



Working Paper No. 2

Research Area: Development

What we ate then and what we eat now: A grandmother's tale

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June 2016

Seshadri, S. R.; Parab, S.; Bhor, N.; N., Latha. (2016).
What we ate then and what we eat now: A grandmother's tale.
Azim Premji University (Working Paper No. 2).

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Available from:

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DOI Link: <https://doi.org/10.61933/wps.2.2016.6>

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What we ate then and what we eat now: A grandmother's tale

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Malnutrition levels in India remain a major public health challenge. According to the fourth round of the District Level Household Survey (DLHS-4, 2012-13), almost 30 percent of all children under the age of 5 are underweight in most states. This is a serious cause for concern for several reasons: low weight-for-age has been associated with a range of disadvantages, including a higher risk of dying due to several disease conditions among young children; changes in the autonomic nervous system; higher risk of hypertension and insulin-resistance in adulthood; adverse impacts on brain development, cognitive ability and school achievement; and behavioural problems such as anxiety and hostility later in life.

Despite policy and programmatic intervention aimed at enhancing overall availability of food, particularly for the poor and marginalized, data show that over a quarter of all children under 5 years are stunted and wasted, and almost a third underweight. In addition, anaemia in children under 5 years continues to be rampant. This case study looks at nutritional outcomes among a group that is not covered by national nutritional surveys: children in primary schools, in the age group 5-12 years. Children in this age group continue to be highly vulnerable to nutritional deficits, and their impact on their physical and mental growth can be critical to their leading a full and productive life.

In addition, the case study provides data on food choices made by rural communities in Karnataka and factors that contribute to these choices. National Sample Survey Organization data highlights a paradox that is peculiar to India: despite sustained economic growth since the 1990s, there has been a reduction in calorific intake; this is contrary to global trends that associate economic growth with enhanced food consumption. Our study shows that there has also been a substantial decrease in the range of different categories of food being consumed by rural communities. We find that the shrinkage in dietary choice is partly due to structural reasons relating to nutritional policy frameworks and program interventions, and partly to shifting tastes and preferences as communities move away from traditional lifestyles.

A multi-pronged approach is required to address this public health emergency. Interventions are needed at the policy, program and household level to establish a comprehensive framework for nutritional support for those most at risk, provide an adequately diversified diet to fulfil nutritional needs and enable households to access a wholesome diet that respects their dietary traditions.

Abbreviations

AWC	Anganwadi Centre
AWW	Anganwadi Worker
BPL	Below Poverty Line
DLHS	District Level Household and Facility Survey
FGD	Focus Group Discussion
ICDS	Integrated Child Development Scheme
IDI	In-depth Interview
NAC	National Advisory Council
NNP	National Nutrition Policy
NPAN	National Plan of Action on Nutrition
NREGA	Mahatma Gandhi National Rural Employment Guarantee Act
NRHM	National Rural Health Mission
OBC	Other Backward Class
PDS	Public Distribution System
PUCL	People's Union for Civil Liberties
RSOC	Rapid Survey on Children
SC	Scheduled Caste
ST	Scheduled Tribe
TPDS	Targeted Public Distribution System
WHO	World Health Organization

Note: This case study is based on the findings of the 'Nutrition Study: Do we know what they eat and why? A Study on School-level Dietary Adequacy and Impact of Cultural Beliefs on Dietary Choice in Rural Karnataka, India' carried out by the Health, Development and Society team of Azim Premji University.

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I. Introduction

Malnutrition levels in India remain a major public health challenge. According to the fourth round of the District Level Household Survey (DLHS-4, 2012-13), almost 30 percent of all children under the age of 5 are underweight in most states. This is corroborated by recent findings from the ongoing Nutrition Study of the Health, Development and Society team of the Azim Premji University: *Do we know what they eat and why? A Study on School-level Dietary Adequacy and Impact of Cultural Beliefs on Dietary Choice in Rural Karnataka, India*. The study focuses on three districts of Karnataka (Mysuru, Yadgir & Mandya) and shows that out of 5340 children in the age group of 5-11 years, 29.7 percent children were underweight (WHO 2007 standard). Further, (i) the percentage is higher among male students (36%) as compared to female (24%) students; (ii) as age increases, more children tend to fall into the underweight category; and (iii) Scheduled Tribe children (36.6%) were more malnourished than non-Scheduled Tribe children (27.8 %).

This is a serious cause for concern for several reasons. Low weight-for-age has been found to raise the relative risk of dying due to several disease conditions, and a significant proportion of deaths among young children can be attributed to malnutrition (Black et al. 2003; Bryce et al. 2005; Caulfield et al. 2004). The long-term physiological impacts of childhood malnutrition are well known: they range from changes in the autonomic nervous system to higher risk of hypertension and insulin-resistance in adulthood. There is also evidence that it can adversely impact brain development, cognitive ability and school achievement (Martins et al. 2011). A study in Barbados found that adults who had experienced childhood hunger tended to be more anxious, less sociable, less interested in new experiences and more hostile than those who were well-nourished throughout childhood (Szalavitz 2013).

One of the contributors to dietary inadequacy and consequent malnutrition is changing food habits. Our study shows that there has been a substantial decrease in the range of different categories of food being consumed by rural communities. We find that the shrinkage in dietary choice is partly due to structural reasons relating to nutritional policy frameworks and programme interventions, and partly to shifting tastes and preferences as communities move away from traditional lifestyles.

The case study first sets the context by tracing the development and current status of government policy in the nutrition sector, and the programmatic response so far to the nutritional needs of those at greatest risk. We then examine the prevalence of malnutrition across Indian states, particularly in Karnataka. Finally, we report in-depth on the findings of research conducted in Karnataka, and end with recommendations that tie the findings back to nutrition policies and programmes, and possible strategies for enhancing the effectiveness of the response.

II. Government policy: the National Nutrition Policy and Food Security Act

The National Nutrition Policy (1993) recognised that under-nutrition was part of the 'vicious cycle of poverty', where inadequate intake of food led to poor physical growth and ill-health. This in turn reduced the capacity for physical activity and work; such reduced capacity translated into reduced earning capacity, greater morbidity and mortality, leading to further poverty and the unending replaying of the vicious cycle. In order to break this, the Policy undertook to strengthen the linkage between agriculture, food and nutrition, and to address the following specific gaps in nutritional profile: (i) low protein intake, resulting in protein energy malnutrition (PEM), and the prevalence of other types of micro-nutrient deficiencies such as iron, iodine and Vitamin A; (ii) low birthweight among newborns; (iii) seasonal dimensions of malnutrition, including the high proportion of rain-fed subsistence farming which increased the vulnerabilities of farmers in the event of poor rainfall; (iv) other natural calamities such as famine, flood and drought that could lead to loss of employment or crops or both; (v) market distortion and disinformation, whereby prices of food could be manipulated and made unaffordable; (vi) urbanization and migration, as reflected in the extremely poor nutritional outcomes of children of slum-dwellers and other urban poor; and (vii) regional variations in vulnerability, for instance, people living in the hills and other remote areas.

The Nutrition Policy aimed to address malnutrition both through direct intervention as well as broader strategies of overall economic development. Direct interventions included: (i) expanding the nutritional interventions under the Integrated Child Development Services (ICDS), by extending coverage and strengthening growth monitoring; (ii) better coverage of women and adolescent girls to ensure safer pregnancy and healthier babies; (iii) food fortification, particularly for pregnant and nursing mothers and adolescent girls; and (iv) popularization of cost-effective healthy diet alternatives based on locally available raw materials.

Policy level interventions mentioned include: (i) ensuring food security through agricultural policies increasing overall food production; (ii) enhancing income security through employment guarantee schemes; (iii) strengthening the Public Distribution System of food grains to poor households; (iv) a range of health-related interventions to reduce morbidity and improve knowledge of positive health and nutrition practices; and (v) most importantly, nutrition surveillance and research, to track the incidence and prevalence of malnutrition and to understand the dynamics of its occurrence and possible ways to halt and reverse it.

The provisions of the National Nutrition Policy have been implemented with varying degrees of success. Previous to this, in 1992, India was a signatory to the World Declaration on Nutrition made at the International Conference on Nutrition (ICN) in Rome, which highlighted priority areas, with specific objectives, to be covered within a given timeframe. The National Plan of Action on Nutrition (NPAN) was drawn up in 1995 with the following goals: (i) reduction in moderate and

severe undernutrition in children by half; (ii) reduction in chronic undernutrition and stunting in children; (iii) reduction in low birthweight births to less than 10 percent; (iv) elimination of blindness due to Vitamin A deficiency; (v) reduction of iron deficiency anaemia among pregnant women to 25 percent; (vi) universal iodization of salt to reduce iodine deficiency disorders to 10 percent; (vii) production of 250 million tonnes of food grains; (viii) improvement of household food security through poverty alleviation programmes; and (ix) promoting appropriate diets and healthy lifestyles (Food and Nutrition Board 1995).

The NPAN included several 'sectoral plans of action' including in agriculture, civil supplies and public distribution, education, forestry, maternal and child health, food processing, information and broadcasting, labour, rural and urban development and women and child development. The idea was to apply a multi-sectoral implementation strategy, coordinated and overseen by the National Nutrition Council – a high-powered body chaired by the Prime Minister and tasked with drawing up guidelines and monitoring progress towards achievement of goals. A Taskforce on Nutrition Surveillance was set up within the Department of Women and Child Development to track nutritional levels nation-wide, as well as to develop District Level Nutrition Profiles to provide data disaggregated by gender, urban/rural location, etc., to aid in better planning of nutrition interventions.

Despite these efforts, malnutrition rates in the country continued to be high, and prompted the creation of the National Nutrition Mission in 2003, aimed specifically at increasing effective coordination between the various nutrition-related interventions of different ministries. The Mission created national-level leadership for the issue and included the Chief Ministers of states (by rotation), federal ministers, academics, NGOs and technical experts. The Mission launched a pilot project in 51 'nutritionally deficient districts' to distribute food grains free of charge through the Targeted Public Distribution System (TPDS) to adolescent girls and pregnant/lactating women in the Below Poverty Line (BPL) category. This was followed in 2008 by the establishment of the National Council on India's Nutrition Challenges, which focused on reforming the ICDS, and recommended institutional and programmatic convergence at the state, district, block and village level for dealing with 200 'high burden malnutrition districts' (NAC 2011). Finally, the National Advisory Council (2004) was extended in 2010 to include special working groups on Food Security and ICDS reforms (Mohmand 2012).

Apart from such government-led efforts, civil society activism has also played an important role in influencing the development of food and nutrition in India. A public interest litigation by the People's Union for Civil Liberties in 2001, for example, led to the universalization of ICDS as well as the provision of a mid-day meal in schools. This was the genesis of the Right to Food Campaign, which contributed significantly to the promulgation of the National Right to Food Security Act 2013 (Khera 2009).

Right to Food: The National Food Security Act (2013) promises ‘...to provide for food and nutritional security in human life cycle approach, by ensuring access to adequate quantity of quality food at affordable prices to people to live a life with dignity and for matters connected therewith or incidental thereto’ (Government of India 2013). The provisions of the Act are as follows (First Post 2013):

- Beneficiaries will be provided rice at Rs 3 per kg, wheat at Rs 2 per kg and coarse cereals at Rs 1 per kg. Up to 75 percent of the rural population and 50 percent of the urban population will get 5 kg of food grain every month. The poorest who fall under the Antyodaya Anna Yojana will continue with their present monthly entitlement of 35 kg of food grains.
- Around 80 million people will be entitled to subsidised food grain under the TPDS. The responsibility of identifying the beneficiaries lies with the state governments. Additional benefits are envisaged for pregnant and lactating women, and for children 6 months to 14 years old. The Bill also empowers women, by designating the oldest woman in the house as the ‘head of the household’.

Given the previous experience with the TPDS, the success of the programme depends critically on the fair, equitable and transparent implementation of its provisions. The cost has also been criticized for being quite steep: at the coverage and entitlement now proposed, the total estimated annual food grains requirement is 61.2 million tons and the corresponding estimated food subsidy for implementation of NFSB, at 2013-14 costs, is about Rs 1,247 billion. The fate of the translation of the provisions into action will depend crucially on the political will of the present government to follow through on a process initiated by the previous one.

III. Related government programs: ICDS, Mid-Day Meal and Public Distribution System

In order to establish a social safety net for the poor and to protect them against the worst ravages of poverty, in terms of their basic health and nutrition needs, the government has implemented several nutrition-related programmes.

The first set of programmes are **Nutrition-specific programmes**, which include:

The *Integrated Child Development Services (ICDS)*, launched in 1975 with the objective of improving the nutritional and health status of children in the age group of 0-6 years to reduce the incidence of mortality, morbidity and malnutrition and enhance the capability of mothers to look after the health and nutritional needs of the children. The programme covers about 89.3 million children and pregnant/lactating mothers. Services are provided at designated Anganwadi Centres (AWCs), where an Anganwadi Worker (AWW) and a helper cater to the nutrition and early child development needs of the children enrolled in the centre. Apart from ensuring the provision of a hot, cooked meal – the responsibility of the helper – the centres also provide nutrition education

and supplementation, immunisation services and pre-school education. There are currently close to 1.5 million AWCs across the country providing such services.

There is also the **Mid-Day Meal Scheme**, providing a hot meal to school-going children. Children in government and government-aided primary schools are provided fresh cooked meals on all working days and for at least 200 days in a year. Meals have a stipulated nutritional value as specified below:

Entitlement norm per child per day under MDM		
Item	Primary (classes one to five)	Upper primary (classes six to eight)
Calories	450	700
Protein (in grams)	12	20
Rice /wheat (in grams)	100	150
Dal (in grams)	20	30
Vegetables (in grams)	50	75
Oil and fat (in grams)	5	7.5

About 120 million children are covered across the country by this programme every year.

Then we have the **School Health Programme**. This programme addresses the health needs of school-going children and adolescents in the 6-18 year age group in government and government-aided schools. It provides for health screening twice a year and early management of disease and disability. The focus is to address the physical and mental health needs of children, provide micronutrient supplementation and promote physical activities. The programme also provides counselling and immunisation, weekly iron folic acid supplementation, along with deworming twice a year. More than 70 million students are covered annually by this programme.

The second set of programmes are **Nutrition-sensitive programmes**, which include:

The **Targeted Public Distribution System** that promotes food security in poor households by providing subsidised food grains to the disadvantaged populace. It will also facilitate operationalisation of the proposed National Food Security Act which will then provide statutory food security to the vulnerable.

The **Annapurna Scheme**, implemented since 2000-01, supplies 10 kg of food grains per person per month free of cost to indigent senior citizens of 65 years and above who are eligible for old age pension but are not getting it.

The **Total Sanitation Campaign**, aimed at reducing open defecation, now well-recognised as a contributory factor to malnutrition; and several programmes which do not have improved nutrition as their basic aim but address its underlying determinants, such as increased school enrolment (particularly for girls) and raising the age for marriage.

The third set of programmes are **enabling environment investments**, such as:

The **National Rural Employment Guarantee Scheme**. This programme aims at enhancing the livelihood security of people in rural areas by guaranteeing a hundred days of wage-employment in a financial year in order to provide poor families with an assured income which would contribute to household food security. The Act guarantees 100 days of wage employment in a financial year to a rural household. The Act covers 615 districts and provided employment of about 2900 million person days in 2010-11. The Scheme also has the potential of upgrading infrastructure and increasing agricultural productivity, thereby altering the geography of poverty, empowering women, and preventing distress migration.

IV. Status of malnutrition in India and Karnataka

a) Current status in India: selected states

The First Global Nutrition Report recently released by the International Food Policy and Research Institute (IFPRI 2015) provides a welcome update on India's progress on key nutrition indicators. Using the Government of India's Rapid Survey on Children (Ministry of Women and Child Development, RSoC 2013-14), the Report estimates that under-5 stunting in India has reduced on average from 47.9 percent in 2005-06 to 38.8 percent in 2013-14; this nine percentage point reduction translates into almost 14.5 million fewer stunted children. However, the findings of the fourth round of the District Level Household and Facility Survey (Reproductive and Child Health Program, DLHS 4 2012-13) show that over a quarter of all children under 5 are stunted and wasted, and almost a third are underweight. In addition, anaemia in children under 5 years continues to be rampant. The RSoC data generally shows a better picture, but even there the level of malnourishment among young children is unacceptably high.

Table 1: Prevalence of malnutrition in children <5 years of age in selected states of India

State	DLHS 4 (2012-13)				Rapid Survey of Children (2013-14)		
	Wasting	Stunting	Underweight	Anaemia	Wasting	Stunting	Underweight
Karnataka	26.4	29.9	29.7	75.9	17	34.2	28.9
Kerala	24.1	22.7	20.9	48.5	15.5	19.4	18.5
Tamil Nadu	28.3	27.8	32.5	60.2	19	23.3	23.3
Maharashtra	34.1	30	38.7	73.7	18.6	35.4	25.2
West Bengal	28.2	37.4	37.4	86.4	15.3	34.7	30

Source: DLHS 4 2012-13, and MWCD Rapid Survey on Children 2013-2014 /

b) Current status in Karnataka

Looking more closely at the most recent data for Karnataka (Ministry of Women and Child Development, RSoC, 2013-14), we find that about 17 percent of children are born underweight, and only about half of all children are exclusively breastfed for the first five months. Full immunisation is relatively high at almost 80 percent. However, data on indicators of malnourishment paint a dismal picture: more than a third of children under 5 years of age are stunted, and almost as many are underweight. Almost one in five children are wasted.

Table 2: Key nutritional indicators by residence and social category - Karnataka

Indicator	Residence			Social category			
	Total	Rural	Urban	SC	ST	OBC	Other
Weighed within 24 hours	89.5	86.8	93.9	84	86.2	91	91.8
Low birthweight of those weighed	17.2	17.2	17.3	21	33.8	13.5	16.4
Fully immunised	79.4	78.9	80.2	79.6	54.1	82.9	81.6
Children 0-5 months exclusively breastfed	55.1	50.8	64.4	65.1	48.6	55.1	56
% of children 0-59 months stunted	34.2	34.2	34.3	37.2	34.8	31.9	36
% of children 0-59 months wasted	17	17.8	15.7	23.9	19.6	16.4	14.5
% of children 0-59 months underweight	28.9	30.2	26.7	37.6	32.8	28.6	25.2

Source: MWCD. Rapid Survey on Children 2013-14.

An important issue to note is the difference between social categories: generally, 'Other Backward Classes (OBC)' and 'Other' categories perform better on most indicators as compared to the Scheduled Caste (SC) and Scheduled Tribe (ST) groups. On some indicators, this difference is quite stark: prevalence of underweight among SC children is 50 percent higher than among the 'Other' category; similarly, full immunisation of children is 50 percent less among STs as compared to the 'Other' category. Low birthweight among ST newborns is significantly higher than for the other categories: twice as much as for the 'Other' category and almost three times as much as OBCs. While rural-urban differences are evident, in the case of indicators of malnutrition, these differences do not appear to be large: stunting levels are the same; wasting is about 10 percent lower and underweight is about 20 percent lower in urban areas.

V. Changing household dietary patterns

India is in the middle of an epidemiological transition: while there is still a considerable burden of communicable disease in the country, there is a rising burden of non-communicable disease such as cardio-vascular disease, stroke and cancer. Many of these are also termed 'lifestyle' diseases and are closely related to changing dietary patterns (Shetty 2002). Accompanying – or perhaps,

contributing – to this is the ‘nutritional transition’, defined as ‘the shift in dietary consumption and energy expenditure that coincides with economic, demographic, and epidemiological changes’ (Wikipedia). Vaz et al (2005) have looked at the issue of nutrition transition, and identify the following factors as reflecting the dietary changes that result: (i) an increase in the consumption of legumes, vegetables and milk as well as animal foods where applicable; (ii) substitution of coarse grains such as ragi and jowar with highly polished grains such as white rice, as well as a reduction of cereals as a proportion of the total diet; (iii) increases in the consumption of edible fat; (iv) increases in the consumption of sugar and sweets. These changes in dietary choice eventually lead to obesity (Vaz et al. 2005). While factors such as urbanisation and globalisation have played an obvious part in this transition, there are other factors that could also be contributing to the epidemic of diabetes and heart disease facing Indians. There is evidence to show that poor early childhood nutrition, which is common in India where a large proportion of children are born underweight, leads to certain metabolic and hormonal changes that allow the body to adapt to nutrient-poor environments. If in later years these same children access calorie-packed foods, their adaptive mechanisms may reduce their ability to metabolize them, leading to obesity, diabetes and other nutrition-related problems (Bankman 2013).

Dietary intake rose steadily from the mid-70s to the mid-90s, with National Nutrition Monitoring Board (NNMB) reports (NNMB 1979-2005) showing an increase in total energy, protein and fat intake during that period (Ramachandran 2011). However, since then, despite sustained economic growth, there has been reduction in energy intake; this is contrary to the general pattern where increased income is associated with increased energy intake. Ramachandran (2011) also reports further complexities that emerge from the data: (i) NNMB data indicates that in the past three decades, the proportion of households where adult dietary intake is adequate has risen two-fold, but the intake of pre-school children is inadequate, reflecting poor intra-household distribution of food; (ii) while stunting, wasting and underweight were associated with mothers who were underweight (BMI <18.5), even with mothers who were overweight (BMI >25), about a third of preschool children were stunted and a fifth were underweight, suggesting that poverty and household food insecurity are not the only determinants of malnutrition; and (iii) school-age is a critical time when dietary habits are set and the nutritional status of the adult is determined.

NSSO data

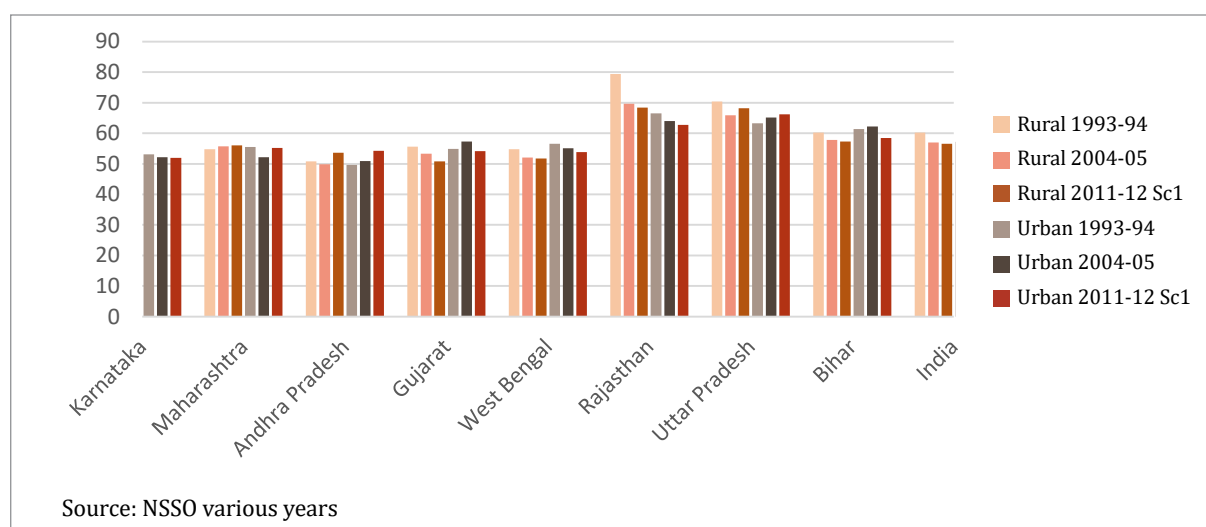
National Sample Survey Organization (NSSO) data from 1983 to 2011-12 provides interesting insights into trends in household nutritional intake during this period. Total nutritional intake per family has remained fairly flat across the years, with a definite dip in the all-India average as well as state-specific data for 2004-05 in rural households; subsequent to this, there has been some recovery, and the 2011-12 levels are very similar to what was seen in 1983. Per capita calorie intake in urban and rural households is very similar with about a 5 percent variation in the all-India average as well as in most states.

Table 3: Trends in household nutritional intake 1983-2012

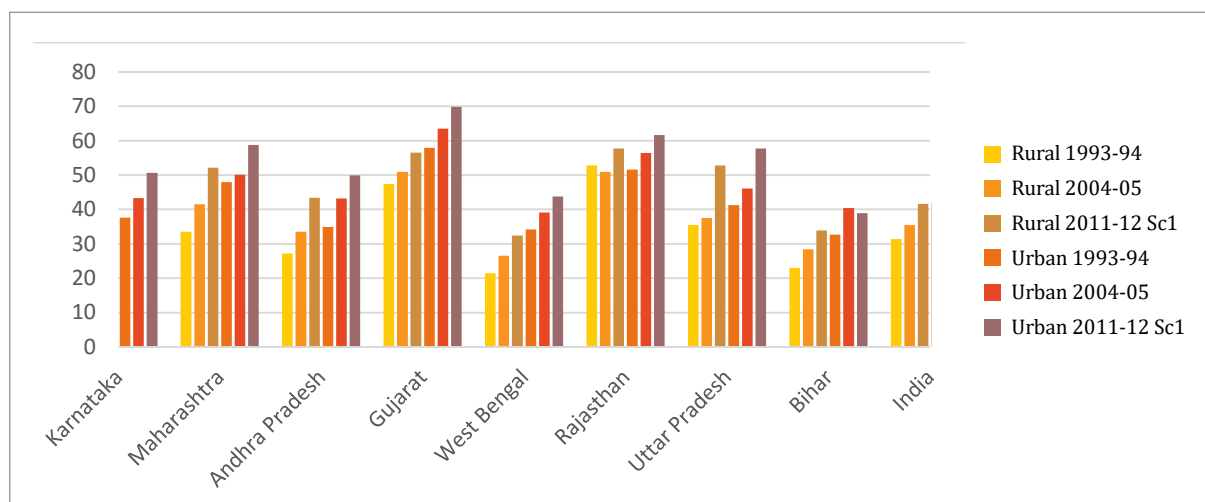
Estimated per capita calorie intake (Kcal) per day in different years										
States	Rural					Urban				
	1983	1993-94	2004-05	2011-12 Sc1	2011-12 Sc2	1983	1993-94	2004-05	2011-12 Sc1	2011-12 Sc2
Karnataka	2260	2073	1845	2003	2164	2124	2026	2046	2007	2245
Maharashtra	2144	1939	1933	2103	2260	2028	1989	2039	2039	2227
Andhra Pradesh	2204	2052	1995	2186	2365	2009	1992	2052	2150	2281
Gujarat	2113	1994	1923	1915	2024	2000	2027	2058	2070	2154
West Bengal	2027	2211	2070	2092	2199	2048	2131	2134	2026	2130
Rajasthan	2433	2470	2180	2263	2408	2255	2184	2335	2151	2320
Uttar Pradesh	2399	2307	2200	2436	2548	2043	2114	2131	2379	2363
Bihar	2189	2115	2049	2057	2242	2131	2188	2171	2080	2170
India	2221	2153	2047	2099	2233	2089	2071	2156	2058	2206

Source: NSSO various years

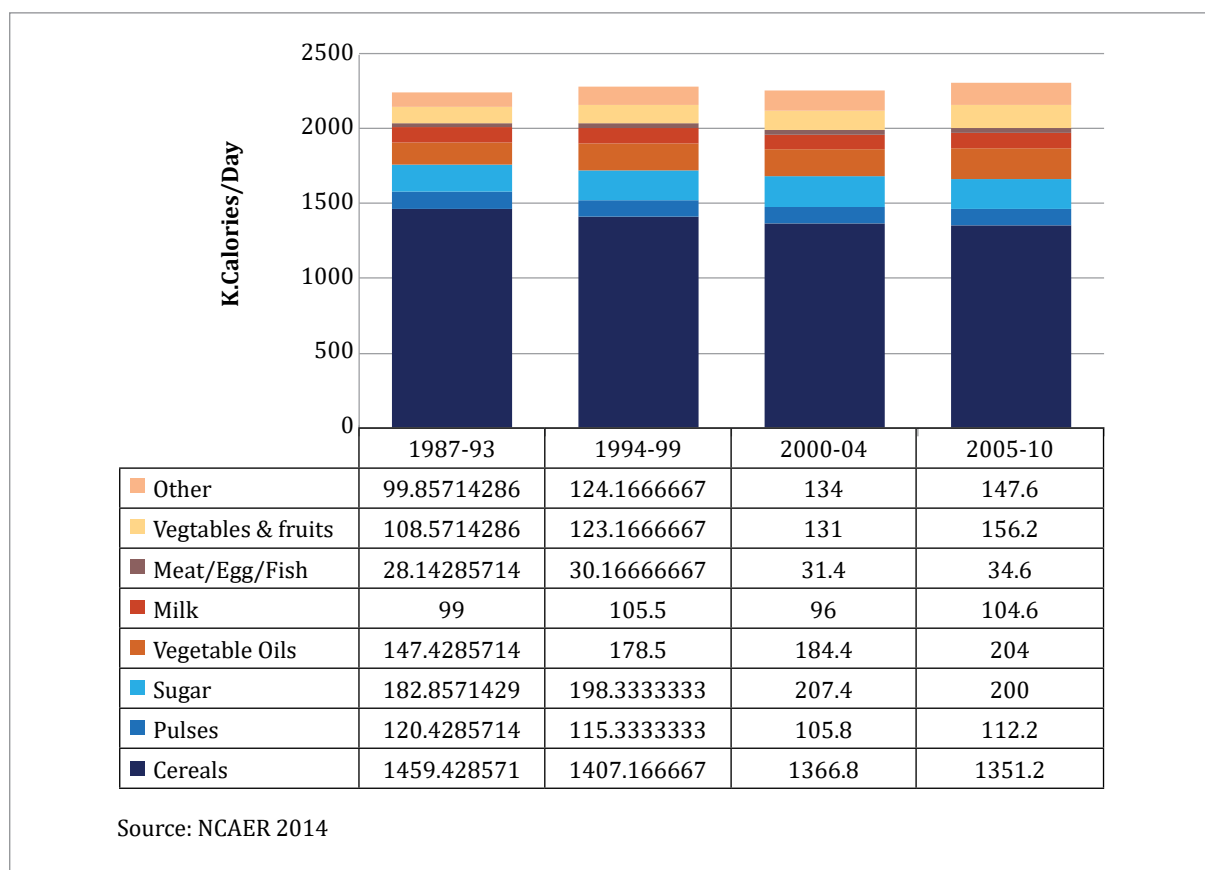
While overall calorie intake has shown little variation over the years, the situation with per capita protein consumption is very similar. In most states, as well as the all-India average, the pattern is flat from the mid-90s to 2011-12; and this is true of both rural and urban areas.

Figure 1: Per capita protein intake (gms) per day

The pattern with per capita intake of fat provides some evidence of a significant change in dietary choice. In both rural and urban settings, there is a clear upward trend in consumption of fat in all states and at the all-India level as well. Average consumption of fat has risen from about 30 gms and 40 gms per capita per day in rural and urban areas respectively in 1993, to 40 gms and 50 gms respectively in 2011-12.

Figure 2: Per capita fat intake (gms) per day

Finally, if we look at the actual composition of the diet and how it has changed over the years, we find some interesting trends. Cereals provide the bulk of calorific intake across all years, although there has been a gradual reduction in their share in the total diet. Items that have increased significantly are vegetable oils, vegetables and fruits and 'other': each of these categories has increased by between 30-50 percent. There has been a gradual increase in the consumption of meat/eggs/fish, while there has been a marginal decline in the consumption of pulses.

Figure 3: Trends in composition of per capita calorie intake by type of food

While this analysis provides interesting insights into the changing composition of the Indian diet in terms of various food groups, it leaves open the question of why such changes are taking place, and how they are reflected in the food choices being made at the household level. These are the issues that the present study seeks to address.

VI. Nutrition study: change in dietary choice in rural Karnataka

Since children are the most vulnerable to nutritional deficit, and ensuring adequate nutrition of children is critical to their physical and mental growth, tracking their nutritional status should be a priority. While the DLHS 4 and RSoC provide data on the nutritional status of children under 5 years of age, data on the nutritional status of school-going children is hard to obtain. The School Health Card provided to all schools under the School Health Program is meant to remedy this lack; however, this is poorly done, and the data is not collated and made available for further research.

In order to fill this gap, we undertook to collect the weight and height data of 5,344 students in Standards 1-5 in government schools of three districts of Karnataka. Table 4 presents data on the performance of the children included in the Nutrition Study on basic indicators of nutritional adequacy. Normal BMI ranges from about 68 to 71 percent of all children sampled in each district. Children below the normal range vary from about 29 percent in Yadgir to about 31 percent in the tribal block of HD Kote. Mandya district shows a small proportion (2%) of the children as overweight. Overall, girls tend to be less underweight than boys, at around 25 percent, 19 percent and 23 percent in Mysuru, Yadgir and Mandya respectively, as compared to around 38 percent, 34 percent and 35 percent for boys in the same districts. Older children (8-11 years) are significantly more underweight than younger children (5-7 years) at approximately 36 percent, 30 percent and 31 percent in Mysuru, Yadgir and Mandya respectively as compared to 25 percent, 26 percent and 28 percent for younger children in the same districts.

Table 4: BMI for age and Height for age status by gender, caste and age group

WHO 2007 Growth reference								
Mysuru		BMI for age %				Height for age %		
Indicator (N)		Severely thin	Thin	Overweight	Normal	Severe stunting	Stunting	Normal
Gender	Male (719)	11.1	27.5	0.6	60.8	4.2	19.9	75.9
	Female (925)	5.1	20.3	0.4	74.2	4.5	21.7	73.7
Caste	ST (730)	9.7	27.4	0.3	62.6	4.1	22.3	73.6
	NST (914)	6.1	20.4	0.7	72.9	4.6	19.8	75.6
Age in categories	5-7 years (788)	4.7	21.4	0.8	73.1	3.6	19	77.4
	8-11 years (847)	10.5	25.5	0.2	63.8	5	22.9	72.1
Total	Total (1644)	7.7	23.5	0.5	68.3	4.4	20.9	74.7
Yadgir								
Gender	Male (1075)	9.4	25.4	0.7	64.6	7.8	24.9	67.3
	Female (1083)	3.8	18.5	0.7	77	8.5	26.8	64.7
Caste	ST (414)	8.2	27.5	0.7	63.5	9.2	27.1	63.8
	NST (1736)	6	20.7	0.7	72.6	7.9	25.6	66.5
Age in categories	5-7 years (878)	6.7	19.6	0.3	73.3	8.4	25.9	65.7
	8-11 years (1265)	6.5	23.7	0.9	68.9	7.7	25.8	66.5
Total	Total (2158)	6.6	21.9	0.7	70.8	8.2	25.9	66
Mandya								
Gender	Male (749)	8.5	26.7	1.9	62.9	2.3	12.1	85.6
	Female (789)	5.3	19.3	2.7	72.8	2	15.5	82.5
Caste	NST (1538)	6.9	22.9	2.3	67.9	2.1	13.8	84
Age in categories	5-7 years (807)	7.4	21.6	2	69	1.6	12.9	85.5
	8-11 years (726)	6.2	24.5	2.6	66.7	2.6	14.9	82.5
Total	Total (1538)	6.9	22.9	2.3	67.9	2.1	13.8	84

Source: Primary data collected for the Nutrition Study; Note: Out of 5344 only 5340 students are included in the analysis because either the age, weight or height of four students is missing.

The data shows even greater variance when we consider stunting. About 16 percent of children are stunted in Mandya district, as compared to almost 34 percent in Yadgir: more than double. About 8 percent of the children in Yadgir are severely stunted, as compared to 2 percent in Mandya. Within each district, the differences between boys and girls, older and younger children and social groups is less significant than the differences in weight.

Why are malnutrition levels still high among school children? To study this issue in greater detail, we decided to understand the changing pattern of dietary availability over a period of time. In order to do this, we conducted a qualitative study with grandmothers who lived in the selected study

areas, to find out how food habits have changed over time and whether it has had any impact on their health.

VII. Methodology

The qualitative data was collected using the purposive sampling method. A total 116 grandmothers participated in the study. Nine Focus Group Discussions (FGDs) and five In-Depth Interviews (IDIs) in HD Kote were conducted from January-August 2015. The participants were all grandmothers who had at least one grandchild. The primary purpose was (i) to understand how food availability



Photo 1: FGD in Yadgir

and accessibility have changed over the years; and (ii) to understand from senior members how these changes have affected the community's health and nutrition, especially of children and women.

Table 5 gives the details of numbers of FGDs/IDIs and age profile of participants. In the FGDs, grandmothers were asked to free-list the food they ate in their youth and record this on a card provided (using a separate card for each item). They then free-listed the food they ate now, also recorded on separate cards. The lists were then compared and discussed. For the IDIs, interviews were conducted in Kannada and then transcribed and translated into English for further data analysis. Translated data was analysed using NVivo-10 trial version software.

Table 5: Sample for case study and mean age of participants

Districts	Total no. of FGDs (date when conducted)	Participants for FGDs	Average participants/ FGD	Total no. of IDIs	Total participants	Mean age
Mysuru	3 (Jan-Feb 2014)	38	13	5 (Jul-Aug 2014)	43	57.2
Yadgir	3 (Feb-Mar 2014)	38	13	-	38	58.8
Mandya	3 (Aug 2014)	35	12	-	35	64.2
Total	9	111	12	5	116	59.9

VIII. Summary of Findings



Photo 2: FGD in Mandya

Change in dietary choices: The foods the grandmothers reported having eaten earlier were categorized into cereals, pulses, vegetables, fruit, milk products, meat and *others* (this last category was a catch-all for snacks and non-traditional foods). In each category (see Table 6), the list of items eaten in the past far exceeds the list of items consumed currently. Some of the foods they mentioned having eaten earlier have

disappeared from their plate now. The only category which was greater today as compared to 20 years earlier was the *others*, which largely contains junk food such as Maggi noodles, pani puri, puffs and chocolate.

Changing food choice: By food category, the change in food choice reported was as follows:

- **Cereal:** Among cereals, nutritious millets such as barley and pearl millet no longer form a part of their diet. Apart from ragi (finger millet) and wheat, the main staple is now different forms of rice. Pulses such as black sesame, horse gram and black gram no longer figure in the diet, although they are all cheap and rich sources of protein.
- **Vegetables:** The variety of vegetables consumed has come down significantly – ten types of green vegetables now as compared to 20 before, for example; and there has been a shift in the types of vegetables being consumed. Earlier, the choice was largely traditional, locally grown produce, such as gourds, roots and tubers. But now, the preference is for what are termed ‘English vegetables’ such as cauliflower, cabbage and tomatoes. These are more expensive and not part of the traditional diet. The choice of fruit has been severely curtailed, with various types of berries and wild fruit being discarded, and the preference mainly for fruit that find their way to the market like apples and bananas.

Table 6: What we ate then and what we eat now: A Grandmother’s Tale

Food Group	What we ate in the past	What we eat now
Cereal	Beaten rice, bamboo rice, corn (small and big), brown rice, white rice, jowar (sorghum), barley, pearl millet, ragi (finger millet), wheat	White rice, bread, beaten rice, beaten rice, jowar, ragi
Pulses	Bengal gram, black gram, black sesame, channa, channa dal (yellow split peas), chickpea, cowpea, green gram, groundnut, horse gram, kidney beans, pigeon peas, moong dal (small yellow lentils), red gram, peas, urad dal (dehusked black lentils)	Peas, cowpea, green gram, groundnut, kidney beans, red gram, pigeon peas, urad dal

Food Group	What we ate in the past	What we eat now
Vegetables	Twenty different types of green leaves, green banana, bamboo shoots, beans, beetroot, bitter gourd, bottle gourd, brinjal, carrot, core of the banana, drumsticks, cluster beans, green chillis, ivy gourd, lotus root, onion, potato, pumpkin, ridge gourd, roots/tubers, snake gourd, thorny potato	Ten different types of green leaves, cucumber, onion, beans, beetroot, bitter gourd, brinjal, cabbage, carrot, cauliflower, drumsticks, green chilli, okra, lemon, potato, pumpkin, radish, ridge gourd, tomatoes, yam
Fruit	Gooseberry, apple, banana, blueberry, cactus fruit, cashew apple, custard apple, dates, two types of banana, elephant apple, figs, grapes, guppatta, helepi (traditional fruits), jackfruit, jambu (rose apple), jauviri (jam berry), jujube (dates), kajjari (dried dates), karae hannu, kavali, majjige hannu (black plum), mango, musambi (sweet lime), nagarahannu, oranges, papaya, pomegranate, wild apple, wild berry	Apple, banana, guava, papaya, banana, wild berry
Milk products	Butter, buttermilk, cow's milk, curds, ghee, buffalo milk	Butter, buttermilk, cow's milk, curds, ghee, buffalo milk
Meat	Antelope, bison, cat, chicken, crabs, deer, different types of fish, duck, egg, forest rat, goat, hakki, 4 or more types of jungle fowl, bird (pelican), mutton, peacock, pork, prawns, rabbit, sheep, tortoise, water snake	Crabs, egg, farm bred chicken, goat, pomfret, mutton, pork, rabbit, sheep, water snake
Other	Chilli bonda (batter fried chillis), chutney, porridge	Biscuits, bonda/bajji, cake, chips, chutney, coffee, gobi manchurian, Horlicks, kadubu (fried coconut sweet), Kurkure, Maggi noodles, masala puri, pani puri, puffs, vada (fried lentil donuts), chocolates, mithai (traditional sweets)

- *Meat*: This has changed dramatically: wild animals found in the forest are no longer part of the diet. Antelope, deer, tortoise, duck – this wide range of choice that was available to the grandmothers when they were young has now shrunk to a handful of choices, with rabbit and water snake being the only two items that are perhaps not available in the shops but still consumed.
- *Other dietary choices*: The category 'other' is very telling, and reveals a long list of packaged junk food of dubious nutritional value but high cost: Maggi noodles, Kurkure, chips, as well as deep fried and sugar-laden goods of various types.

Reasons for the change: The grandmothers were quite perceptive about the reasons for the change in dietary choices being made by today's generation. These can be broadly categorized as follows:

A. Structural

- a. *Monetization of food:* The reasons stated by grandmothers for the reduction in consumption of these foods is mainly because the local cereals, pulses, vegetables, tubers, and fruits which they used to produce are not produced now and they have to depend on the market. According to them, most of the things they used to get in their villages either through growing them or exchanging with their neighbours/friends are now available in the market; but the prices have increased so much that they cannot afford to buy them, which has resulted in low consumption.
- b. *Changing economic incentives:* In the past, they used to cultivate vegetables and grain on their land for their own use. Their perception is that people have either become lazy and given up farming, leased the land to larger farmers, started growing cash crops, migrated to the city or use hybrid seeds and a lot of chemical fertilizers to produce them. This has resulted in reduction in the quality of the people's diet and impacted their health as well. Similarly, they would earlier rear cattle and consume the milk and milk products; but now even if they rear cattle, the milk is sold to the dairy instead of being used at home. Some participants expressed their concern over this: *"We had cows and used milk for the home but now everything is sent to the dairy. In earlier times, curds, butter, buttermilk were used at home and given to the children too"* (Mandya).
- c. *Impact of policy change:* They reported that in previous generations, they would hunt and eat different types of animals from the forest, but now the restrictions laid down by the Forest Department preventing hunting/entry into designated forests has deprived them of this option. The range of non-vegetarian food that they used to eat has therefore come down drastically, and they depend largely on market-bought items.
- d. *Change in agricultural practices:* The general perception was that today's food contains too many chemicals. The grandmothers constantly commented that food eaten in the present is impacting the health of everyone due to a variety of reasons, such as the use of pesticides, fertilizers and chemicals that are used to ripen fruits, as well as modern irrigation practices:



Photo 3: Word cloud of frequently used words by grandmothers

“Farmers spray large amount of medicines while growing cereals which causes more diseases.” They were also of the opinion that they could not produce anything in their fields without using chemicals because the soil has lost its fertility after constant use of fertilizers over the years. *“Earlier jowar, sesame were grown; but now there is no rain, and we need a lot of chemicals and machines to grow those crops. Earlier oilseed cakes were used as manure but now we have to get fertilizers from the Co-operative, otherwise seeds don’t sprout and grow,” (Mandya). “We used homemade fertilizers, fertilizers made of cow’s waste and we grew good crops; now it has become impossible to grow crops without adding foreign fertilizers,” (Yadgir).*

The introduction of hybrids was perceived as another problem. The local varieties of cereals and pulses have disappeared. They think these had very high nutritive value when compared to hybrids. *“Not only pulses, but native varieties of all food grains have disappeared. Wherever you look, only hybrids have taken over,” (HD Kote).*

B. Programmatic

Impact of subsidised supply: The foods that continue to be cheap are those that are available through the Government’s Public Distribution System (PDS): for Rs. 48, each household can procure about 30 kgs of rice, 2 kgs of wheat and 1 kg of sugar, apart from some cooking oil. Partly because of this, they now get a stomach full of food. Nevertheless, they feel that in the past, even though they had less food, it was more nutritious.

C. Household/individual

- a. Change in taste: In the past, in Mysuru and Mandya districts, the staple cereal was ragi and in Yadgir it was jowar. In recent years, ragi consumption has gone down mainly because the present generation does not like ragi-based items. The case is the same with jowar. There is a big shift according to the grandmothers from ragi/jowar to rice. *“Nowadays we eat more rice. There is no strength in it, elders in the house need ragi balls. Women of today quarrel when asked to make ragi balls,” (Mandya). One grandmother also said that “Everybody is becoming diabetic at a very young age as they eat a lot of rice.”* With regard to meat, their children and grandchildren demand broiler chicken in preference to traditional meats. One participant in Yadgir commented: *“We used to eat sweet dishes like obbattu and payasa but today’s kids eat chocolate, biscuit, kurkure, mithais from sweet shops and suffer from stomach upset.”*
- b. Changing traditions/practice: Grandmothers reported that they ate different varieties of vegetables and fruits from the forest which they do not get now because the present generation is not willing to go into the forest to collect them. Rearing cattle has become difficult because children are not interested in helping to look after them, cattle are not allowed in the forest for grazing by the forest department, or there is a scarcity of grass.

- c. Change in perceptions: With all types of food – grains, vegetables, fruit, meat – the perception was that changing agricultural practices had negatively impacted taste and quality. The grandmothers felt that the milk in the market is adulterated and the quality is poor as compared to what they used to have earlier. *“In those days, ghee used to smell so good that even our neighbours would come to know when we made it. Today’s ghee does not have any smell,”* (Yadgir).

IX. Discussion

Diets have changed significantly in the rural households studied, and from the grandmothers’ point of view, these changes bode ill for the health and nutritional well-being of their families. It is important to understand this changing landscape of food habits and preferences, and the impact it is having on household food choice.

The World Declaration on Nutrition (1992) stated that *“Hunger and malnutrition are unacceptable in a world that has both the knowledge and the resources to end this human catastrophe... We recognize that globally there is enough food for all and... pledge to act in solidarity to ensure that freedom from hunger becomes a reality.”* India’s NPAN and Food Security Act have put in place some useful goals and targets for the reduction of malnutrition due to both macro- and micro-nutrient deficiency. The objectives have largely focused on ensuring availability of *adequate* quantum of food, while balancing the nutritional value of the total diet of the household. However, issues regarding intra-household food distribution and dietary adequacy for children within households continue to be a matter of concern and cannot be addressed by such interventions.

There are three possible ways in which to intervene constructively on the issue of dietary choice and dietary change:

- I. At the policy level, (a) basic nutritional requirements should be provided to all households, with a particular focus on the poor, to ensure that the issue of under-nutrition is addressed effectively. The issue of rice/wheat-based food subsidies, through the PDS or now recommended by the Right to Food Bill, and the long-term impact of this on household dietary choice has been documented in this study: the ease of preparation and handling of such food makes it the more convenient, if less nutritious, preferred option as the staple. The risk of non-communicable disease at a later age is significantly elevated, however, due to a switch from traditional cereals such as ragi and jowar to rice. (b) Intersectoral action is critical: agriculture and forest policies should support families to supply their own food needs, and make it financially and otherwise viable for them to do so.
- II. At the programme level, various in-school and out-of-school programmes have been put in place to ensure provision of nutritious food to those who need it. However, the nutritional composition of the food being provided either through school meals or through the ICDS programme needs to be examined. Currently, these diets are also carbohydrate-heavy, and the

prescribed protein and vegetable elements are often left by the wayside due to considerations of cost or availability. The establishment of vegetable gardens in schools – as envisaged as part of the MDMS and demonstrated effectively in the Bangladesh Nutrition Project – should be encouraged. Other efforts to block the marketing of junk food to school children – documented in the Centre for Science and Environment Report (CSE 2014) -- need to be taken up so as to prevent the marketing and sales of such products within and near educational institutions. Apart from this, healthy food choices and the importance of having a nutritious and balanced diet should be introduced into the curriculum to raise awareness of these important issues.

- III. At the household level, there is a need to do a lot more to address the issue of healthy food choice: (a) increased awareness and education at the community and household levels to motivate farmers to cultivate cereals like ragi over rice; (b) efforts to encourage people to make the effort to cook and eat such healthy alternatives; (c) awareness about organic farming and its health benefits; and (d) innovative ideas such as creating seed banks of local cereals and pulses with high nutritive value; re-discovering forgotten foods and recipes; and creating a knowledgebase, and so on.

Finally, awareness needs to be raised about locally available foods, their nutritive value and importance in reducing malnutrition. With the limited resources that are available, people can make more affordable and sustainable choices that could prove to be the long-term solution to the persistent tragedy of childhood malnutrition.

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