Climate Change and Impact on Nutrition – Options for Action

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CLIMATE CHANGE AND FOOD AND NUTRITION SECURITY

1. Food security: causes
2. Malnutrition
3. Climate change & food security
4. Climate change & food security: Future
5. Improving food security

Food security & right to food

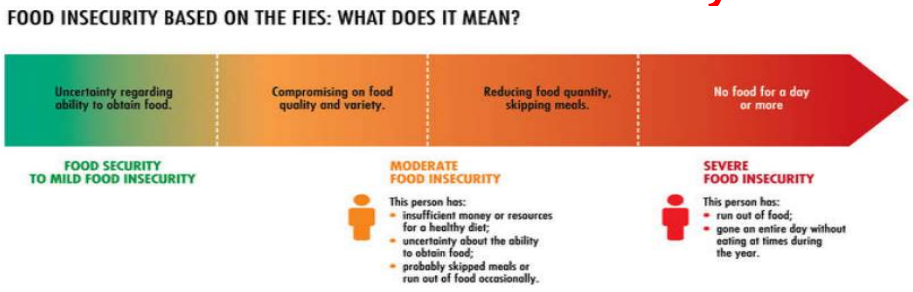
- **Food security** defined as:

  "When people, at all times, have physical, social & economic access to sufficient, safe & nutritious food preferences for an active & healthy life" (FAO, 2002)

- The right to food is universal
  - –International Covenant on Economic, Social & Cultural Rights (UN-OHCHR, 2008)
  - –The related concept of food entitlement was identified by 1998 Nobel Laureate Amartya Sen

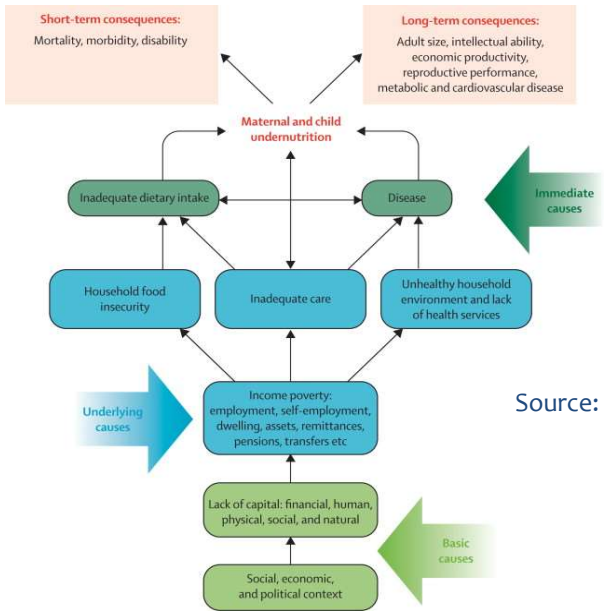
3

Causes of food insecurity



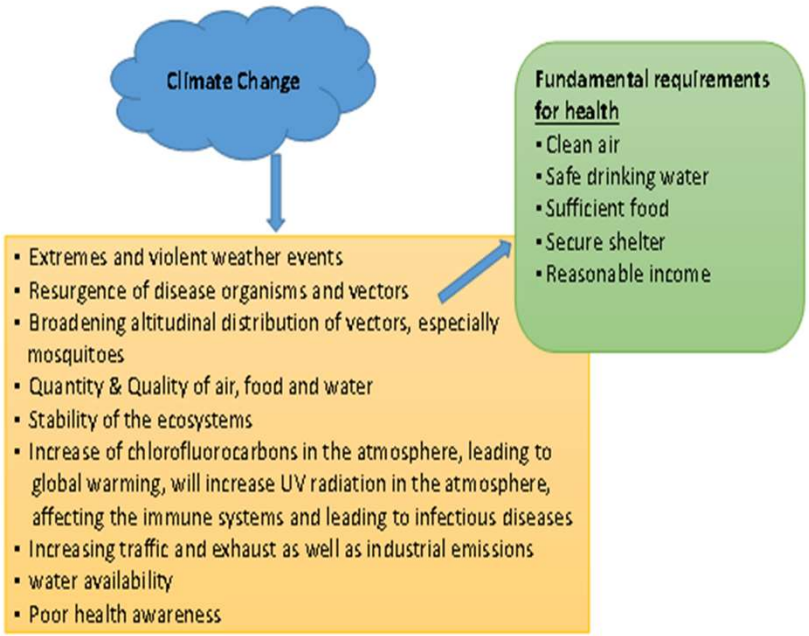
- **A person is food insecure when they lack regular access to enough safe and nutritious food for normal growth and development and an active and healthy life.**
- **This may be due to unavailability of food and/or lack of resources to obtain food.**
- **Food insecurity can be experienced at different levels of severity.**
- **FAO measures food insecurity using the Food Insecurity Experience Scale (FIES) shown above.**

Source: http://www.fao.org/hunger/en/



Source: Black JL et al. (2008)

Causes of food insecurity



What is Health?

As per WHO definition … Health is a state of complete physical, mental and social well-being, but not only just absence of disease or infirmity (WHO, 2014)

What is Nutrition?

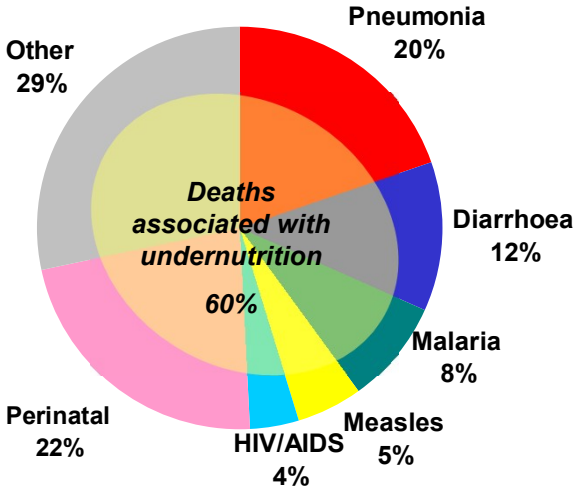
Nutrition is the process of taking the food into body and absorption nutrients in those foods in the body

What is Malnutrition?

"Malnutrition s a pathological state that results from ingestion of one or more nutrients, either in excess or deficient quantities over a period of time."

- Nutrition is a fundamental pillar of human life, health and development across the entire life span.
- From the earliest stages of fetal development to old age.
  - at birth,
  - through infancy,
  - childhood,
  - adolescence,
  - adulthood and old age
- Proper food and good nutrition are essential for survival, physical growth, mental development, performance and productivity, health and well-being.
- Nutrition is an essential for foundation of human and national development.

Major causes of death among children under five, global, 2000



Sources:

For cause-specific mortality: EIP/WHO using 1999 data.

For deaths associated with malnutrition: Caulfield LE, Black RE. Malnutrition and the global burden of disease: underweight and cause-specific mortality.

Articles

Subnational mapping of under-5 and neonatal mortality trends in India: the Global Burden of Disease Study 2000–17

India State-Level Disease Burden Initiative Child Mortality Collaborators*

Lancet 2020; 395: 1640–58
Published Online May 12, 2020
https://doi.org/10.1016/S0140-6736(20)30471-2
See Comment page 1591

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Summary

Background India has made substantial progress in improving child survival over the past few decades, but a comprehensive understanding of child mortality trends at disaggregated geographical levels is not available. We present a detailed analysis of subnational trends of child mortality to inform efforts aimed at meeting the India National Health Policy (NHP) and Sustainable Development Goal (SDG) targets for child mortality.

Methods We assessed the under-5 mortality rate (U5MR) and neonatal mortality rate (NMR) from 2000 to 2017 in 5×5 km grids across India, and for the districts and states of India, using all accessible data from various sources including surveys with subnational geographical information. The 31 states and groups of union territories were categorised into three groups using their Socio-demographic Index (SDI) level, calculated as part of the Global Burden of Diseases, Injuries, and Risk Factors Study on the basis of per-capita income, mean education, and total fertility rate in women younger than 25 years. Inequality between districts within the states was assessed using the coefficient of variation. We projected U5MR and NMR for the states and districts up to 2025 and 2030 on the basis of the trends from 2000 to 2017 and compared these projections with the NHP 2025 and SDG 2030 targets for U5MR (23 deaths and 25 deaths per 1000 livebirths, respectively) and NMR (16 deaths and 12 deaths per 1000 livebirths, respectively). We assessed the causes of child death and the contribution of risk factors to child deaths at the state level.

Who are vulnerable for nutrition?

- Infants and Young Children (<5 years)
- Adolescent Girls
- Pregnant & Lactating Women
- Elderly
- Socio-economically deprived Groups
  - Schedule Castes
  - Schedule Tribes
  - Urban Slum communities

1. Undernutrition: Marasmic child

2. Micronutrient deficiency: Anemai

Triple Burden of Malnutrition

3. Overnutrition: Obesity

What are the Nutrition challenges in India

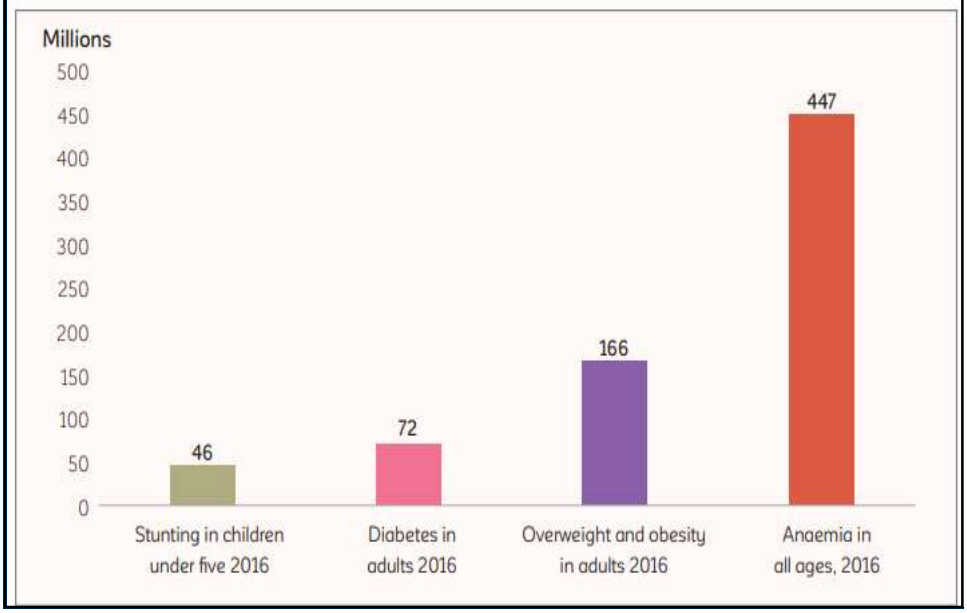
Malnutrition is one of the most important public health Problems, arises either from deficiency or excess or imbalance of a single or various nutrients in the body.

We are facing 'triple burden of disease'

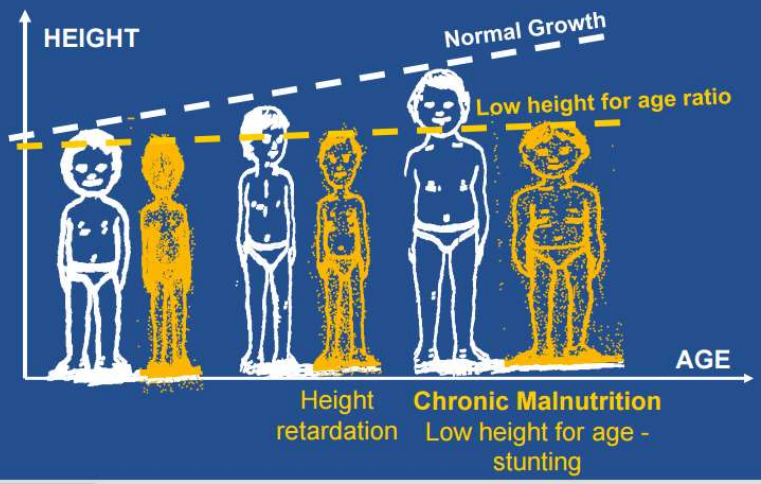
1. **Protein energy malnutrition (PEM)**
   - Low birth weight (LBW)
   - Chronic energy deficiency (CED)
   - Undernutrition – Clinical: Kwashiorkor and Marasmus and Sub-clinical forms: Stunting, wasting, underweight
2. **Micronutrient deficiencies (MND)**
   - Vitamin A deficiency (VAD)
   - Iron deficiency anemia (IDA)
   - Iodine deficiency disorders (IDD)
   - Zinc deficiency disorders
3. **Diet related chronic non-communicable diseases (NCDs)**
   - Overweight and obesity
   - Insulin resistance
   - Type 2 Diabetes
   - Cardiovascular diseases (CVD), hypertension, Cancers etc.

Fact I : Worsening Nutrition Situation Around The World

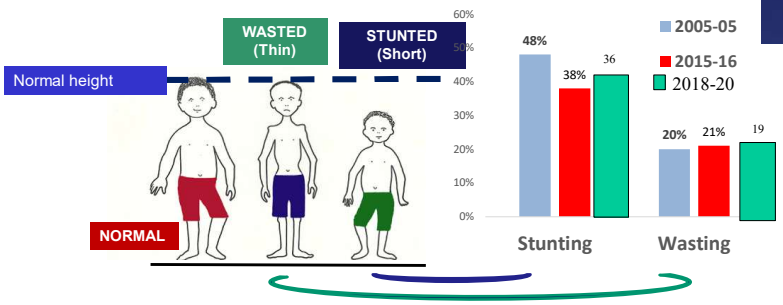
The burden of malnutrition among children and adults in India (in millions)



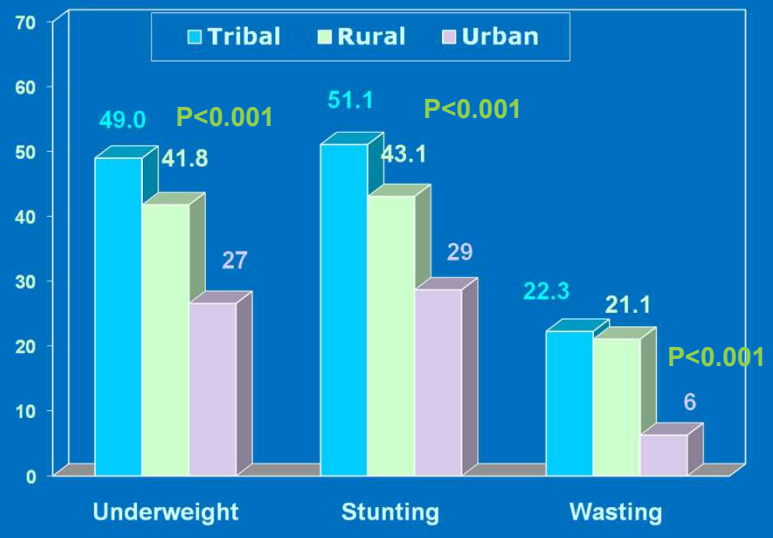
Chronic malnutrition, the best indicator of the quality of life, is a sign of a structural problem



Key issues in childhood undernutrition



Prevalence (%) of undernutrition among Tribal, Rural and urban under five year Children in India



NNMB SURVEYS: Tribal 2008-09, Rural 2011-12 and Urban 2013-15 (Preliminary data)

Received: 10 September 2018 | Revised: 27 March 2019 | Accepted: 4 April 2019
DOI: 10.1111/mcn.12830

ORIGINAL ARTICLE

WILEY Maternal & Child Nutrition

Association between Anthropometric-based and Food-based Nutritional Failure among Children in India, 2015

William Joe[1] | Sunil Rajpal[2] | Rockli Kim[3] | Avula Laxmaiah[4] | Rachakulla Harikumar[4] | Nimmathota Arlappa[4] | Indrapal Meshram[4] | Nagalla Balakrishna[6] | Madhari Radhika[5] | Soumya Swaminathan[7] | S.V. Subramanian[3,8]

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Abstract

Inadequate dietary intake is a critical underlying determinant of child undernutrition. This study examined the association between anthropometric-based and food-based nutritional failure among children in India. We used the 2015–2016 National Nutrition Monitoring Bureau data where anthropometric outcomes and food intake were both measured for each child. We followed the World Health Organization child growth reference standards to define anthropometric failures (i.e., height-for-age *z* score < −2 SD for stunting, weight-for-age *z* score < −2 SD for underweight, and weight-for-height *z* score < −2 SD for wasting), and the Indian Council of Medical Research recommended dietary allowance (RDA) to define adequacy in intake of calorie, protein, and fat. We used descriptive and regression-based assessments to test the association between the two indicators of nutritional failure and also computed the area under the receiver operating characteristic curve (AUC). The prevalence of stunting, underweight, and wasting was 28.6%, 24.3%, and 12.8%, respectively, whereas 78.2%, 27.4%, and 50.8% of the children had below RDA norms consumption of calorie, pr… correlation between anthropo… ging from −0.013 to 0.147) … ing that in

Key messages

- This study found very weak association and poor discriminatory accuracy between food-based failures, as per calorie, protein, and fat intake, and anthropometric-based failures among children in India.
- India continues to experience a high prevalence of inadequate dietary intake, particularly among the disadvantaged population.
- Explicit recognition of dietary intake as part of policy targets can raise socio-political visibility of this important indicator of nutrition.

TABLE 1 Prevalence (%) of stunting, wasting, and underweight among children (6 to 59 months) by macronutrient intake, NNMB

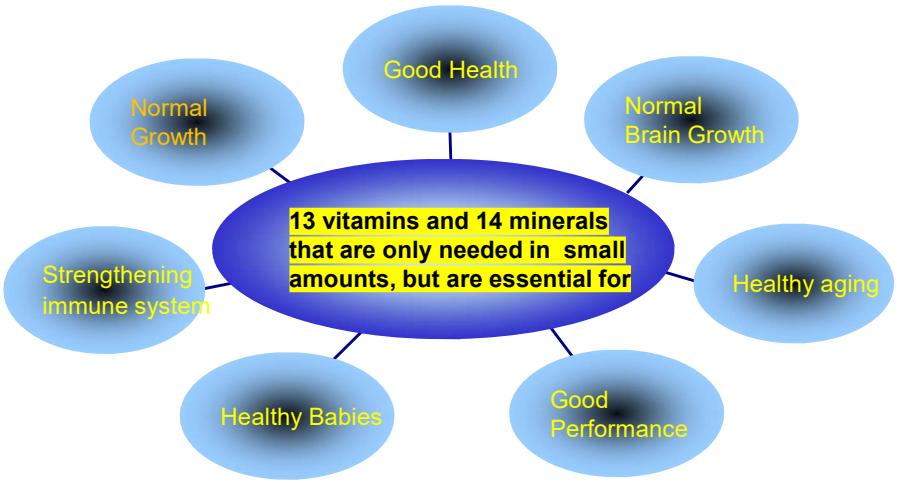
	Prevalence (%)			Mean z score			
Dietary intake	Stunting	Wasting	Underweight	Height-for-age	Weight-for-height	Weight-for-age	*N*
Calorie (kcal)							
Below RDA	30.3	13.5	25.7	−1.30	−0.72	−1.20	1,421
Above RDA	22.2	10.6	19.5	−0.92	−0.62	−0.94	395
Protein (gm)							
Below RDA	38.6	12.8	29.6	−1.52	−0.72	−1.33	497
Above RDA	24.7	12.7	22.4	−1.10	−0.68	−1.01	1,319
Fat (gm)							
Below RDA	33.6	13.3	27.0	−1.37	−0.70	−1.23	923
Above RDA	23.4	12.4	21.6	−1.06	−0.69	−1.06	893
Calorie, protein, and fat							
Below RDA	30.4	13.3	25.6	−1.30	−0.72	−1.20	1,457
Above RDA	21.1	11.1	19.2	−0.91	−0.62	−0.93	359
All	28.6	12.8	24.3	−1.22	−0.69	−1.14	1,816

Note. % SD of *z* scores are based on WHO Reference Group Norms for child anthropometric measurements.

Abbreviations: NNMB, National Nutrition Monitoring Bureau; RDA, recommended dietary allowance.

MICRONUTRIENT DEFICIENCIES

Micronutrients (vitamins and minerals) are essential for many functions and health



They cannot be produced by the body and have to come from the diet only

Micronutrient deficiencies affect

- Foetal and child growth
- Cognitive development
- Resistance to infection

The public health implications of micronutrient deficiencies are potentially huge and significant for its prevention and control of diseases

Most micronutrient deficiencies are usually found amongst

- resource poor population groups
- food insecure and vulnerable households in developing countries

Key risk factors

- Poverty
- Lack of access to a variety of foods
- Lack of knowledge of appropriate dietary practices
- High incidence of infectious diseases

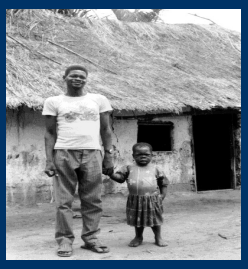
Micronutrient Deficiencies

The Ugly Face of "Hidden Hunger"

Iron Deficiency

Folic Acid Deficiency

Vitamin A Deficiency



Iodine Deficiency

Zinc Deficiency

Public Health Nutr. 2012 Apr;15(4):568-77. doi: 10.1017/S136898001100214X. Epub 2011 Sep 2.

Prevalence of ocular signs and subclinical vitamin A deficiency and its determinants among rural pre-school children in India

Avula Laxmaiah [1], Madhavan K Nair, Nimmathota Arlappa, Pullakhandam Raghu, Nagalla Balakrishna, Kodavanti Mallikharjuna Rao, Chitty Galreddy, Sharad Kumar, Manachala Ravindranath, Varaganti Vikas Rao, Ginnela N V Brahmam

Affiliations + expand

PMID: 21884647 DOI: 10.1017/S136898001100214X

Abstract

Objective: To assess the magnitude and determinants of vitamin A deficiency (VAD) and coverage of vitamin A supplementation (VAS) among pre-school children.

Design: A community-based cross-sectional study was carried out by adopting a multistage, stratified, random sampling procedure.

Setting: Rural areas of eight states in India.

Subjects: Pre-school children and their mothers were covered.

IRON DEFICIENCY ANAEMIA

a major nutritional problem

ANAEMIA IS MOST COMMON AMONG PREGNANT WOMEN AND LACTATING MOTHERS

Causes

- Low iron, folate intake in pregnant, lactation
- Blood loss
- Hookworm infestation
- Increased needs in pregnancy lactation

consequences

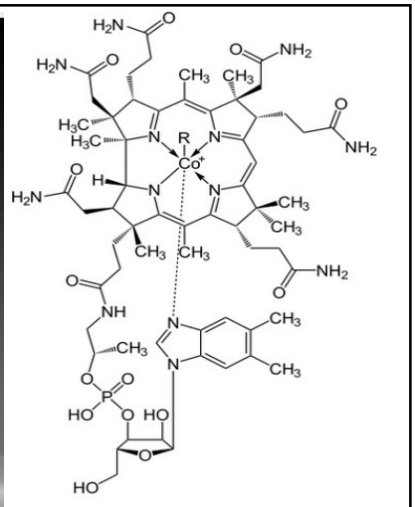
- Fatigue
- Low work efficiency, productivit
- Maternal deaths
- Pregnancy wastage
- Premature delivery
- Low birth weight babies

ANAEMIA ASSESSMENT IS MADE THROUGH

Standard method in clinic

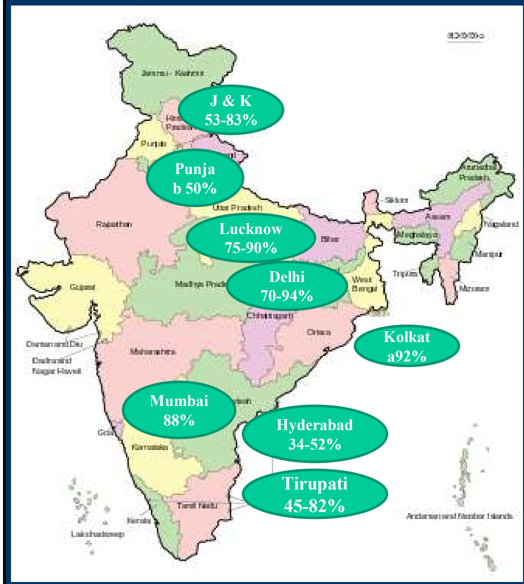
Filter paper method in the field

Folifer tablet distribution



ICMR-NIN and 4 partner Institutes carried out B12 study during 2017-21 was conducted in 8 states of India: Prevalence of B12 deficiency was 25%

Prevalence of vitamin D deficiency in India



- High prevalence of vitamin D deficiency (serum 25 (OH) vitamin D3 < 20 ng/ml) found in studies across the country
- Vitamin D deficiency: high prevalence in women especially during pregnancy & lactation was observed

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Original Paper

Annals of Nutrition & Metabolism

Ann Nutr Metab 2013;62:231–241
DOI: 10.1159/000348674

Received: January 7, 2012
Accepted after revision: February 4, 2013
Published online: April 6, 2013

Prevalence and Determinants of Micronutrient Deficiencies among Rural Children of Eight States in India

Avula Laxmaiah[a] Nimmathota Arlappa[a] Nagalla Balakrishna[b]
Kodavanti Mallikarjuna Rao[a] Chitty Galreddy[a] Sharad Kumar[a]
Manachala Ravindranath[a] Ginnela N.V. Brahmam[a]

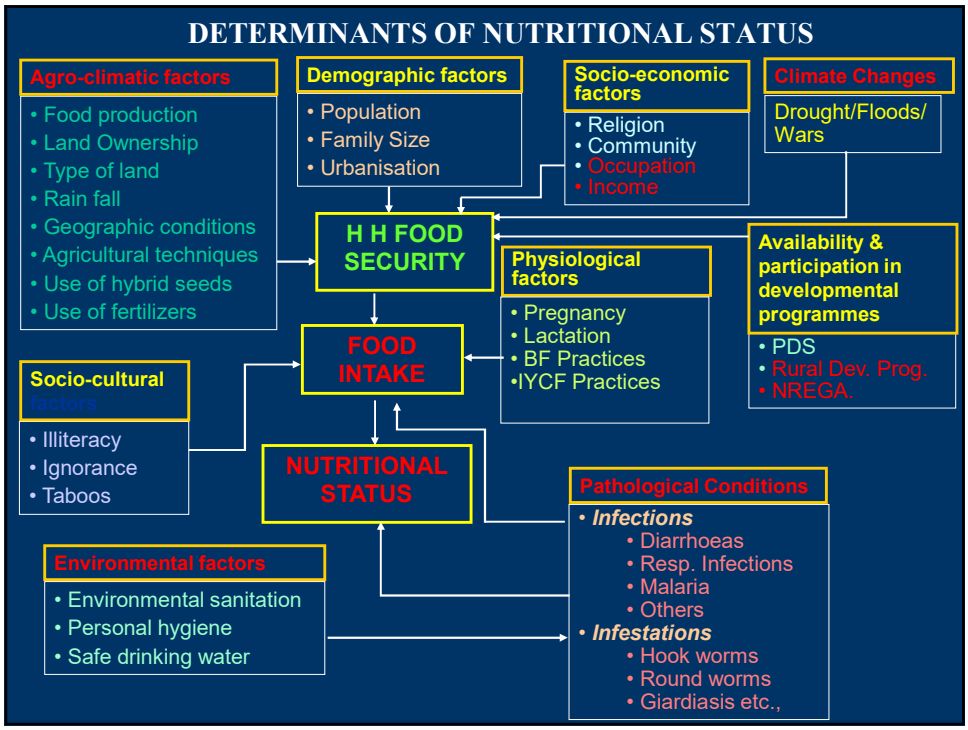
Divisions of [a]Community Studies and [b]Biostatistics, National Institute of Nutrition, Indian Council of Medical Research (ICMR), Hyderabad, India

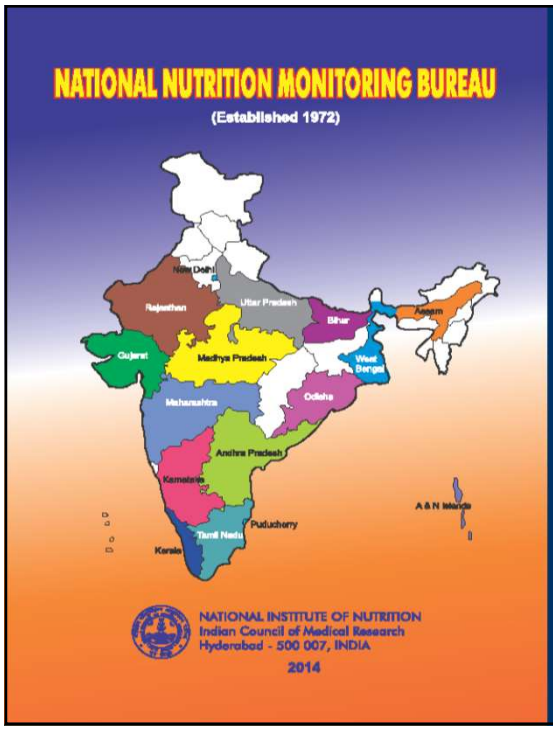
Key Words
Micronutrient deficiencies · Vitamin A deficiency · Bitot's spots · Anemia · Iodine deficiency disorders · Preschool and school-age children · Adolescents

Abstract
Background/Aims: Micronutrient deficiencies continue to be a major public health problem in India. The aim of this study was to assess the prevalence and determinants of mi-

children who used sanitary latrines. ***Conclusions:*** Micronutrient malnutrition is a public health problem among rural children, and it was higher among children of SC/ST, illiterate parents and those not possessing a sanitary latrine. Thus, there is a need to improve environmental sanitation; fortification of foods could also help in mitigating the problem.

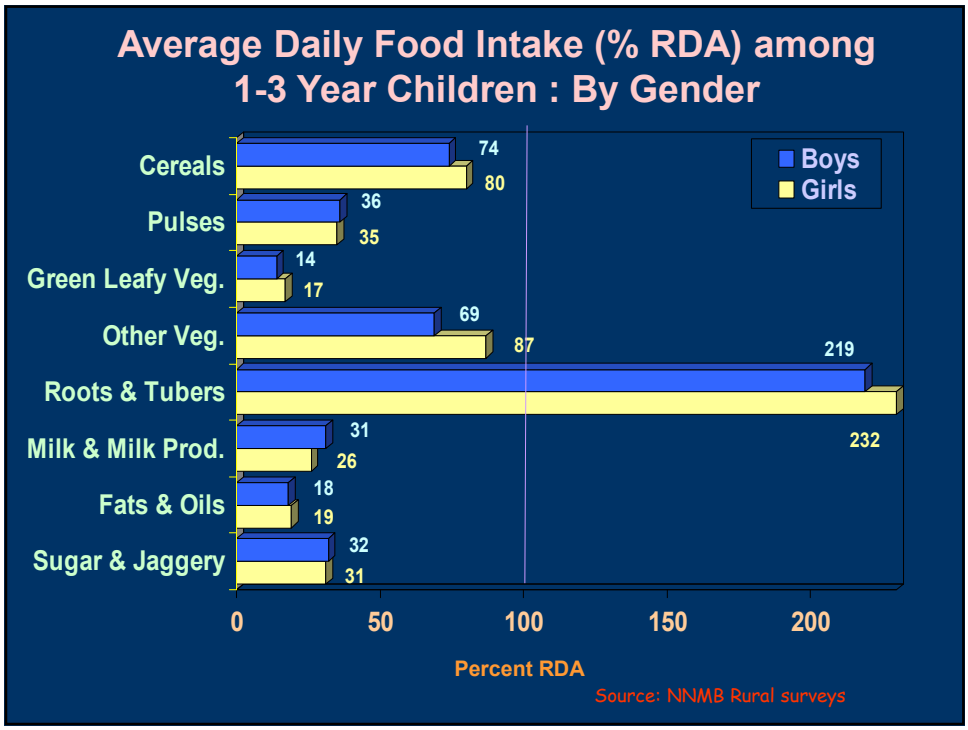
Introduction

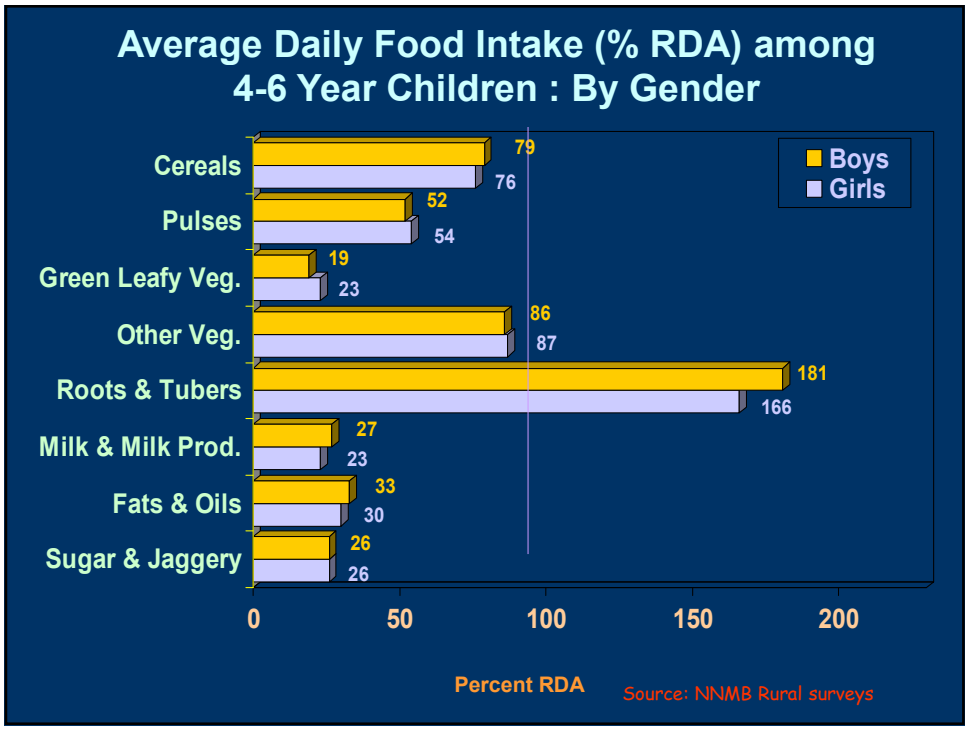


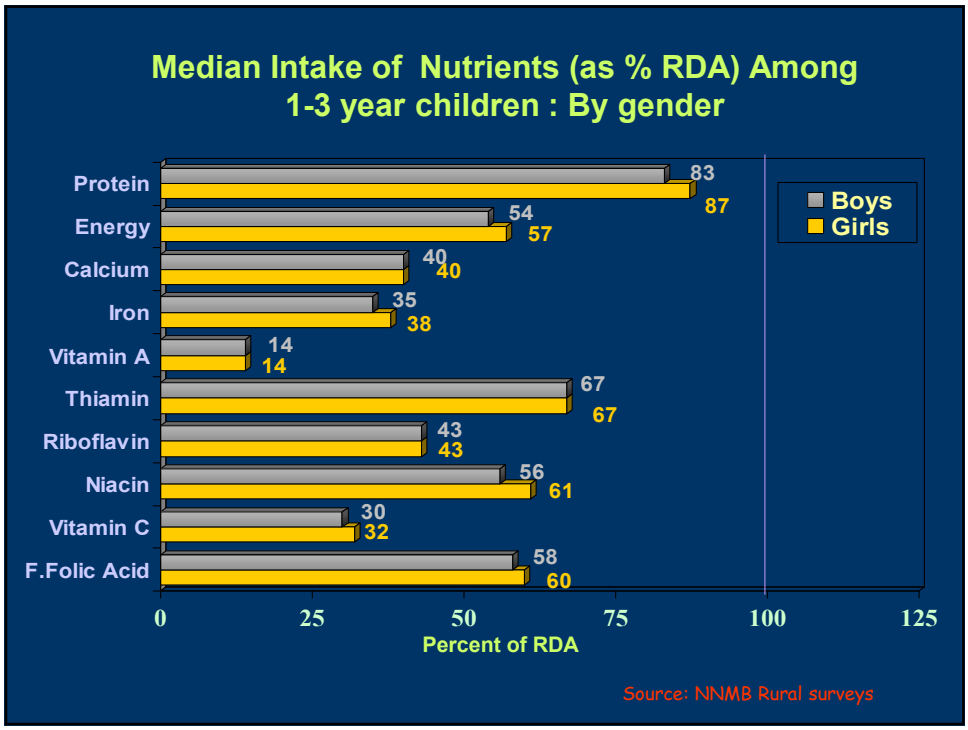


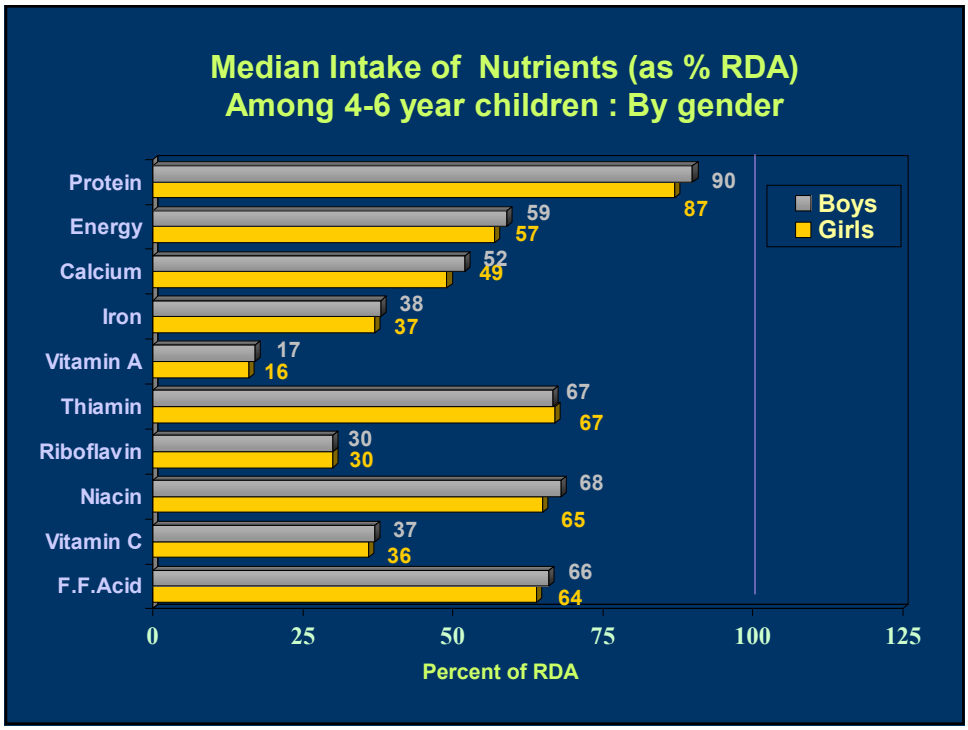
NNMB surveys estimated consumption levels of sugars, salts and fats in the states of……

- ANDHRA PRADESH
- KARNATAKA
- KERALA
- TAMIL NADU
- MAHARASHTRA
- MADHYA PRADESH
- ORISSA
- UTTAR PRADESH
- GUJARAT AND
- WEST BENGAL

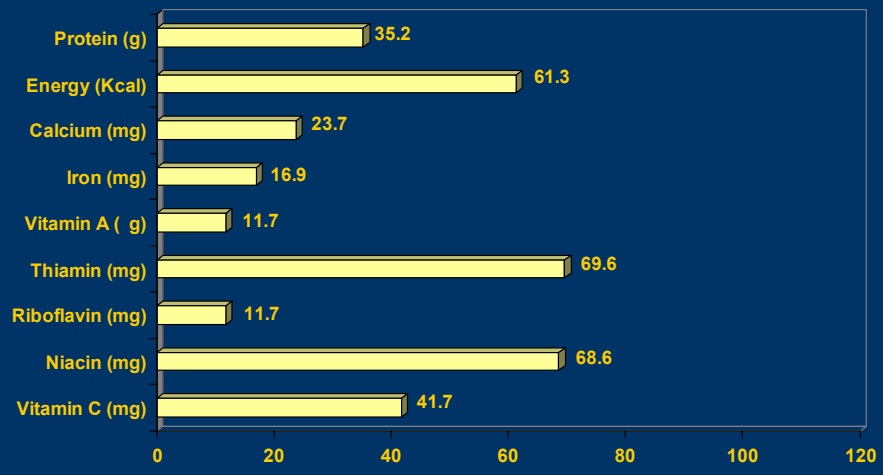

Average Daily Food Intake (% RDA) among 1-3 Year Children : By Gender
Cereals
Pulses
Green Leafy Veg.
Other Veg.
Roots & Tubers
Milk & Milk Prod.
Fats & Oils
Sugar & Jaggery
74
80
36
35
14
17
69
87
219
232
31
26
18
19
32
31
Boys
Girls
0
50
100
150
200
Percent RDA
Source: NNMB Rural surveys


Average Daily Food Intake (% RDA) among 4-6 Year Children : By Gender
Cereals
Pulses
Green Leafy Veg.
Other Veg.
Roots & Tubers
Milk & Milk Prod.
Fats & Oils
Sugar & Jaggery
79
76
52
54
19
23
86
87
181
166
27
23
33
30
26
26
Boys
Girls
0
50
100
150
200
Percent RDA
Source: NNMB Rural surveys


Median Intake of Nutrients (as % RDA) Among 1-3 year children : By gender
Protein
Energy
Calcium
Iron
Vitamin A
Thiamin
Riboflavin
Niacin
Vitamin C
F.Folic Acid
83
87
54
57
40
40
35
38
14
14
67
67
43
43
56
61
30
32
58
60
Boys
Girls
0
25
50
75
100
125
Percent of RDA
Source: NNMB Rural surveys

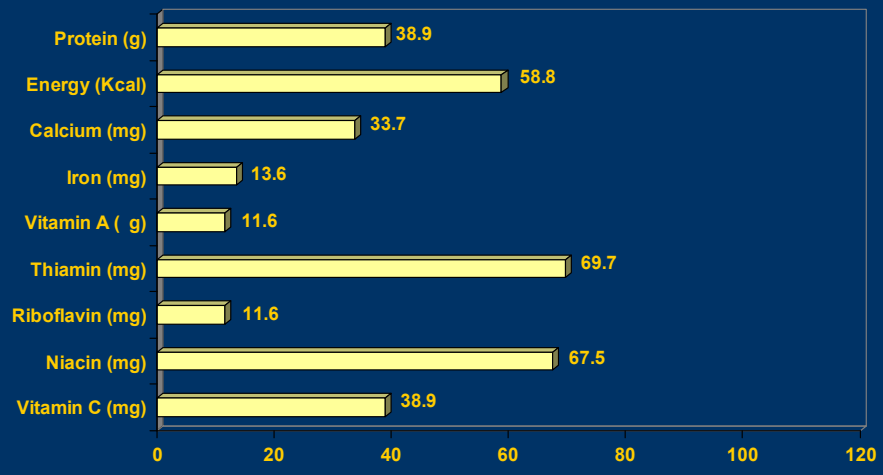

Median Intake of Nutrients (as % RDA) Among 4-6 year children : By gender
Protein
Energy
Calcium
Iron
Vitamin A
Thiamin
Riboflavin
Niacin
Vitamin C
F.F.Acid
90
87
59
57
52
49
38
37
17
16
67
67
30
30
68
65
37
36
66
64
Boys
Girls
0
25
50
75
100
125
Percent of RDA

Median Intake (per day) of Various Nutrients >70% of RDA: 13-15 Year Girls



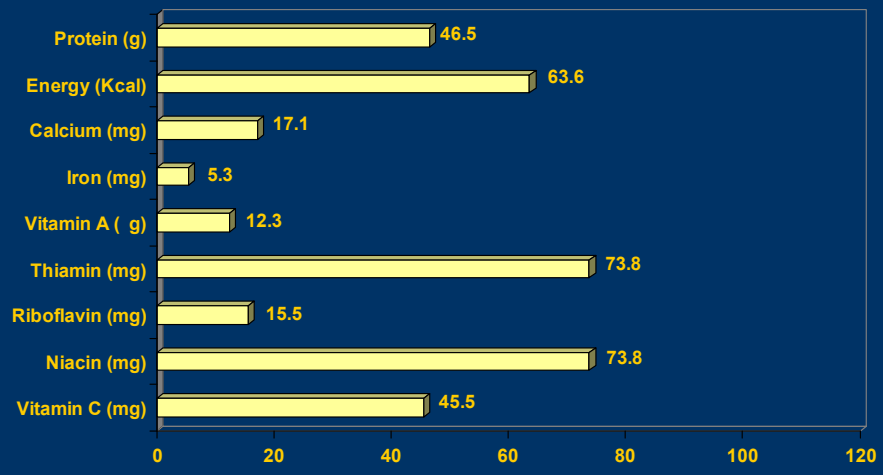
Laxmaiah et al 2006

Median Intake (per day) of Various Nutrients >70% of RDA: 16-17 Year Girls



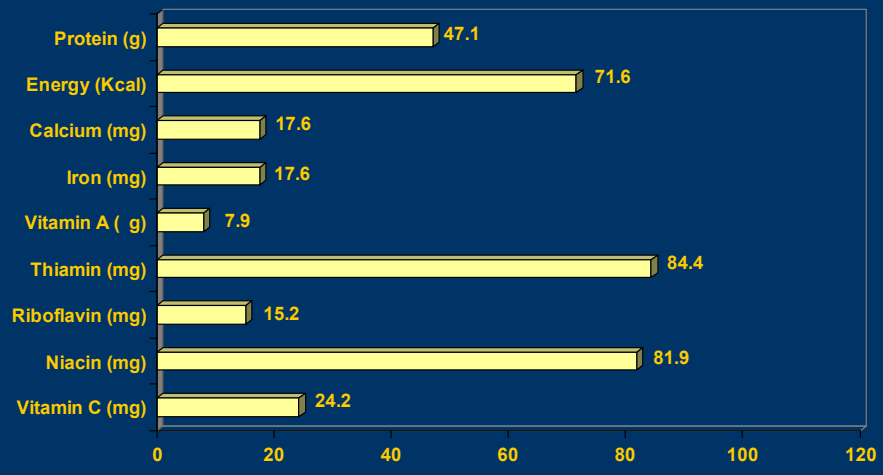
Laxmaiah et al 2006

Median Intake (per day) of Various Nutrients >70% of RDA: Pregnant women

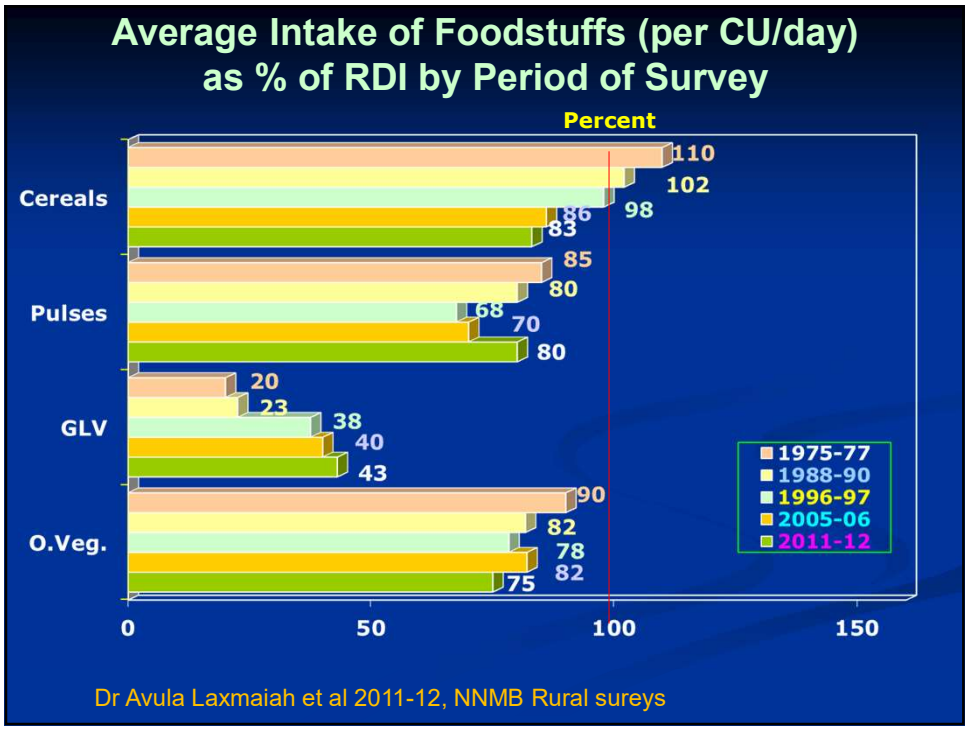


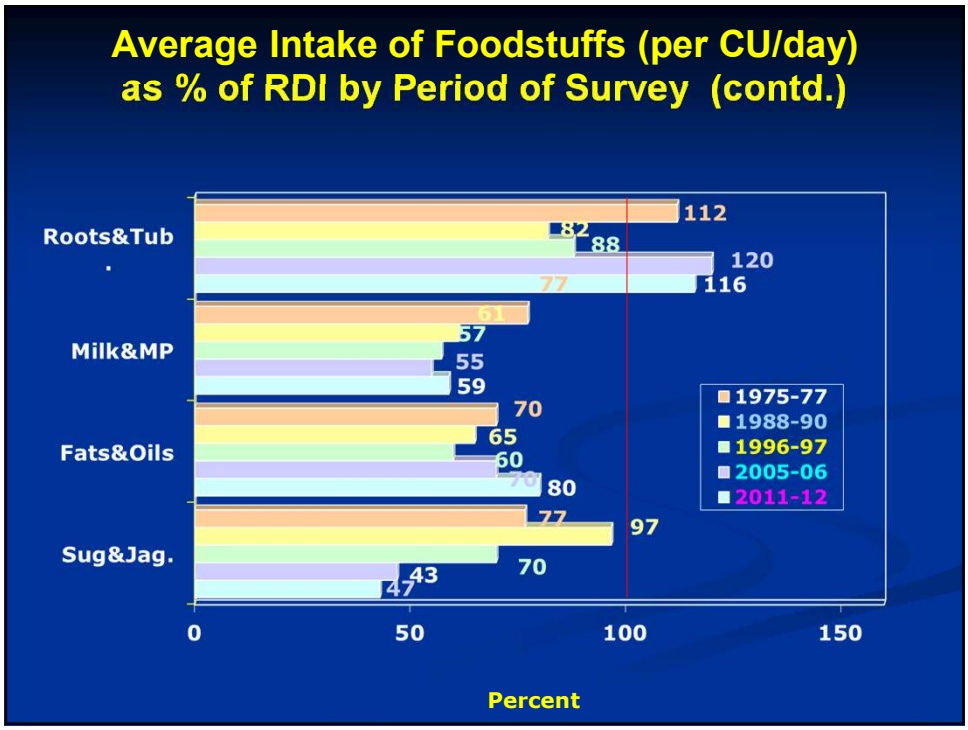
Laxmaiah et al 2006

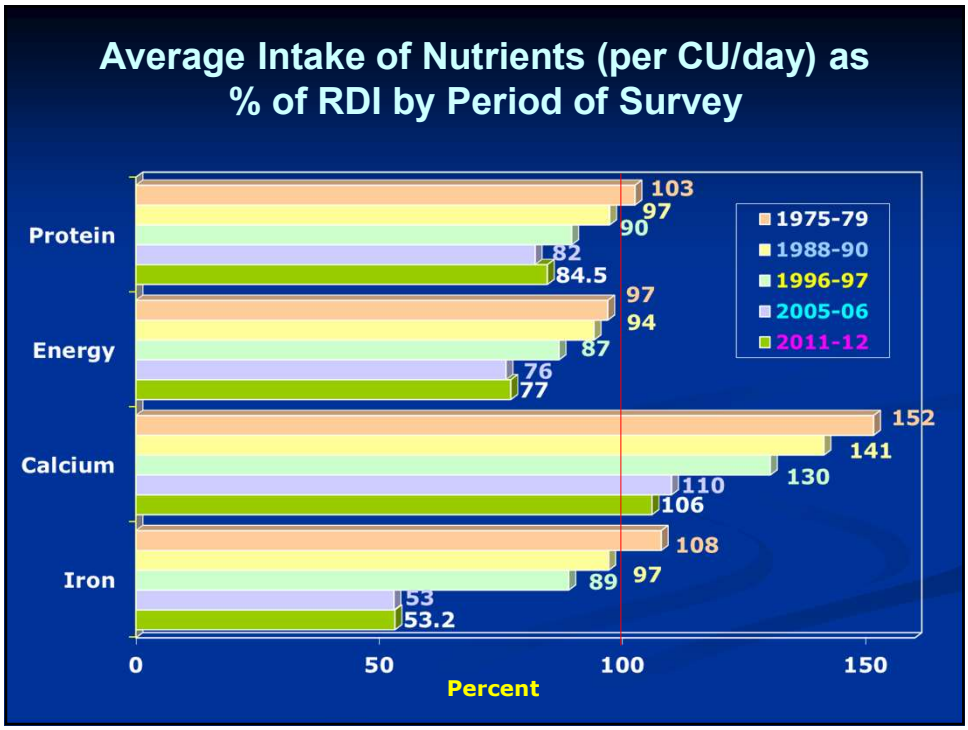
Median Intake (per day) of Various Nutrients >70% of RDA: Lactating mother

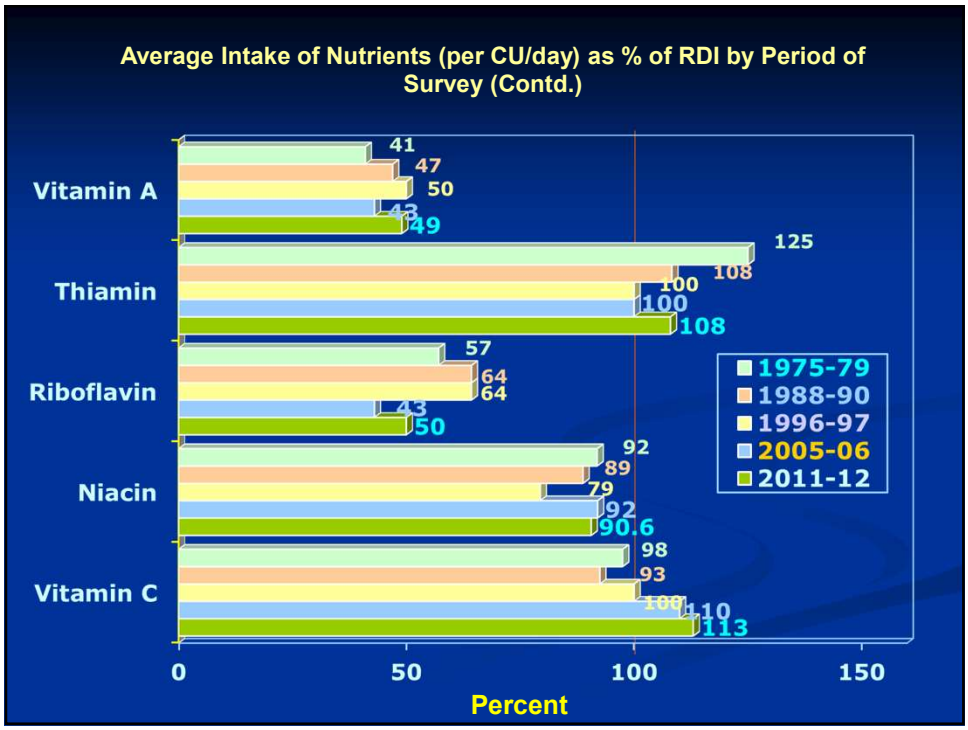


Laxmaiah et al 2006


Average Intake of Foodstuffs (per CU/day) as % of RDI by Period of Survey
Percent
Cereals
110
102
98
86
83
Pulses
85
80
68
70
80
GLV
20
23
38
40
43
O.Veg.
90
82
78
82
75
1975-77
1988-90
1996-97
2005-06
2011-12
0
50
100
150
Dr Avula Laxmaiah et al 2011-12, NNMB Rural sureys

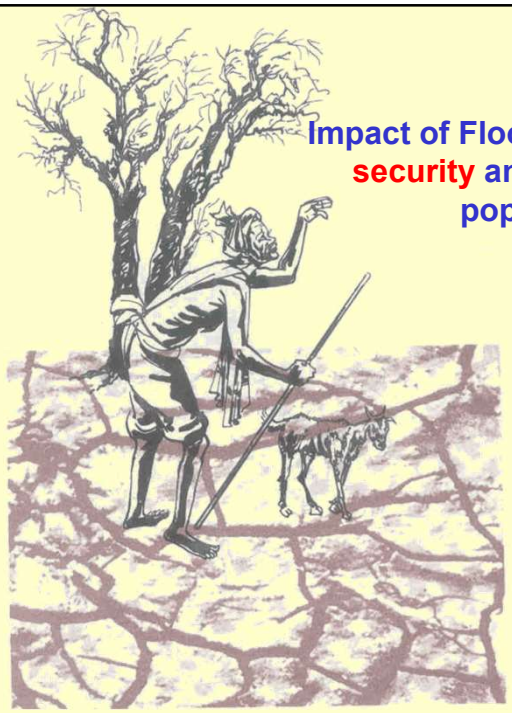

Average Intake of Foodstuffs (per CU/day) as % of RDI by Period of Survey (contd.)
Roots&Tub.
112
82
88
120
77
116
Milk&MP
61
57
55
59
Fats&Oils
70
65
60
80
Sug&Jag.
77
97
70
43
47
1975-77
1988-90
1996-97
2005-06
2011-12
0
50
100
150
Percent


Average Intake of Nutrients (per CU/day) as % of RDI by Period of Survey
Protein
Energy
Calcium
Iron
103
97
90
82
84.5
97
94
87
76
77
152
141
130
110
106
108
89
97
53
53.2
1975-79
1988-90
1996-97
2005-06
2011-12
0
50
100
150
Percent


Average Intake of Nutrients (per CU/day) as % of RDI by Period of Survey (Contd.)
Vitamin A
Thiamin
Riboflavin
Niacin
Vitamin C
41
47
50
43
49
125
108
100
100
108
57
64
64
43
50
92
89
79
92
90.6
98
93
106
110
113
1975-79
1988-90
1996-97
2005-06
2011-12
0
50
100
150
Percent

Climate change adding to the problem of existing Food Insecurity

- Food security is already a significant challenge
- All else equal, climate change is likely to worsen global food security
- There are clear steps that can be taken to help mitigate the anticipated challenges to food security attributable to climate change



Impact of Floods and Drought on Food security and Nutritional status of population in India

Drought 2001-2002

Natural calamities like drought /Floods /Famines/ Cyclones/ Earth quakes are known to affect adversely the country's economy in terms of

Agricultural production
Agro based industrial out put
Rural employment
Purchasing power

Household food insecurity
Migration
Large scale displacement / death of cattle/ Human beings

Prevalence of Under nutrition
Epidemic of diseases and mortality

DROUGHT IMPACT ON NUTRITION IN INDIA

NIN/NNMB Study Findings

- **National Nutrition Monitoring Bureau (NNMB) surveys have shown that even normal circumstances, within the rural groups including the Scheduled Castes and Scheduled Tribal population, landless labourers , small and marginal farmers consume nutritionally inferior diets.**
- **During the earlier episodes of drought, average calorie consumption in affected areas of Andhra Pradesh, Bihar and Maharashtra was observed to be ranging from 1100 – 1400 Kcal per day – a level barely sufficient to meet the basic bodily needs.**

Per cent of families consumed < 500 Kcal per capita per day(Starvation diet)

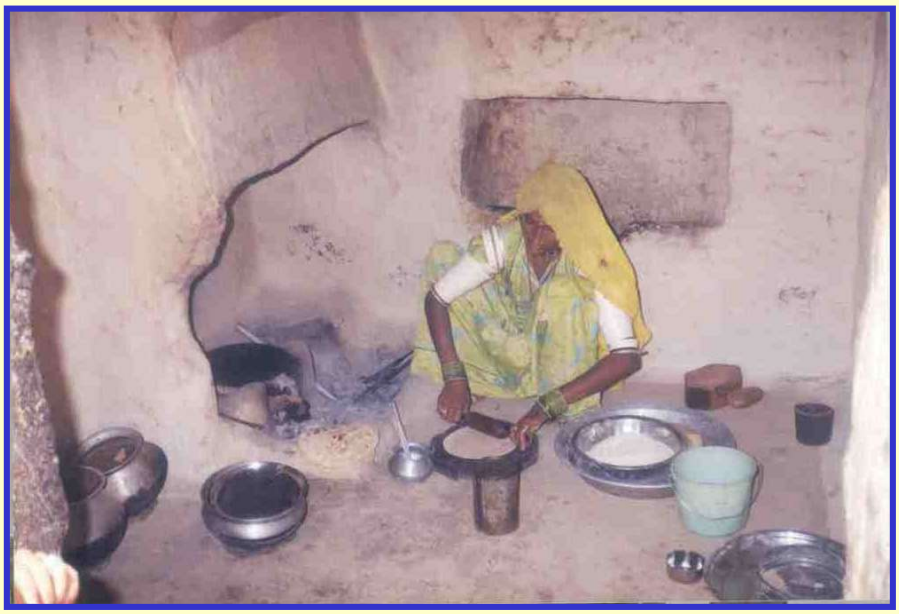
Andhra Pradesh	(1967)	26.1%
Bihar	(1969)	8.2%
Maharashtra	(1974)	3.8%

Prevalence of clinical signs of nutritional deficiency(0-5 Yrs Children)

Clinical signs	Andhra Pradesh	Bihar	Maharashtra
Marasmus	6.0	10.6	2.4
kwashiorkor	2.0	0.8	1.6
Conj.Xerosis	4.2	3.3	30.0
Bitot spots	3.0	4.5	4.0

The State Rajasthan experienced drought conditions in the beginning of new millennium continuously for 2-3 years.

At the request of Ministry of Agriculture,GOI and ICMR,the present survey was carried out with an objective to assess the nutritional status of the community in drought affected areas of Rajasthan.



AVERAGE HOUSEHOLD CONSUMPTION (g/CU/day) OF FOODSTUFFS

Food Group	Mean intake			RDI (ICMR,1981)
	Drought 2003	Drought 2000	Rajasthan DWCD 1998	
n	299	200		
Cereals &Millets	357	489	483	460
Pulses & Legumes	5	23	29	40
Green Leafy Vegetables	0	2	24	40
Roots & Tubers	73	54	79	50
Other Vegetables	17	12	45	60
Milk & Milk Products	77	150	198	150
Fats & Edible Oils	14	13	22	20
Sugar & Jaggery	22	21	25	30

AVERAGE HOUSEHOLD INTAKE (CU/ day) OF NUTRIENTS

Nutrients	Mean intake			RDI
	Drought 2003	Drought 2000	Rajasthan DWCD 1998	
n	299	200		
Protein (g)	61	71	76	60
Total Fat (g)	27	36	46	40
Energy (Kcal)	1827	2163	2386	2425
Calcium (mg)	441	517	734	400
Iron (mg)	24	33	30	28
Vitamin A (µg)	127	213	400	600
Thiamin (mg)	2.1	2.3	2.6	1.2
Riboflavin (mg)	1.0	1.3	1.2	1.4
Niacin (mg)	18	18	21	16
Vitamin C (mg)	14	18	46	40
Free Folic Acid (µg)	63	46	-	100

J. Hum. Ecol., 14(3): 153-158 (2003)

Diet and Nutrition During Drought in Western Rajasthan, India

K. Mallikharjuna Rao, A. Laxmaiah, M. Ravindranath, K. Venkaiah, D. Hanumantha Rao, G.N.V. Brahmam and K. Vijayaraghavan

Table 1: Distribution (%) of households by current sufficiency of different food groups as perceived by the head of household - districts pooled

Food group	*Perception of head of household*	
	Sufficient	*Insufficient*
Cereals & Millets	84.8	15.2
Pulses	63.1	36.9
Vegetables	52.7	47.3
Milk and Milk products	77.4	22.6
Fats & Oils	67.9	32.1

Number of households=393

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Table 3: Distribution of households according to different coping strategies adopted during drought-districts pooled

*Coping Strategies**	*Per cent*
Use food stocks/money/savings	39.4
Purchase low cost food items	31.0
Borrow cash/food from neighbors	51.4
Gather food from surrounding areas	2.8
Seek additional employment	12.2
Seek or obtain government assistance	5.1
Reduce food consumption	35.6
Migration	8.1
Sell household or business assets to obtain income or food	9.4
Others	0.8

Number of households=393 * Multiple responses

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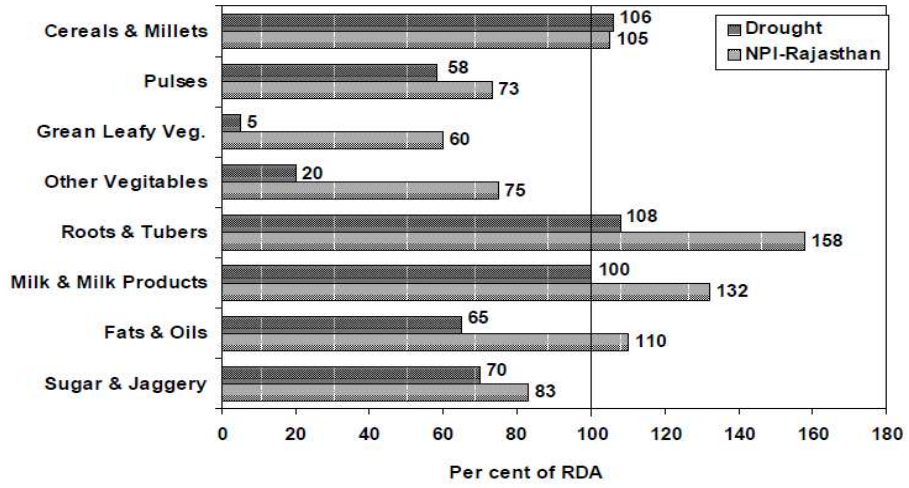


Fig. 1. Mean in take of food stuffs (g/CU/day) as per cent of RDA

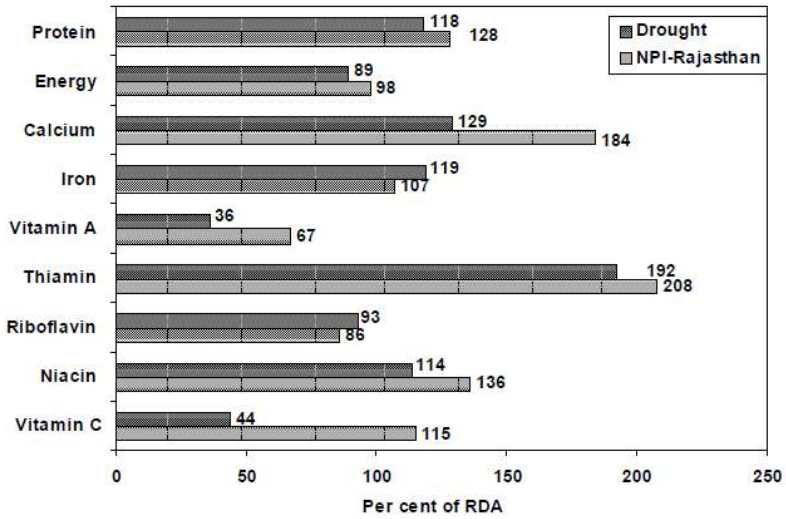


Fig. 2. Mean intake of Nutrients (CU/day) as per cent of RDA

Table 5: Distribution of adults according to BMI classification – districts pooled

BMI	*Males*		*Females*	
	Drought	*Non-drought**	*Drought*	*Non-drought**
N	603	-	1019	-
<16.0	10.1	**12.0**	8.4	**12.2**
16.0-17.0	13.3	**11.9**	9.4	**10.9**
17.0-18.5	25.5	**22.7**	22.0	**21.4**
18.5-20.0	20.2	**19.7**	22.6	**21.0**
20.0-25.0	26.2	**31.1**	32.0	**32.3**
25.0-30.0	3.6	**2.5**	5.1	**2.2**
³ **30.0**	**1.0**	0.1	**0.5**	0.0

* Nutrition Profile of Indians (DWCD)

COMMENTS

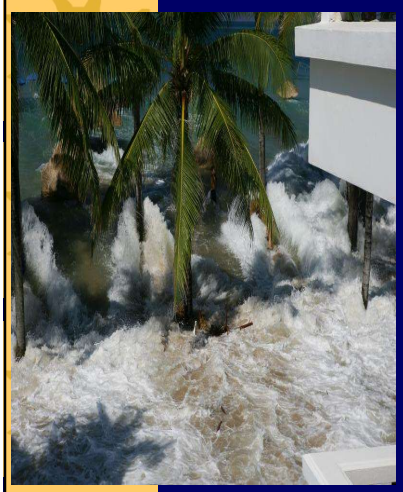
- **A significantly higher proportion of households were having food insecurity during drought among Scheduled Castes and Scheduled Tribe communities,landless, small and marginal farmers.**
- **The impact of lack of food security was reflected as higher incidence of under nutrition in the population.**
- **However, availability of subsidized food grains through PDS, accessibility to purchase food through provision of employment under SGRY etc., might have averted the population from severe nutritional stress.**

- **There is a need to develop long term strategy for the management of recurrent drought conditions through an integrated policy of water and land management linked to employment.**
- **Strengthening of short term approach include crash programme of employment,supply of food, fodder and drinking water and provision of health and veterinary care to meet any emergencies is also equally important**.

Early warning indicators for disaster preparedness :

- Meteorological/agricultural production indicators (eg.,rainfall data, agro-meteorological data, crop forecasts,grazing conditions,livestock condition etc.,)
- Socio- economic indicators(eg., price movements of staple foods,livestock and household assets, abnormal migrations etc.,)
- Nutrition and health indicators.

Health and Nutrition status of Tsunami affected population living in the relief camps in Andaman & Nicobar Islands



A.Laxmaiah, Ch.Gal Reddy, Sharad Kumar, K.Venkaiah and GNV. Brahmam

National Institute of Nutrition, Jamai-Osmania (Post), Hderabad – 500 007, India

Deaths and missing subjects: Nicobar District

Island	Population	Deaths Identifed	Missing confirmed	Medical professionals deployed
Car Nicbar	20, 292	270	580	16
Chowra	1385	41	15	5
Terrassa	2026	45	6	5
Katchal	5312	1	1529	5
Noncowry	927	-	2	3
Kamorta	3412	1	376	2
Gr. Nicobar	7566	19	536	5
Sub-total (A)	40, 920	377	3044	41

Deaths and missing subjects: Andaman District

Island	Population	Deaths Identifed	Missing confirmed	Medical professionals deployed
South Andaman	2, 96, 556	7	-	18
Little Andaman	17, 528	41	16	6
Sub-total (B)	3, 14, 084	48	16	24
Grand Total (A+B)	3, 55, 004	425	3060	65

Relief Measures include

(In association with several National/international Govts./NGOs)

Provision of Rations (Per Person/Day)

500 g of Rice, 100g of Pulses, 300g Veg.
50g Milk Powder, 40g Oil, 30g Sugar.

Other Essentials

Tarpaulin tents, clothes, blankets, utensils, mosquito nets, soaps & detergents.

In addition, efforts were also put to complete construction of temporary shelters before onset of monsoon and simultaneously started construction of permanent shelters.

Relief Measures include

(Contd..)

- Ex-gratia of Rs 1,00,000 for the families of dead/ missing.
- Rs 10,000 for loss of Property/petty business.
- Food for work programme was under implementation in all the affected villages.
- Vocational training such as tailoring was imparted.
- Necessary sports/games and entertainment facilities were provided.

Investigations

- Measurement of heights and weights of selected individuals
- Clinical examination of all those covered for anthropometry for the presence of nutritional deficiency signs,
- History of morbidity during the previous fortnight,
- Weighment and Institutional diet survey was carried out.
- Finger prick blood samples collected on sub-sample of individuals for estimation of Hb and serum vitamin A.

Collecting of finger prick blood sample on special filter paper

Conclusions

- The intake of protective foods such as GLV, other vegetables and MMP was low.
- This was reflected in low intake of micronutrients such as Iron, Calcium, Vitamin A, Riboflavin, Niacin, Vitamin C, Folic acid and low serum vitamin A level.
- Relatively better intake levels of macronutrients (protein and energy) which was reflected in lower levels of prevalence of undernutrition in different age groups as indicated by various anthropometric indices.

Conclusions (contd..)

- The Nicobarese are nutritionally better off, Compared to the settlers across all age groups.
- The nutritional status of the Settlers was closer to the rural mainlanders.
- Prevalence of various morbidities among population studied was relatively low.
- No epidemic was reported in these areas.

Impact of relief measures

The timely and efficient implementation of relief measures by the A&N administration along with National and International NGO's significantly contributed in the prevention of deleterious effects floods generally encountered and loss of property.

Recommendations

- Improvement of micronutrient status of the community, especially preschool children by increase in the coverage of IFA and massive dose of vitamin A.
- Supplementation micronutrient fortified biscuits to preschool children under ICDS, initiated by UNICEF may be strengthened and extended to all areas.

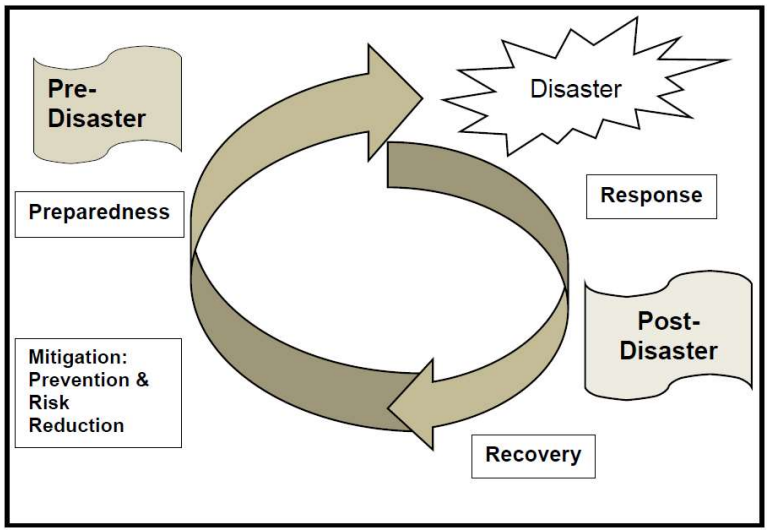
Recommendations (contd..)

- Community to be educated to grow and consumption of protective foods.
- Change of lifestyle through nutrition education among Nicobarese due to overweight/obesity, especially in adults and adolescents.

Action of the Administration

After receiving our recommendations by the Andaman & Nicobar Administration, have started the IFA tablets distribution and coverage of massive dose of vitamin A by a campaign approach. This indicate the promptness of the Administartion.

CLIMATE CHANGE MITIGATION



Climate-sensitive elements of the food system

COMPONENT

- **Photosynthesis** (temperature & soil moisture)
- **Weeds**
- **Pests**
- **Pathogens**
- **Floods, storms**
- **Droughts**
- **Conflict**
- **Poverty**
- **Transport**
- **Processing**
- **Distribution**
- **Storage**
- **Preparation**

Basic current modeling

Food yield

Stability of food supply

Access to food

Food end-use

NDMA – MINISTRY OF DEFENCE, GOVT. OF INDIA

P R R M

There are environmental aspects, strategies and tools that need to be considered at every stage of the disaster cycle

What is Disaster Management?

Preparedness -- activities prior to a disaster.
Examples: preparedness plans; emergency exercises/training; warning systems.

Response -- activities during a disaster.
Examples: public warning systems; emergency operations; search and rescue.

Recovery -- activities following a disaster.
Examples: temporary housing; claims processing and grants; long-term medical care and counseling.

Mitigation - activities that reduce the effects of disasters.
Examples: building codes and zoning; vulnerability analyses; public education.

Source: Information and Communication Technology in Disaster Risk Management - presentation prepared by Sujit Mohanty, Manager-Disaster Information Systems, GOI-UNDP Programme, Ministry of Home Affairs, GOI, 2005

Development of DRR plan for food and Nutrition Security

Steps to improve future food security

- Improve governance & leadership
- Secure food entitlement
- Pursue & encourage technological breakthroughs
  - Water quantity & water quality
  - More investment in research for sustainable agriculture

Steps to improve future food security

- **Address food demand & supply**
  - Population growth not 'fixed': can be reduced by reducing global inequality
  - Limit meat consumption to 90 grams/day
- **Improve food production models**
  - Account for likely climate change impacts
- **Pursue climate change mitigation**

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Thank You.