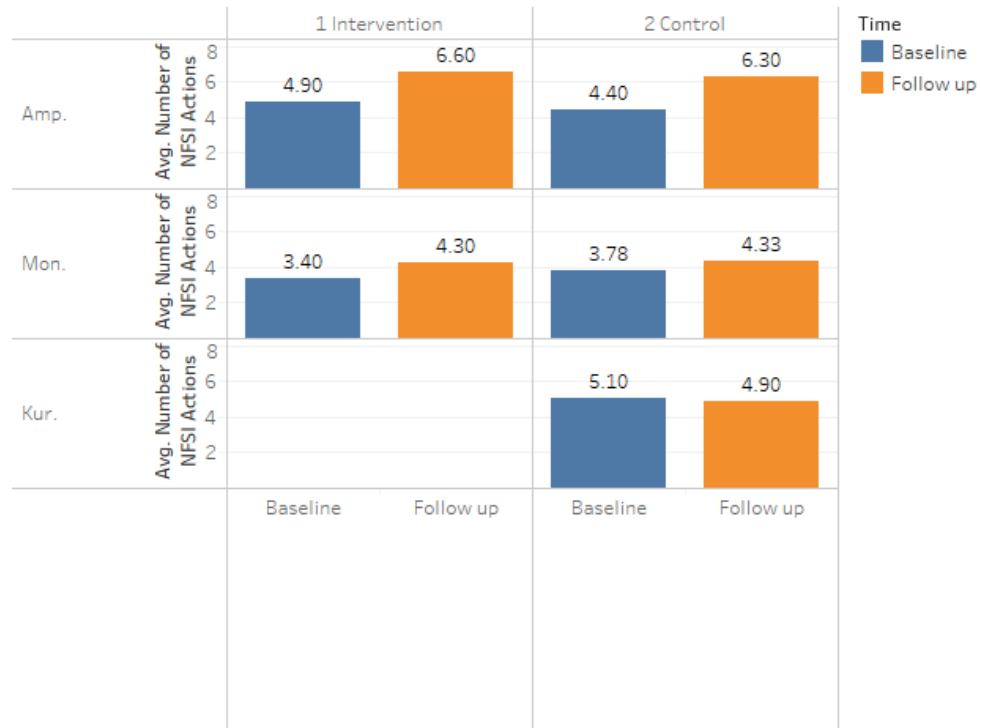
The mean number of actions in each of these areas is shown in Table X. At baseline, control schools followed an average of 1.28 actions (SD 1.07) related to having a nutrition policy, while in intervention schools it was slightly lower (mean 0.95 actions, SD 0.83). The average number of actions related to enhancing awareness and capacity building was 0.55 (SD control 0.87, SD intervention 0.76). Control schools had an average of 1.31 (SD 0.76) actions related to creating a supportive school environment and for intervention schools it was slightly lower (1.00 actions, SD 0.92). The average number of actions related to providing a supportive school nutrition and health service was 1.31 (SD 0.81) for control schools and 1.65 (0.67) for intervention schools.

In both intervention and control groups, the average number of actions related to having a nutrition policy, enhancing awareness and capacity of the school community, and providing a supportive school environment increased over time. In both groups, the average number of actions related to creating a supportive school environment decreased to an average of less than one action per school.

Over time, the mean number of actions increased from 4.15 (SD 1.63) to 5.45 (SD 2.28) in the intervention group and from 4.45 (SD 2.08) to 5.21 (SD 2.02) in the control group. Comparing the change over time between districts, the mean number of actions increased in control and intervention groups in Ampara and Moneragala, but it decreased in Kurunegala (the control district).

Figure 4.19 Number of NFSI actions implemented in schools, by district and intervention status, over time

Average number of NFSI actions implemented in schools, by district and intervention status over time



## Student measures

We selected one class from each of the 49 intervention and control schools. We collected data on pupil's health behaviours, diet and anthropometrics from 1,311 pupils at baseline (549 intervention, 762 control). At one year of follow-up, we collected from the same students (n=1,262, 501 intervention, 761 control).

*Table 4.10 Description of student sex and age*

	Intervention / Phase							
	1 Intervention				2 Control			
	Baseline		Follow up		Baseline		Follow up	
	n	%	n	%	n	%	n	%
<b>Age</b>								
11 years or younger			4	0.8%			5	0.7%
12 years	18	3.3%	9	1.8%	28	3.7%	9	1.2%
13 years	94	17.1%	26	5.2%	97	12.7%	32	4.2%
14 years	214	39.0%	31	6.2%	243	31.9%	65	8.5%
15 years	195	35.5%	223	44.5%	376	49.3%	267	35.1%
16 years	24	4.4%	189	37.7%	14	1.8%	364	47.8%
17 years	2	0.4%	19	3.8%	4	0.5%	17	2.2%
18 years	2	0.4%					2	0.3%
<b>Sex</b>								
Female	296	53.9%	268	53.5%	388	50.9%	378	49.7%
Male	251	45.7%	224	44.7%	371	48.7%	363	47.7%
<b>Grand Total</b>	<b>549</b>	<b>100.0%</b>	<b>501</b>	<b>100.0%</b>	<b>762</b>	<b>100.0%</b>	<b>761</b>	<b>100.0%</b>

At one year of follow-up, we asked pupils about their ethnicity. Most pupils (intervention: n=423, 84.4 percent, control: n=663, 87.12 percent) self-identified as Sinhala, while around a tenth (intervention: n=47, 9.4 percent; control: n=64, 8.41 percent) identified themselves as Sri Lankan Moor. Around 5 percent of pupils identified themselves as either Sri Lankan Tamil (intervention: n=28, 5.6 percent; control: n=33, 4.34 percent) or Indian Tamil (intervention: n=2, 0.40 percent; control: n=1, 0.13 percent).



*Table 4.11 Description of student ethnicity*

Question	Answer (group)	Intervention		Control	
		n	%	n	%
Ethnicity	Sinhala	423	84.4%	663	87.1%
	Sri Lankan Moor	47	9.4%	64	8.4%
	Indian Tamil	2	0.4%	1	0.1%
	Sri Lankan Tamil	28	5.6%	33	4.3%
	No answer	1	0.2%		
<b>Grand Total</b>		<b>501</b>	<b>100.0%</b>	<b>761</b>	<b>100.0%</b>

Pupils were asked to report the education and work status of both parents. When asked about the education of their father, more than 85 percent of pupils (intervention n=430, 85.8 percent; control n=677, 89 percent) declined to answer. Around half (n=249, 49.7 percent) of intervention students and 43.9 percent (n=334) control students reported that their father was self-employed.

Students were asked to report the highest level of their mother's education. The control group had a slightly higher level of maternal education, with 49.54 percent of students reporting that their mother had passed GCE O/L and above (with 3.3 percent having a degree) compared to 29.94 percent of intervention students. Around 3.8 percent of pupils in the control group and 5.6 percent in the intervention group reported their mothers had no schooling.

Table 4.12 Description of student's socio-economic status

		Intervention			
		1 Intervention		2 Control	
Question	Answer (group)	n	%	n	%
Father's education	Degree and above	7	1.4%	6	0.8%
	Passed G.C.E (A/L)	12	2.4%	8	1.1%
	Passed G.C.E (O/L)	10	2.0%	21	2.8%
	Passed grade 6-10	22	4.4%	21	2.8%
	Up to grade 5	19	3.8%	19	2.5%
	No schooling	1	0.2%	9	1.2%
	No answer	430	85.8%	677	89.0%
	Degree and above	13	2.6%	25	3.3%
Mother's education	Passed G.C.E (A/L)	27	5.4%	83	10.9%
	Passed G.C.E (O/L)	110	22.0%	269	35.3%
	Passed grade 6-10	181	36.1%	216	28.4%
	Up to grade 5	89	17.8%	76	10.0%
	No schooling	28	5.6%	29	3.8%
	No answer	53	10.6%	63	8.3%
	Government employee	61	12.2%	136	17.9%
	Homemaker	70	14.0%	83	10.9%
Father's work status(past 12 months)	Non-government employee	84	16.8%	142	18.7%
	Non-paid	6	1.2%	8	1.1%
	Retired	3	0.6%	11	1.4%
	Self-employed	249	49.7%	334	43.9%
	Student	2	0.4%	2	0.3%
	Unemployed (able to work)	10	2.0%	10	1.3%
	Unemployed (unable to work)	4	0.8%	2	0.3%
	No answer	12	2.4%	33	4.3%
Mother's work status (past 12 months)	Government employee	22	4.4%	47	6.2%
	Homemaker	262	52.3%	349	45.9%
	Non-government employee	36	7.2%	89	11.7%
	Non-paid	5	1.0%	4	0.5%
	Retired	1	0.2%	1	0.1%
	Self-employed	132	26.3%	197	25.9%
	Student	4	0.8%	3	0.4%
	Unemployed (able to work)	22	4.4%	48	6.3%
	Unemployed (unable to work)	8	1.6%	5	0.7%
	No answer	9	1.8%	18	2.4%

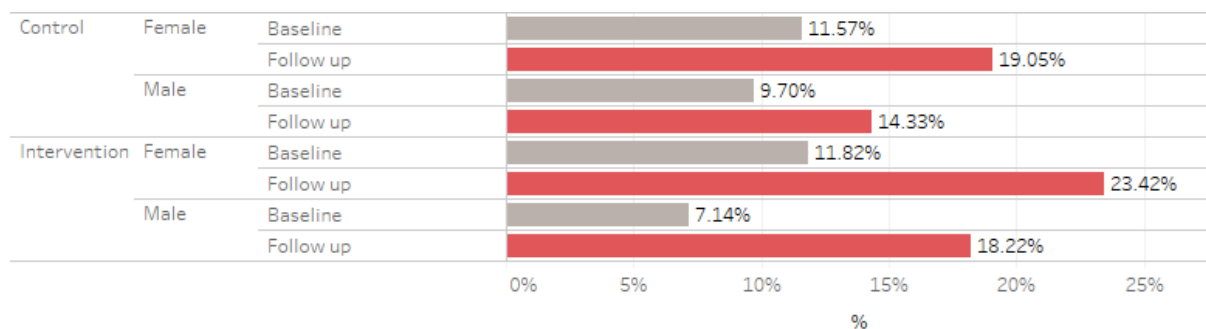
Pupils were weighed and measured. Around one third of females were underweight and this was consistent between intervention and control groups and over time. For females in the intervention group, the proportion who fell within a healthy weight range increased over time, whereas for females in the control group, it decreased (intervention: 58 to 59.7 percent; control: 58.7 to 56.3 percent). The proportion who fell within a healthy range increased for males in both the intervention and the control group (intervention: 35.5 to 39.5 percent; control: 40.4 to 46.1 percent).

*Table 4.13 Age and sex-adjusted body weight categories by sex and intervention status over time*

Sex	Answer (group)	Intervention / Phase				2 Control			
		1 Intervention		Follow up		Baseline		Follow up	
		n	%	n	%	n	%	n	%
Female	Underweight	106	35.9%	92	34.3%	126	32.6%	130	34.4%
	Normal	171	58.0%	160	59.7%	227	58.7%	213	56.3%
	Obese	6	2.0%	3	1.1%	9	2.3%	7	1.9%
	Overweight	12	4.1%	13	4.9%	25	6.5%	28	7.4%
Male	Underweight	152	62.0%	126	56.5%	203	55.0%	176	49.2%
	Normal	87	35.5%	88	39.5%	149	40.4%	165	46.1%
	Obese	1	0.4%			2	0.5%	3	0.8%
	Overweight	5	2.0%	9	4.0%	15	4.1%	14	3.9%
Grand Total		540	100.0%	491	100.0%	756	100.0%	736	100.0%

We asked pupils to report on key dietary behaviours such as how many times in the past week they had consumed fast food. Fast food is often high in fat, salt and refined carbohydrates, so it is often used as one measure to understand how much unhealthy food is in a person's diet. One possible answer that students could select was 'I did not eat fast food in the past week.' In both control and intervention groups, there was an increase in the percentage of students selecting this answer over time, but for intervention students, the percentage who did not eat fast food increased from 11.82 to 23.42 percent among females and from 7.14 to 18.22 percent among males. This suggests some improvement in the dietary behaviour of INPARD students.

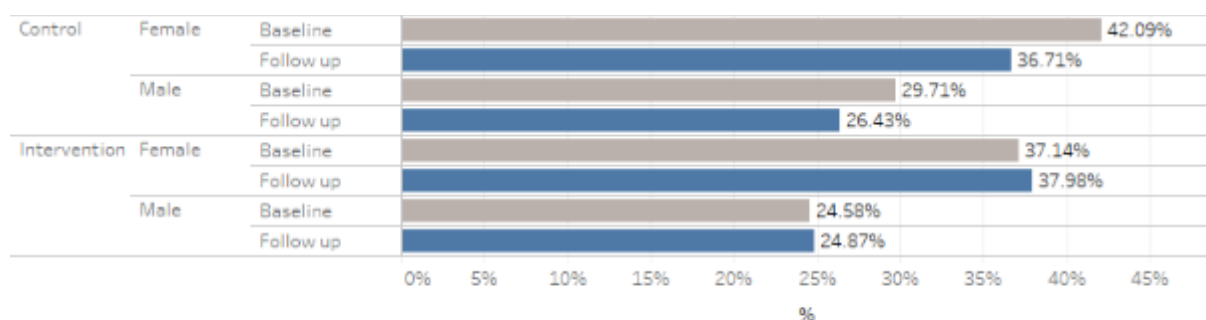
*Figure 4.15 Percentage of pupils who reported that they did not eat from a fast food restaurant in the past week (by intervention status)*



Phase  
 Baseline  
 Follow up

We asked students to report how many times they drank sugar sweetened beverages (soft drinks such as ‘Elephant House’) in the past 30 days. One possible answer was “I did not drink soft drinks in the past 30 days.” In the control group, the percentage of students who reported that they did not drink soft drinks dropped (suggesting that more students were consuming soft drinks over time), whereas in the intervention group, there was a slight increase in the proportion of students who said they had not had soft drinks in the past 30 days.

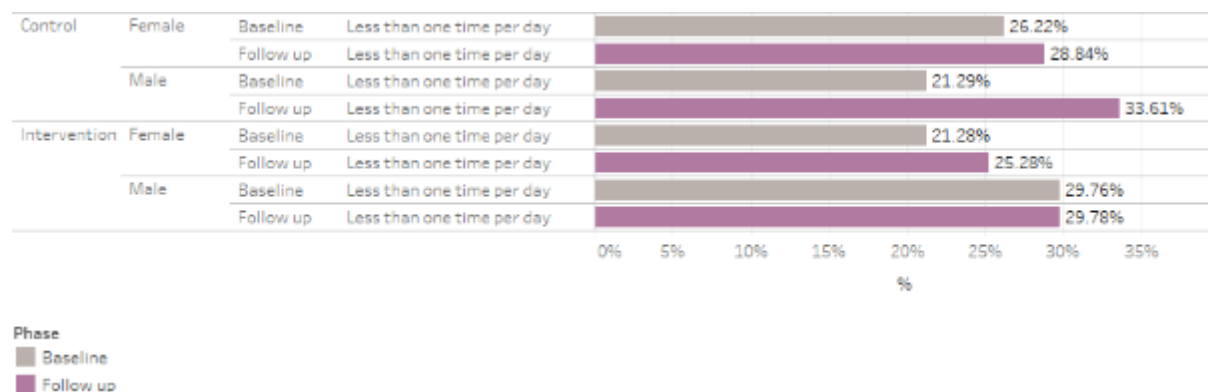
*Figure 4.16 Percentage of pupils who did not drink soft drinks in the past 30 days*



Phase  
 Baseline  
 Follow up

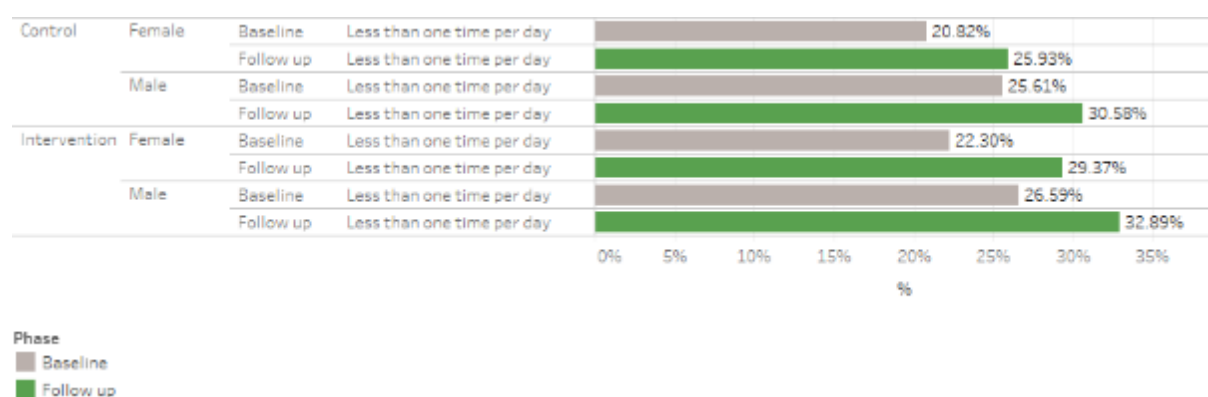
Pupils were asked to report the frequency of consuming fruit and vegetables. In the control group, there was a large increase in the percentage of male students who reported consuming fruit less than one time per day or not at all in the past 30 days (21.3 to 33.6 percent). In the intervention group, this measure remained relatively consistent (29.8 percent).

*Figure 4.17 Percentage of pupils who reported consuming fruit less than one time per day*



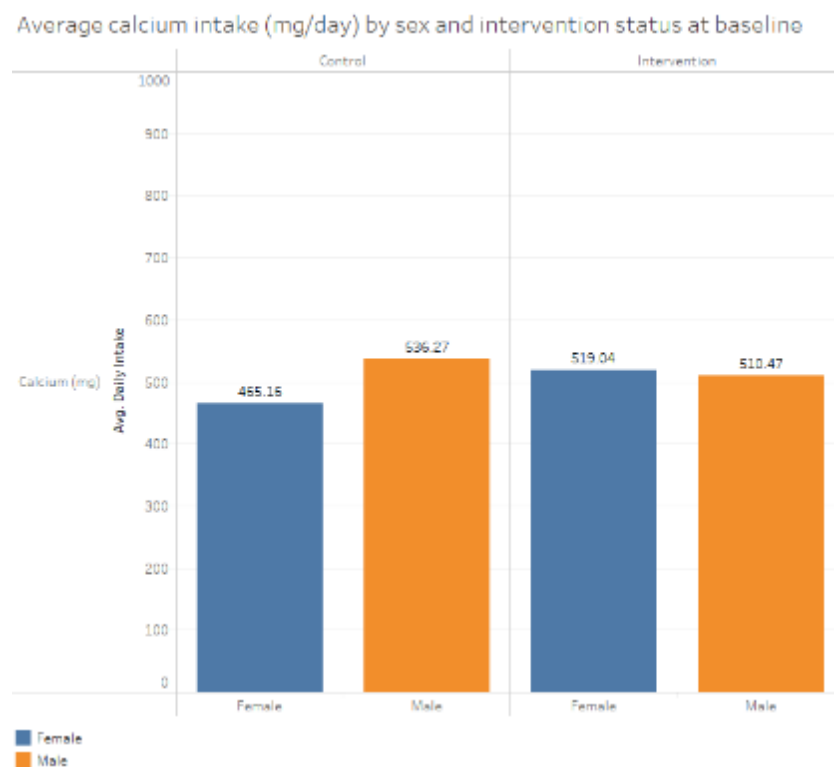
In all groups, there was an increase in the percentage of students who reported that they consumed vegetables less than one time per day.

*Figure 4.18 Percentage of pupils who reported consuming vegetables less than one time per day*



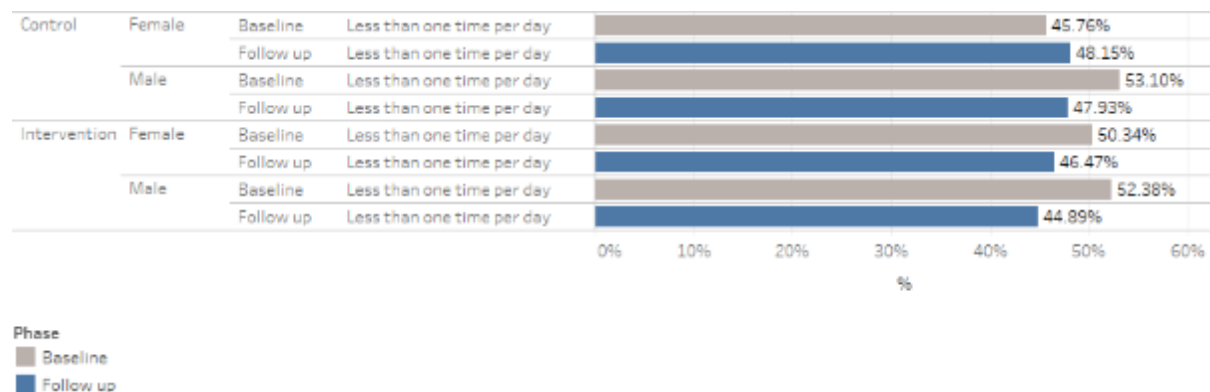
We also asked students about how frequently they consumed milk products. According to baseline data from a food frequency questionnaire, the average levels of dietary calcium in both intervention and control groups is below recommended levels of 1,000-1,300 mg/day for adolescents.

**Figure 4.19 Average calcium intake (mg/day) among students at baseline**



In the INPARD intervention group, the percentage of male and female pupils who had low levels of consumption (“less than one time per day” or “I did not drink milk in the past 30 days”) decreased. In the control group of females, the percentage who had low milk consumption increased.

**Figure 4.20 Description of student milk consumption by sex, intervention status and time point**



## Qualitative results - Practices and attitudes on nutrition promotion: School principals

Principals identified a number of barriers to healthy dietary choice by students, which could be found at a number of levels of influence of a socio-ecological framework: (i) structural level barriers included educational and agricultural policies, (ii) living and working level barriers included employment opportunities and local food production, (iii) social and community level barriers included traditions and social/cultural beliefs and (iv) individual level barriers included knowledge and preference. Findings from this study suggest that the barriers to healthy dietary choice among secondary school students in Sri Lanka occur at many levels. This supports the use of multifactor programmes to promote healthy eating.

These findings have been published in Health Promotion International (Townsend, N., Williams, J., Wickramasinghe, K., Karunarathne, W., Olupeliyawa, A., Manoharan, S., & Friel, S. (2015). Barriers to healthy dietary choice amongst students in Sri Lanka as perceived by school principals and staff. Health promotion international, dav056.) and an extract below is given as an example.

In relation to educational policy participants felt there was a lack of coverage of food and nutrition in the national curriculum, although they acknowledged that there was coverage on a small scale in some subjects.

*“Every grade will have some lessons on nutrition but they will be short and in more than one subject . . . a more holistic approach to healthy diet is probably needed, rather than a typical classroom lesson.” Moneragala, Participant 6*

Participants felt that policies on national food programmes took responsibility for food provision away from the parents. Livelihood development programmes, introduced to the districts to improve financial security, have been used to start businesses which countered healthy dietary choices. Where development programmes did attempt to improve the accessibility of healthy foods, through donations of crops and seeds, they had failed as the locals did not have proper training for their production, or in the management of the land they were using. Principals also felt that some agricultural policies limited the production and availability of locally grown produce and limited student’s access to fresh fruits and vegetables.

Globally, schools struggle to implement recommendations that policy-makers and researchers recommend, but it is particularly difficult for schools in resource-scarce settings. Results from this project suggest that, when schools are given adequate support from sectors extending from education and beyond into development, agriculture and other areas, it may be possible to bring about positive changes. One key factor that we believe may have contributed to some of the successes that were observed was that project stakeholders had high-level support. Stakeholders from the various sectors were able to meet regularly because they had the support of divisional secretariat. Ideally, the decisions would be made at the district level. However, one of the strengths of the project was that interventions were community-led and therefore, more likely to be engaging the people that we were intended to reach. Even if high-level support is needed, our findings suggest that empowering communities from the ground-up is also an important component of success. Our findings strengthen arguments that schools are an important part of a multisectoral approach to promoting health, but that they may struggle to have an effect in isolation and need support themselves from a number of sectors and stakeholders.



## Improving individual-level nutrition indicators

The INPARD project was interested in assessing diet as an outcome indicator for rural development projects. Individual intake was assessed using a food frequency questionnaire (FFQ). The FFQ is the most common method of assessing dietary intake. It has two components: a food list and a frequency response section to describe the frequency and amount of consumption. Selecting items for the food list is an important and difficult task. To limit the burden on respondents the list cannot be too long. At the same time, the list must include foods which are eaten often by a significant proportion of the population, and which contain nutrients of interest that vary in consumption from one person to another. Unlike alternative methods (such as a 24-hour dietary recall, which is based on foods and amounts consumed on a specific day), the FFQ assesses usual intake over a longer period.

The FFQ has several advantages. First, it is easy for subjects to complete (compared to keeping detailed multi-day food records), the processing is inexpensive (relative to other methods) and, unlike 24-hour recalls, or other methods which measure consumption on a given day, the FFQ assesses longer-term usual intake, minimising the error of day to day consumption. (That said, there are several considerations which must be discussed related to the underlying principles and sources of bias which may arise from using FFQs. The underlying principle is that average long-term diet is more important than intake on a few specific days.) One problem, which affects many forms of diet assessment, is the problem of reporting errors. Studies which have compared energy intake from food records to intake determined by doubly labelled water have found that under-reporting is common, particularly among certain individuals such as the obese, women, male athletes, and adolescents.

The FFQ was administered to household members and pupils via a paper survey. It was then transcribed from the paper surveys and analysed in Nutrisurvey, the English translation of a professional German nutrition software which conducts nutrient analysis. The FFQ for this project included many commonly consumed mixed dishes (including more than 10 types of curries). To analyse the nutrient content of these foods, they were broken down into composite parts using a recipe data base which contained the mixed foods' ingredients and amounts, preparation methods and yields for these popular dishes.

The following dietary measures were produced for each individual.

**Daily intake of foods:** Daily consumption of 87 food items, grouped into eight food components (cereals or equivalents, vegetables, pulses, meat/poultry and meat/poultry products, fruits, drinks, miscellaneous and alcohol).

**Nutrient intake:** A nutritional analysis of the daily micro- and macro-nutrient composition of pupil's diets including total energy protein, fat, carbohydrates, dietary fibre, alcohol, cholesterol, vitamins (A, B1, B2, B6, B12, folic acid) and minerals (sodium, potassium, calcium, magnesium, phosphorus, iron, zinc). Nutrient analysis involves using a database of food composition, a coding system for matching foods on the FFQ to foods within the database and software for calculating the nutrients. Altogether, this raw data included 107 dietary measures per pupil.

## Creating a summary dietary variable

Compared to single nutrient measures, researchers argue that a composite measure may provide a better assessment of diet quality. Traditionally, nutritional epidemiologists focussed on the health effects of single nutrients, but this approach has been criticized as being reductionist and failing to gather a full assessment of diet quality. There are various methods for summarising the overall quality of diet, including the use of indices.

## Types of diet quality indices

In a summary review of diet quality indices and their associations with health-related outcomes in children and adolescents, Marshall et al found 119 studies using 80 different diet quality indices, but most of them were developed for use within developed, high-income countries where the primary health concern related to over-nutrition [Marshall, S., T. Burrows, and C. Collins, *Systematic review of diet quality indices and their associations with health-related outcomes in children and adolescents*. Journal of Human Nutrition and Dietetics, 2014. **27**(6): p. 577-598].

Given the high prevalence of underweight among this study population, specific areas of nutrition such as micro-nutrient and protein adequacy were of particular interest. At the same time, because this study population is also undergoing a rapid epidemiological transition and a transition away from traditional diets, assessing consumption of foods high in fat, sugar, and salt was also necessary.

Kim et al developed a diet quality index that was validated for use in international contexts [Kim, S., et al., *The Diet Quality Index-International (DQI-I) provides an effective tool for cross-national comparison of diet quality as illustrated by China and the United States*. The Journal of nutrition, 2003. **133**(11): p. 3476-3484.]. Unlike the original DQI, which

focused on diet quality for populations within the USA, the DQI International was developed to be useful in a range of culturally and economically diverse contexts and includes components that make it appropriate for use in countries where undernutrition is a problem, such as Sri Lanka

The DQI-I assesses the quality of a diet based on its variety, adequacy, moderation and overall balance and is described in the tables below

*Table 4.14 DQI-International components, scores and cut off points*

Component	Possible Points	Scoring
<b>Variety</b>	<b>(0-20 points)</b>	
Overall food group variety (meat/poultry/fish/eggs; dairy/beans; grain; fruit; vegetable)	0–15 points	≥1 serving from each food group/d 15
	12	Any 1 food group missing/d
	9	Any 2 food groups missing/d
	6	Any 3 food groups missing/d
	3	≥4 food groups missing/d
	0	None from any food groups
Within-group variety for protein source (meat, poultry, fish, dairy, beans, eggs)	0–5 points	
	5	≥ 3 different sources/d
	3	2 different sources/d
	1	From 1 source/d
	0	None
<b>Adequacy</b>	<b>0–40 points</b>	
Vegetable group	0–5 points	
	5	≥3–5 servings/d
	0	0 servings/d
Fruit group	0–5 points	
	5	≥2–4 servings/d
	0	0 servings/d
Grain group	0–5 points	
	5	≥6–11 servings/d
	0	0 servings/d 0
Fibre*	0–5 points	
	5	≥20–30 g/d
	0	0 g/d
Protein*	0–5 points	
	5	≥10% of energy/d
	0	0% of energy/d
Iron	0–5 points	
	5	≥100% RDA (AI)/d
	0	0% RDA (AI)/d

Calcium	0–5 points	
	5	100% AI/d
	0	0% AI/d
Vitamin C	0–5 points	
	5	100% RDA (RNI)/d
	0	0% RDA (RNI)/d
<b>Moderation</b>	<b>0–30 points</b>	
Total fat	0–9 points*	
	9	≤ 20% of total energy/d
	6	>20–30% of total energy/d
	0	>30% of total energy/d
Saturated fat*	0–6 points	
	6	≤ 7% of total energy/d
	3	>7–10% of total energy/d
	0	>10% of total energy/d
Cholesterol	0–6 points*	
	9	≤ 300 mg/d
	6	>300–400 mg/d
	0	>400 mg/d
Sodium	0–6 points	
	6	≤ 2400 mg/d
	3	>2400–3400 mg/d
	0	≥3400 mg/d
Empty calorie foods	0–6 points	
	6	≤3% of total energy/d
	3	>3–10% of total energy/d
	0	>10% of total energy/d
Overall balance	0–20 points	
Carbohydrate:Protein:Fat Ratio (kcal)*	10 points	
	10	55-65:10-15:15-25
	7	52-69:9-16:13-27
	3	50-70: 8-17: 12-30

Unfortunately, the FFQ data did not differentiate between the various types of fat, so one way to construct a diet quality score was to modify the allocation of points. Total fat and cholesterol were modified from the original max of 6 points to a new max of 9 points due to the lack of data on saturated fat (a component which was included in the DQI-I for a maximum of 6 points). Additional modifications were made for the ‘Overall balance score.’ The original DQI-I included a component related to the fatty acid ratio (Poly unsaturated fatty acids: mono unsaturated fatty acids: saturated fatty acids- PUFA: MUFA: SFA). We did not have this data, so we increased the value of the other ‘Overall balance component,’ which was based on the macronutrient ratio. Originally, the maximum score was worth 6 points in the DQI, but I increased it to be worth 10 points.

Using this framework, we conducted a diet quality score. This process involved grouping foods into categories and converting the food weight (in grams) into serving sizes using the Sri Lankan Dietary recommendations, and summing the number of servings of rice/breads, vegetables, fruits, beans, meats, dairy products and empty calorie foods.

*Table 4.15 Description of Sri Lankan Diet Recommendations*

Food groups	Servings (Adolescents)	Servings (Adults)	Serving Size
Cereals and starch food	7-10	6-11	1 cup (130-140 grams) rice, 1 slice (50 g) bread
Fruits	2	2-3	1 medium size fruit, ½ cup of cut fruit, 2 Tbsp. (20-30 grams) dried fruit
Vegetables	2-3	3-5	3 Tbsp. (1/2 cup) cooked, 1 cup raw salads (200 mL)
Pulses, fish, meat, eggs, nuts	2-3	3-4	30 grams of cooked fish/poultry/meat, 3 Tbsp. cooked pulses, 1 egg, 15 g dried fish
Milk or milk products	2	1-2	1 cup (200 mL) milk, 1 cup (100 mL) yogurt, 30 grams (2 Tbsp. milk powder)
Nuts and oil seeds	2-3	2-4	1 Tbsp. (15 grams)

## Components of the diet quality score international

### *Variety*

The variety score was based on two components: the overall food group variety and the within-group variety for protein sources. Pupils who had eaten from all food groups were given the highest number of points and those who ate from fewer food groups were given lower numbers of points.

### *Adequacy*

The adequacy score was based on pupils' consumption of foods from each of five food categories: vegetables, fruit, grains, fibre, and protein. A range is provided for fibre in the original DQI and, following the Sri Lankan

recommendations. Adequate consumption of fibre was defined as more than 30 grams per day.

The Sri Lankan recommendations of 60.1 grams of protein per day was used to calculate the adequacy of protein intake in combination with the DQI definition of 10 percent of total energy coming from protein sources. Using the definition from the DQI, 26 percent of pupils in the baseline sample met protein recommendations; using the recommendations of 60.1 grams per day, 35 percent of pupils did. To be on the conservative side, the original DQI-I definition of adequate protein was selected, which is greater than or equal to 10 percent of total energy.

The adequacy of iron was based on the Sri Lankan definition of 15 mg/day. The adequacy of calcium was based on the Sri Lankan definition of 1000 mg per day. This requirement is lower than the US recommendation of 1,300 mg per day. More than 75% of pupils consumed less than 1,000 mg/day. Adequacy of vitamin C was based on 100 mg per day. The adequacy of vegetables, fruit, grain, protein, iron, calcium and vitamin C was summed to create a total adequacy score.

### *Moderation*

The DQI-International requires moderation to be calculated using fat and saturated fat. The FFQ output in this project did not distinguish between saturated and unsaturated fat. Therefore, the points that were allocated for saturated fat were distributed between cholesterol and fat (all types).

### *Moderation for Empty calorie foods*

Calories from sweet foods were used to calculate the proportion of total calories from empty calorie foods lacking nutritional quality. This included foods such as fizzy drinks, candy, and biscuits. Points were allocated on the percentage of calories which came from these foods. If more than 10 percent of energy came from these foods, then pupils received no points. If fewer than 3 percent came from these foods, pupils received six points.

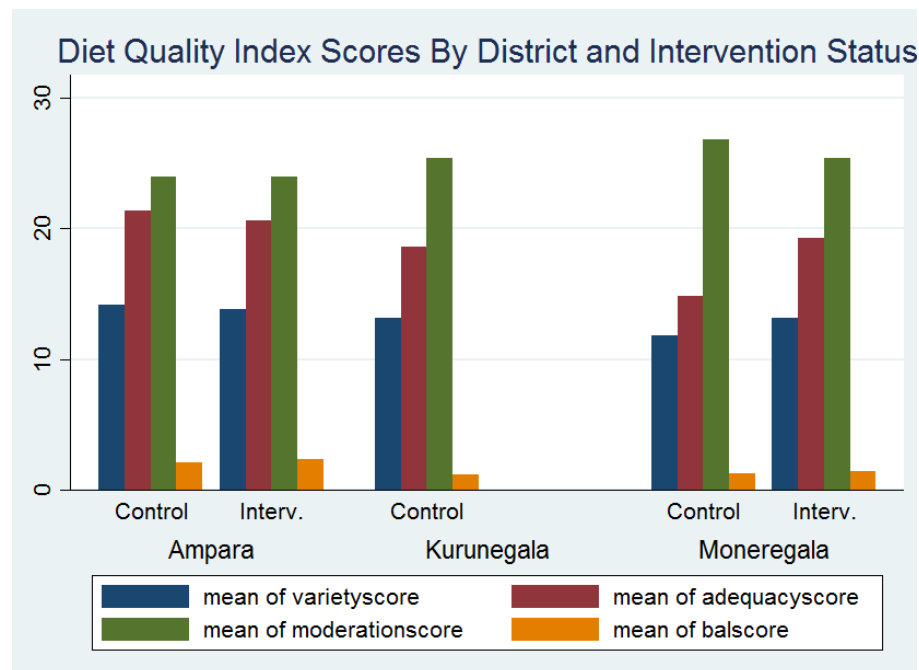
### *Overall balance*

The final component of the FFQ was based on the ratio of macronutrients, the proportion of energy available from carbohydrates, protein, and fat. The original DQI-I had an additional component which contributed to the 'balance score.' In addition to the macronutrient ratio, it allocated up to 4 points based on the fatty acid ratio of the diet. No data were available on the *type* of fat (saturated versus unsaturated). 4 points were therefore assigned to the first macronutrient ratio score (increasing the maximum from a potential of 6 to a potential of 10 points).

Using these methods, here is an example of what the diet quality index scores by district and intervention status were at baseline. The advantage

of the diet quality score international is that it summarises various considerations related to a healthy diet, not only in terms of diversity, but also moderation, adequacy, and balance. These are important factors to consider in a country facing a double burden of under- and over-nutrition.

Figure 4.21 Diet Quality Index Scores using INPARD data



Future work is needed to validate a diet quality index for Sri Lanka and to collect dietary data which includes measures such as saturated fat, trans fat or types of fatty acids. Additional work is also needed to generate a database on the nutritional profiles of common Sri Lankan foods. Currently, there is a reliance on proxy measures from international sources. How accurately these proxies represent Sri Lankan foods is very uncertain. Improving these measures is a critical next step toward monitoring and evaluating the nutritional quality of the Sri Lankan population's diet. Such understanding will strengthen the targeting of future public health interventions that are concerned with multisectoral approaches to improving nutrition and preventing non-communicable diseases.

## Summary of findings and lessons learnt

The INPARD study pointed to the importance of sharing information about the roles and responsibilities of different stakeholders before starting a multi-sectoral intervention or programme. This allows stakeholders to have a more focussed engagement to achieve specific outcomes.

This project demonstrated how to develop a curriculum for a multi-sectoral team to achieve common goals. Outcome based approaches were used to develop the curriculum, and participatory learning was used as a key learning technique.

The INPARD activities also show that it is possible to conduct multi-sectoral capacity building programmes for nutrition promotion. After completing the capacity building programme, stakeholders could address specific nutritional issues in their community. They were able to clearly identify how each officer could contribute to achieve a common nutritional goal working from within their respective sectors.

Useful interventions can be implemented successfully through better coordination between sectors, with limited resources. Some sectors have not traditionally work in close collaboration, but if they work in collaboration it shows a huge potential to improve nutrition. One example is schools and rural development organisations at villages.



This study demonstrates how to collect data at individual and environmental levels in villages and schools to quantify the impact of multi-sectoral interventions on nutrition.

Results from village dataset analysis shows that multisectoral interventions lead to several nutrition related outcomes among adults.

- Vegetable servings consumed in a day increased in men and women in INPARD areas.
- In areas where salt was prioritised as an issue, there were large decreases in the percentage of people who always add salt to rice.
- INPARD areas shows an increased in percentage of people classified as healthy weight' in both men and women. This is important as nearly a third of men and women are overweight or obese. Similarly, an increase in the prevalence of individuals with a healthy waist circumference was found in INPARD areas for both sexes.

School data also show several positive outcomes in intervention areas.

- There was a drop in INPARD areas in the number of school with sweets, chocolate or ice cream available within schools for students to purchase.
- In INPARD schools, the percentage who did not eat fast food in the past week increased from 11.82 to 23.42 percent among females and from 7.14 to 18.22 percent among males
- In the INPARD intervention group, the percentage of male and female pupils who had low levels of consumption ("less than one time per day" or "I did not drink milk in the past 30 days") decreased.
- The intervention group, there was a slight increase in the proportion of students who said they had not had soft drinks in the past 30 days.

This shows that it is possible to collect nutrition related data in villages and schools to demonstrate the changes in nutrition outcomes due to multi-sectoral actions.

Some indicators improved in intervention areas and some indicators such as consumption of fruits and consumption of milk exhibited no change.

The INPARD study addressed the four pillars of SAFANSI's strategy (Figure 5.1) through a series of approaches.

Supporting the goal of 'improved evidence and analysis,' INPARD demonstrated how to collect data to quantify the impact of rural development on nutrition outcomes and contribute to an empirical base on interventions across health and non-health sectors. Findings from this project will inform the strategies and focus areas of future projects.

INPARD supported the national and regional action plans by building the capacity of officers who deliver these services in the community. The Ministry of National Policies and Economic Affairs is incorporating INPARD indicators into their new evaluation framework for future development projects. INPARD demonstrated how evidence-based approaches could be used to identify nutrition-related problems in the community, identify possible solutions, prioritise actions, implement the actions with a multi-sectoral team, and evaluate and measure the impact.

Building the systems and capacity for multi-sectoral approaches to nutrition promotion was a key component of INPARD. Although national policy highlighted the need for coordination across sectors, local and village officials working outside the health sector had no practical training on their roles in promoting nutrition. This project improved their knowledge and demonstrated how to collaborate with multiple stakeholders through practical case studies. Additionally, INPARD introduced a system to review these multi-sectoral activities at divisional level monthly meetings to strengthen communication, and accountability. Previous multi-sectoral interventions had focussed predominantly on high-risk approaches while INPARD promoted lower risk population-based approaches.

INPARD fostered innovation through activities like demonstrating how a microfinance committee could consider the nutritional impact of a potential project during its review of loan applications. This consideration could be further promoted by including "nutritional impact" as one of the criteria when officials assess applications for

microfinance. Additionally, INPARD demonstrated the feasibility of collecting nutrition-related individual-level and area-level data in schools and villages. The tools, partnerships, and methods employed in this data collection could be applied to future agriculture and rural development projects. Within schools, INPARD arranged sessions for school principals, canteen staff, and meal providers to connect with staff from other schools through visits, sharing experiences and best practices, and trouble-shooting problems. By setting up these meetings, INPARD created a space for fostering innovations at the grassroots level and beyond. This kind of capacity building extended up to the divisional level. For example, INPARD organised training sessions at divisional levels with groups of participants from seven neighbouring villages. These sessions allowed stakeholders to share experiences and discuss challenges, solutions, and innovative ideas.

Figure 5.1 Four pillars of SAFANSI's strategy



<http://www.worldbank.org/en/region/sar/brief/food-nutrition-security-initiative-safansi>

## Challenges

Different stakeholders have their own regular meetings and work schedules, which makes it difficult to organise multi-sectoral training sessions.

The high-risk approach or the method of identification of individuals and families with nutritional issues and helping them has been the most common practice in the past. Some stakeholders struggle to grasp the concept of population-level interventions and they continue to focus on individual level interventions with the involvement of different sectors. It was essential to reemphasise the population level approach throughout the training programme and revisit these principles regularly.

There is no dedicated officer with the job role of coordinating with different sectors and to organise meetings. The officers who work in the same village visit the village on different days of the week and do not have a common place to meet. The INPARD study team actively coordinated these teams to visit the village on a common day and meet at a common place with the community members. But there is no formal mechanism to coordinate this procedure beyond the study period.

Some barriers are cultural in nature, such as myths around fresh milk consumption. The INPARD study found no detectable changes to milk consumption but also demonstrated ways in which this could potentially be addressed.

Consumption of fruits also did not show an increase, mainly owing to the seasonality of fruits in these areas. Some of the case studies examined programmes which attempted to preserve fruits. The common practices include making jam, which requires adding sugar. The INPARD study encouraged other alternatives such as dried fruits or frozen fruit packets and several case studies showed some success. These options need to be explored more to have an impact at population level.

## **Role of INPARD study partners**

The INPARD project had a dedicated team of stakeholders from a range of institutions. They include researchers, public health experts, clinicians, nutritionists, agriculture officers, engineers, rural development specialists, administrators, and policy makers.

### **UN Agencies**

The World Bank coordinated local stakeholders and organised regular workshops. This provided the opportunity to inform stakeholders about study design and interventions at an early stage and to identify individual roles and to incorporate their comments. The World Bank organised workshops to discuss the results of the study and communicate them to policymakers, including the Ministry of National Policies and Economic Affairs. The World Health Organization provided necessary inputs and guidance, especially for the development of the curriculum. UNICEF provided inputs to improve the study based on their previous experience of collecting data for the needs assessment and conducting multi-sectoral nutrition promotion activities.

### **Government ministries**

The Ministry of Health played a leading role in implementing INPARD interventions. When the World Bank informed them of this study, the health secretary appointed a team of experts representing different units of the Ministry as stakeholders. These included the Ministry's Nutrition Coordination Division, Nutrition Division, Health Education Bureau, Family Health Bureau, Planning Unit, Organizational Development unit and Public Health Services section.

At the INPARD planning meetings it was decided that the INPARD project would mainly work with existing stakeholders using the government mechanisms. This avoided bringing external consultants and distracting the ongoing activities in these areas. Furthermore use of existing government mechanism led to better acceptance in study areas and established trust with the project team. The Health Promotion Unit at the Health Education Bureau (HEB) is mainly responsible for capacity building on multi-sectoral approaches for health. The Health Promotion Unit at HEB facilitated multi-sectoral workshops for stakeholders to identify and prioritise multi-sectoral interventions. They are described in the case studies section of this book. HEB also led the training for the health promotion module of the curriculum.

The training modules were developed by a team of multi-sectoral experts and approved by the relevant units within the Ministry of Health. This allowed the INPARD project to keep messages consistent with the ongoing programmes of the Nutrition Division, Family Health Bureau and the Health Education Bureau. Different units in the Ministry of Health communicated about INPARD at provincial, district and Medical officer of Health (MOH) levels in intervention areas to secure their support. Because Sri Lanka still has a very strong link between national ministry and local health services, this communication was crucial to securing support in intervention areas.

When the INPARD project was initiated the development project (RaP) was implemented by the Ministry of Economic Development (MOED). At the request of the World Bank, the MOED facilitated access to the RaP project areas, arranged meetings with the staff, and encouraged village development organisations to get involved with INPARD activities. The RaP staff also coordinated with other government ministries in intervention areas to secure their support.

The agriculture sector is also represented by central ministry and provincial activities. The INPARD team worked closely with these both. They allocated time for their officers to attend meetings, conducted capacity building programmes for new nutrition friendly business and to make more nutritious foods using local agriculture products. They worked with the INPARD team to promote school and home gardening in intervention areas.

The Education Ministry and regional authorities also permitted access to schools to collect data and to conduct multi-sectoral nutrition promotion activities. They facilitated the establishment of school health clubs, awareness raising events about nutrition, school gardening projects, and the improvement of school canteens and mid-day meals.

Administration played a key role in facilitating INPARD interventions. District and divisional secretariats conducted regular meetings in intervention areas with stakeholders to discuss progress and support ongoing activities. The INPARD team provided a monthly activity plan to all divisional secretaries and they discussed this in their regular multi-sectoral meetings. They allowed village level officers to attend training workshops, regular multi-sectoral meetings, and implement activities.

### **Village level officers**

Multi-sectoral teams at the village level played an important role in the case studies described in this report. The village level team public health midwives, public health inspectors, administrative officers, economic development officers, agriculture officers, and school principals worked in collaboration with the community resource persons (CRP) of the village development organisations. During the training and follow up workshops this team sat together to identify and prioritise nutrition promotion activities which are useful for their local context. Those projects were followed up by the INPARD health promotion team and facilitated implementation. The teamwork and the collaborative efforts of the village level multi-sectoral team in addressing population level nutrition promotion measures is a unique feature of the INPARD project.

### **Universities**

The University of Colombo, Faculty of Medicine, Diabetes Research Unit (DRU) has previous experience of conducting epidemiological studies. They managed the data collection and data entry with the help of other researchers. They obtained ethics approval, contacted schools and village level officers, arranged logistics for data collection in a very tight timeline. Nutrition Researchers from the University of Colombo trained data collectors and supervised Food Frequency Questionnaire (FFQ) data management. The Medical Education Department played the leading role in curriculum development for multi-sectoral capacity building, using an outcome based approach. They also supervised the qualitative component of the study. The University of Sri Jayawardenapura worked closely with the DRU team to coordinate data collection and data entry. This involved checking and supervising field level researchers. The University of Jaffna and Eastern University of Sri Lanka helped to develop the survey tools, data collection on the field and qualitative data collection in Tamil language.

The University of Oxford and the Australian National University were involved as international collaborators for this project with co-principal investigators. They worked with the task team leader and local researchers to develop the survey instruments, pilot data collection, and develop databases. University of Oxford analysed data and wrote the report with other contributors. Both the University of Oxford and the Australian National University attended INPARD workshops and findings dissemination sessions.



### **Contributory factors**

Some factors which are beyond the control of INPARD team impinged on the outcome of the study. Sri Lanka has a strong focus on improving nutrition and addressing non-communicable diseases. There are many nationally led programmes and local level programmes taking place simultaneously.

The general attitude of government level officers towards supporting new initiatives and the culture of collaboration in schools is an important factor affecting the overall study.

During the study period between 2014 August and 2015 August, there were three elections. These were provincial council elections, presidential elections, and general parliamentary elections. During the election campaign periods it was not feasible to organise community level events. Every initiative tended to be looked at through a political lens. Implementation of the action plan as initially planned and timing therefore had to be changed. The follow up data collection was postponed from May-June 2015 to August-September 2015 due to the parliamentary elections. May-June is the fruit season in these areas and home-grown fruits are an importance component of the daily diet. Changing the month of data collection would have impacted the and interpretation of results. A countrywide drought heavily affected Ampara during the study period and would have affected food production, availability, and access.

After the Presidential election in January 2015, there were major changes in the organisation of some ministries and higher-level officials including secretaries. The INPARD team had to conduct advocacy sessions again and re-establish some of the collaborations.

## Key recommendations

**Introduce appropriate measurable indicators for quarterly reporting and final impact evaluations. Based on the INPARD study, the following indicators are recommended.**

Food price data in local communities.

Food availability in local communities and shops.

Nutrition friendliness of schools (A score based on NFSI tool).

Number of meetings attended by multi-sectoral teams in the area.

Number of children and adults eating the recommended level of fruits and vegetables.

Number of adults and children in the “healthy weight” category.

Diet Quality Index to measure the overall healthiness of diets.

**For designing and implementing rural development projects in the future, the following actions are recommended.**

Introduce multi-sectoral training at the village and higher levels as a regular procedure.

Familiarise officers with the population level approach and encourage them to introduce those interventions alongside those targeting high-risk individuals.

Create resources for different sectors which provide guidance related to the organizational structure, roles, and responsibilities of relevant stakeholders.

Create a mechanism and appoint an officer assigned responsibility for coordinating regular meetings between practitioners working in different fields relating to nutrition.

Arrange logistics for multi-sectoral teams to visit the same village regularly.

Include nutrition as a core-component in the village development agenda, to encourage micro-finance support to business which addresses nutritional issues in the community.

Village development organisations and other village level officers should work closely with schools to help them to implement their nutrition promotion policies.

The monitoring and evaluation frameworks used to assess agriculture and rural development projects need to incorporate nutrition-related indicators. INPARD used several tools including a validated Sri Lankan Food Frequency Questionnaire (FFQ) to collect this information.

#### **Future research to support to integration nutrition promotion and non-health sector response**

Continuing the development of context relevant indicators in Sri Lanka should remain a priority. There are various diet diversity scores (DDS) and diet quality indices (DDI) published in the literature. INPARD areas have a larger proportion of underweight children and a larger proportion of overweight adults. A DDI should be developed and validated to suit Sri Lankan context.

Public health messages and current recipes used by village level officers are targeted for underweight individuals or overweight individuals. There is no ongoing research to develop recipes and nutritional advice for households with both underweight and overweight individuals. Healthcare workers and multi-sectoral teams should be trained to address this issue.

Sri Lanka does not have a complete food composition table. Most of the researchers take values from other countries which are likely different from the basket of agricultural products available in Sri Lanka. Composing a more accurate table for Sri Lanka will be important in identifying issues relating to nutrients and micronutrients in the country's diet.

## Key recommendations

For agriculture and rural development programme designers and evaluation officers	For government ministries and other institutions	For village level organisations, communities and stakeholders	For researchers and academia
Introduce appropriate measurable nutrition indicators for quarterly reporting and final impact evaluations.	Familiarise officers with the population level approach and encourage them to introduce those intervention alongside interventions which target high-risk individuals.	Include nutrition as a core-component in the village development agenda, to encourage micro-finance support to business which addresses nutritional issues in the community.	Develop diet diversity scores (DDS) and diet quality indices (DDI) to suit local context.
Introduce multi-sectoral training at the village level and higher levels as a regular procedure.	Create resources for different sectors which provide guidance related to the organizational structure, roles and responsibilities of relevant stakeholders.	Village development organisations and other village level officers should work closely with schools to help them to implement their nutrition promotion policies.	Develop nutrition related messages, guidelines and recipes for households with both underweight and overweight individuals.
Include nutrition as a core-component in the development programmes	Create a mechanism and appoint an officer with the responsibility of coordinating different officers to meet regularly and discuss nutrition related issues in the area they serve.	Support production and distribution of animal source foods that provide important nutrients. Increase availability and affordability of fruits, vegetables, pulses, nuts and seeds.	Compile the food composition tables with important macro and micro nutrient information, for common agriculture products and composite dishes.
	Arrange logistics for multi-sectoral teams to visit the same village regularly on a common date.		
	Improve accountability in reaching nutrition and public health goals. Refocus agricultural research investments to support healthy diets and nutrition.		



## Dissemination of findings

The INPARD study organised several workshops to discuss the project and to disseminate findings. These include working with established community groups supported by village development officers, public health midwives, and schools to engage with the public in the districts in which the study is being conducted. School workshops were conducted to inform and direct the research, as well to keep them informed of findings. Local monthly meetings were organized to reach many members of the community and to provide an additional platform to disseminate findings. Connections with the divisional secretariats (DS) for the three districts within which this work was carried out were created, allowing for engagement at the district level through contact with the regional directors of health services, education, and other sectors. National level workshops were held to bring together national policy makers, government officials, and relevant organisations such as the WHO and the World Bank to discuss results and to create opportunities for stakeholders to identify future challenges and important questions of research, as well as to inform policy formulation and implementation. Links with local and national media in Sri Lanka were established to work with journalists concerning the reporting of health issues in the local press and to disseminate findings to the public.

Early findings of the INPARD baseline results were shared with national and international stakeholders. In 2014 INPARD organised a workshop in Colombo to share some findings and how they are going to inform further study.

*Figure: 8.1 INPARD Workshop with stakeholders to share qualitative findings*



INPARD lessons were also shared at the SAFANSI knowledge exchange event in New Delhi, India.

The World Health Organization organised two high-level dialogues in 2015 to discuss the non-communicable disease (NCD) agenda with multiple stakeholders. An INPARD team was invited to present at both meetings.

Each meeting was attended by more than 300 high level participants from different countries. This included Director General of the World Health Organization and ambassadors to UN missions in Geneva, ministers, and senior government officers. The [meeting report](#) mentions INPARD as an example of how to link multiple SDGs and how UN agencies can work in collaboration to support the NCD agenda.

INPARD research team presented oral and abstract presentations at international scientific conferences including the International Society of Behavioural Nutrition and Physical Activity (ISBNPA) in Edinburgh, UK in June 2015, Global Food Security Conference, Ithaca, USA in October 2015, and the International Union for Health Promotion and Education Conference in Brazil in May 2016. INPARD researchers organised a symposium at the Sri Lanka Medical Association Sessions to share the lessons of INPARD. Stakeholders of the project attended the symposium and related their experiences.

*Figure 8.2 INPARD symposium, Sri Lanka Medical Association Scientific Conference*



### **TV documentary**

*Figure 8.3 : Screenshots of the one hour INPARD documentary on national television*



National television of Sri Lanka (Rupavahi) telecasted an hour-long documentary on the INPARD project highlighting the importance of addressing nutrition in this era of rapid economic development in the country in November 2014.



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