

shiree

STIMULATING HOUSEHOLD IMPROVEMENTS RESULTING IN ECONOMIC EMPOWERMENT



UNIVERSITY OF
CAMBRIDGE

Monitoring the changes in socio-economic & nutritional status of extreme poor households

– Methods behind the
longitudinal panel survey

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shiree Change Monitoring System (CMS)

shiree has robust surveys - monitoring and evaluation structure

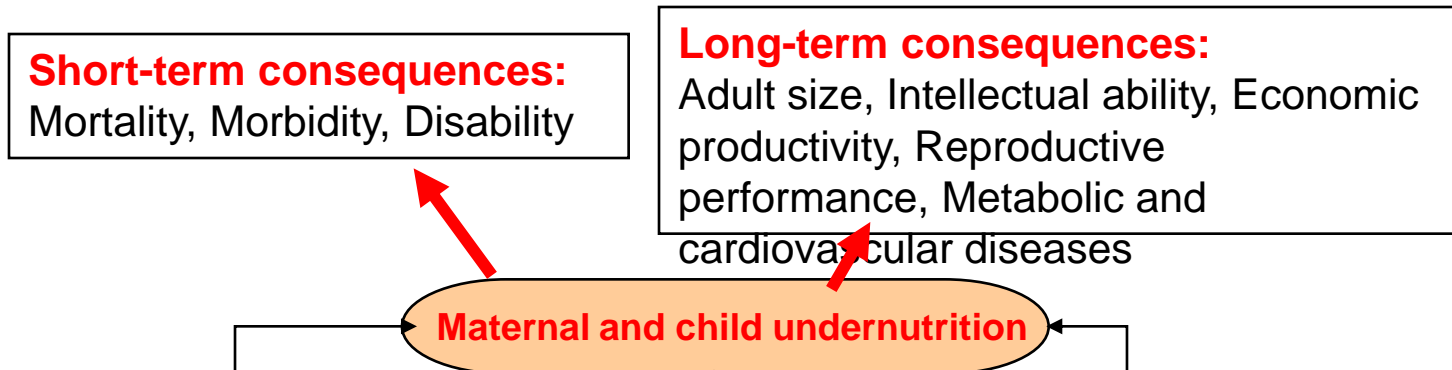
CMS 1	The Household Profile	To provide the baseline from which to monitor change over time – all beneficiaries
CMS 2	Monthly Snapshot	To enable an assessment of trends monthly – all beneficiaries
CMS 3	Socio-economic and Anthropometric Surveys	To provide in depth socio-economic and nutritional data allowing an assessment of longer term change and the impact of project interventions – random sample in Scale Fund NGO beneficiaries
CMS 4	Participatory Review and Project Analysis	To provide a forum for beneficiaries to explain changes in their lives and the reasons for these changes, as well as creating a platform for Innovation Fund NGOs to adapt and improve their innovations according to the needs of beneficiaries – group discussion in Innovation Fund NGO beneficiaries
CMS 5	Tracking Studies	To provide quality longitudinal tracking studies documenting the dynamics of extreme poverty as it is experienced and changes in beneficiaries' lives as a result of project interventions – small selection of beneficiaries

Shiree Change Monitoring System (CMS)

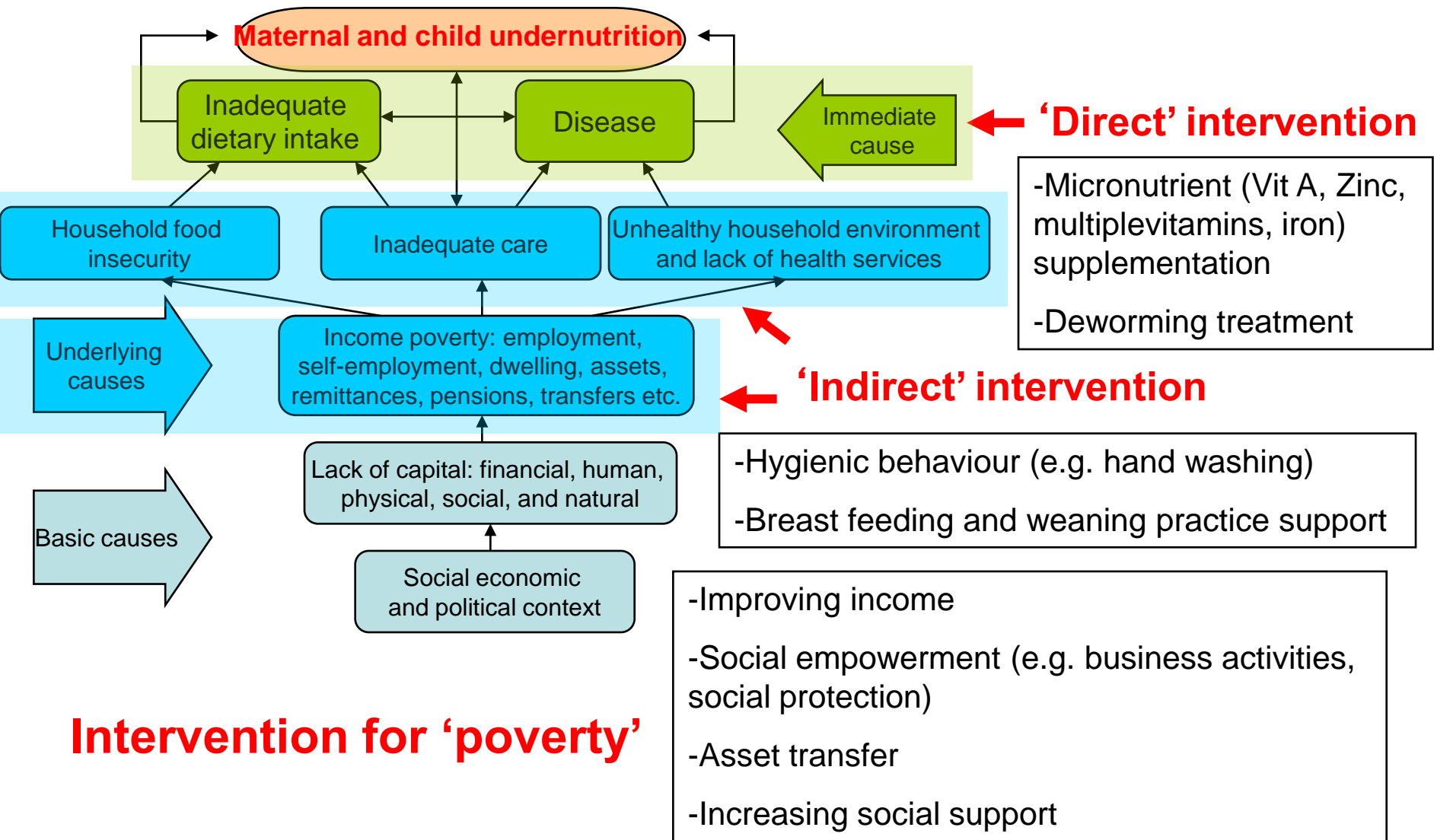
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Background of Undernutrition



So **how** can we improve nutritional status?



shiree Scale Fund Rounds One and Two NGOs

NGOs	Activities	Round 1 Phase I	Round 1 Phase II	Round 2
CARE 	'Social and Economic Transformation of the Ultra-Poor'	20,000 HHs	20,000	
Uttaran 	'Integrated Approach to Transferring Khas Land, Skills and Assets'	12,000	15,000	
NETZ 	'Advancement of Marginalised Adivasis Deprived of Economic Resources'	9,000	9,000	
Practical Action Bangladesh 	'Building Economic Empowerment and Resilience for Extreme Poor Households in Riverine areas'	16,850	15,000	
Save the Children 	'Economic and Food Security through Asset Transfers and Access to Social Entitlements'	15,000	22,000	
DSK 	'Social Mobilisation, Asset Transfer and Small Business Creation'	10,000	15,000	
Concern 	'Economic and Social Empowerment of the Extreme Poor'			22,500
Oxfam 	'Resilience through Economic Empowerment, Climate Adaptation, Learning and Leadership'			10,500
Caritas 	'Ensuring Sustainable Livelihood of Extreme Poor of CHT'			10,000



THE W

PAB: PRACTICAL ACTION
Technology challenging poverty



CARE:

Gaibandha,
Nilphamari,
Rangpur, Lalmonirhat



Propor

Gaibandha,
Nilphamari,
Rangpur,
Lalmonirhat

Concern: CONERN
worldwide

Sunamgonj, Habigonj

NETZ:

Rajshahi, Naogaon,
Chapai-Nawabgonj



DSK:

Dhaka slums
(Karail, Kamrangichar)



Uttaran:

Satkira, Khulna



Caritas:

Bandarban



Oxfam: Oxfam

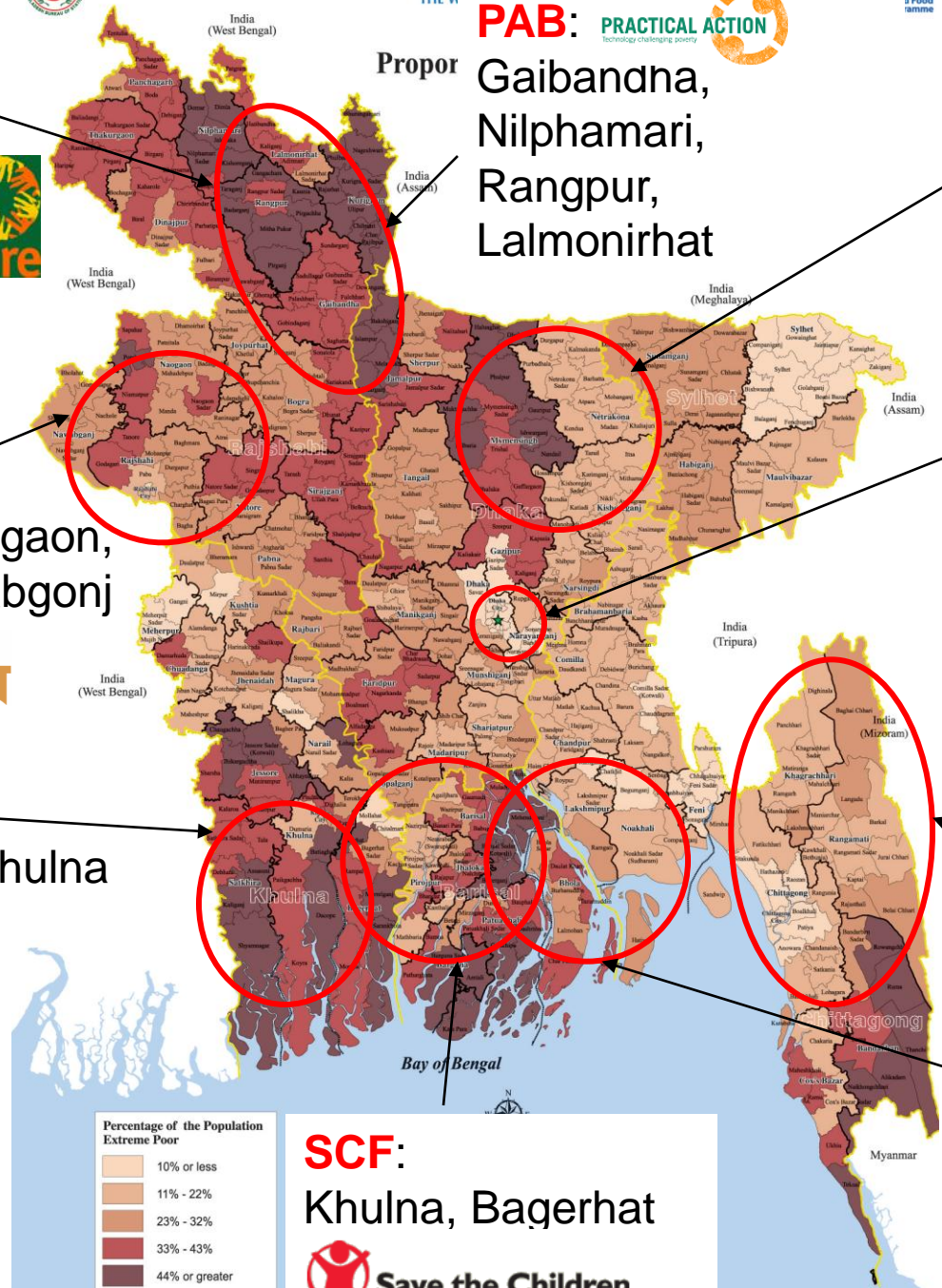
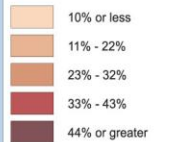
Barisal, Borguna,
Pataukhali, Pirojpur

SCF:

Khulna, Bagerhat



Percentage of the Population
Extreme Poor

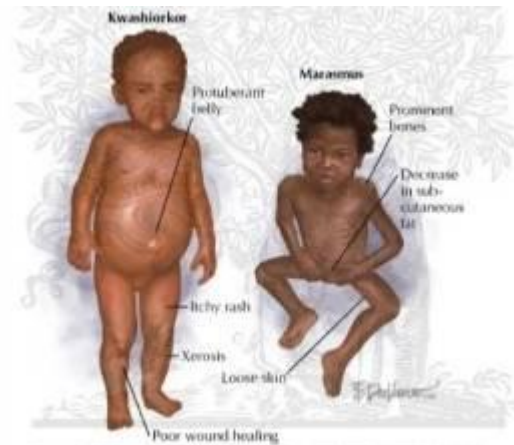


How can we measure nutritional status?

- Measurement of size and body composition (**anthropometric indicators**)
- Biochemical content of biological samples (e.g. haemoglobin in capillary blood) (**biochemical indicators**)



- Clinical examination of external physical signs of nutrient deficiencies (**clinical indicators**)

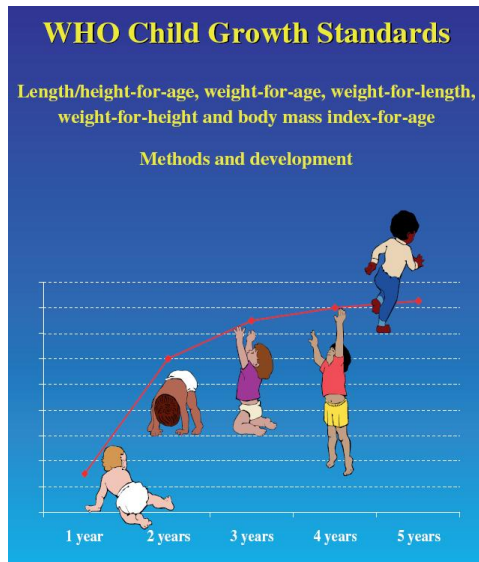


In **fieldwork based studies** tend to use non-invasive and inexpensive methods (e.g. anthropometry, finger prick)

Anthropometry (weight and height/length) – but how tall, or, how heavy, on average, should a child be at a given

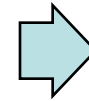
There is no easy answer, but ‘standards’ were produced by World Health Organization and it is based on ‘healthy’ and ‘breast-fed’ infants only from a diverse set of countries with frequent measurement

WHO child growth standards 2006



Knowing the child's;

- Weight
- Height or Length
- Age
- Gender



Three different types of nutritional status can be obtained

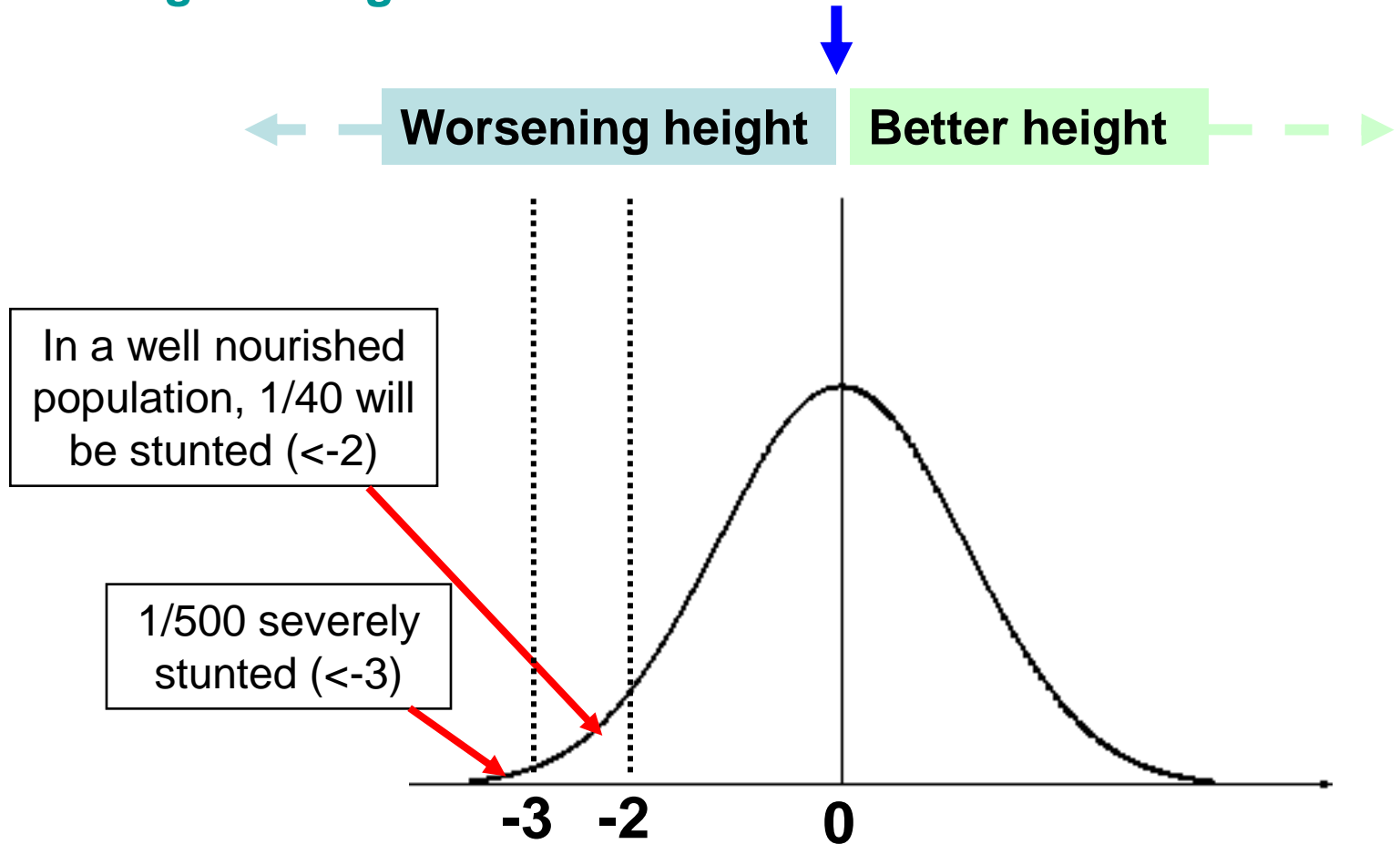
- **Weight-for-height (WHZ)** reflects body mass relative to height – ‘wasting’ – acute undernutrition
- **Height-for-age (HAZ)** reflects height (length) relative to age – ‘stunting’ – chronic undernutrition
- **Weight-for-age (WAZ)** reflects body mass relative to age – ‘underweight’ – acute/chronic undernutrition

$$z = \frac{x - \bar{x}}{SD}$$

What does Z-score explain?

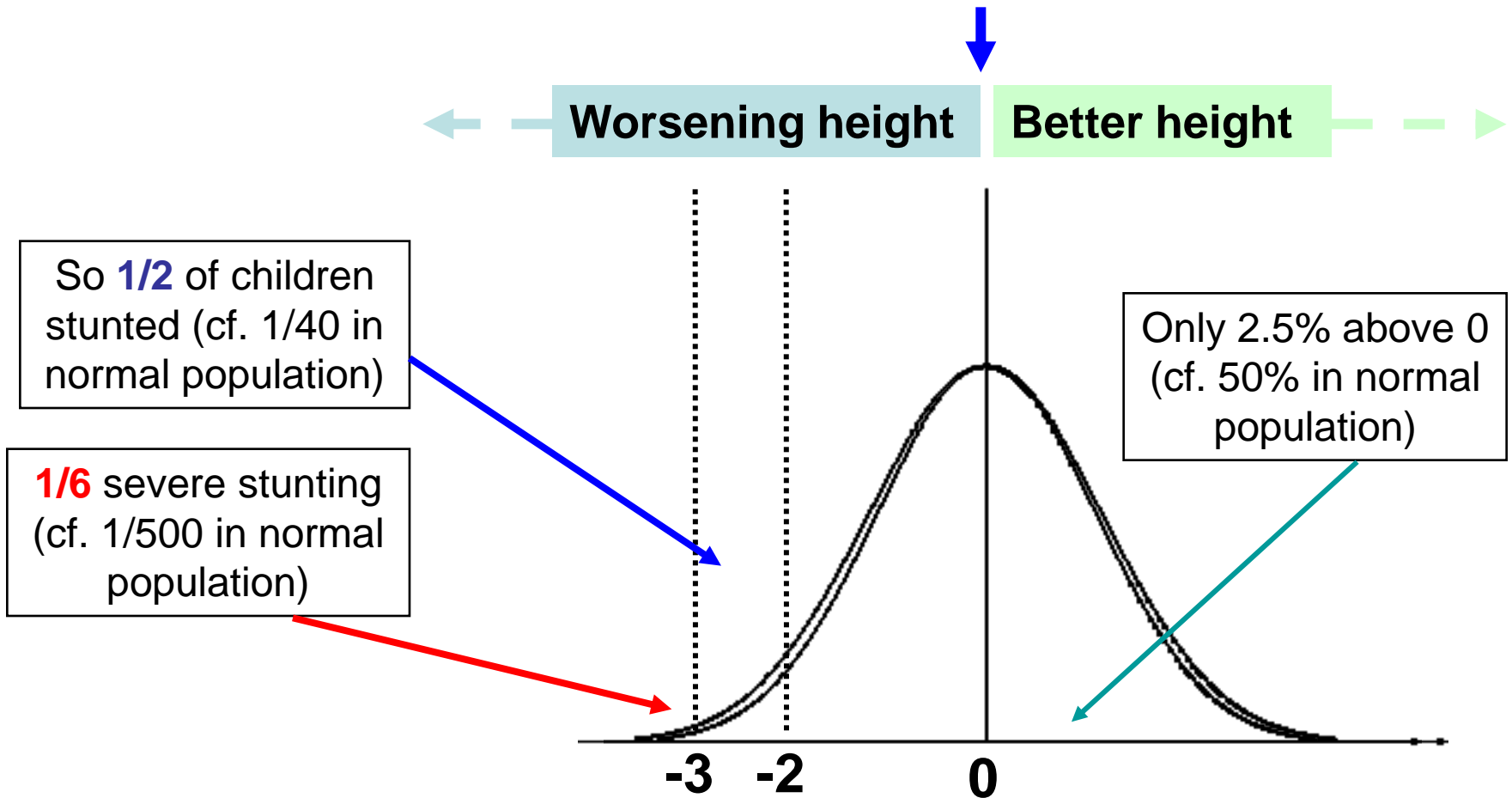
For example, 'Healthy' population's height-for-age

A child with $z = 0$ is of average height for his/her age and gender



But Bangladeshi infants are;
HAZ mean = -2, SD = 1

A child with $z = 0$ is of average height
for his/her age and gender



Are they undernourished?



Sanjita and Maleka are 21-months-old Bangladeshi girls from the same village

What do their z-scores tell us?

	Sanjida	Maleka
HAZ (stunting)	- 0.83	- 4.41
WAZ (underweight)	- 1.50	- 5.50
WHZ (wasting)	- 0.91	- 1.29

Design of annual panel nutrition surveys in Scale Fund

Cohort 1 - Phase One 6 NGOs (Phase 1: 64HHs each)

Cohort 2 - additional cohort from urban slum (DSK) and Adivashi (NETZ) in 2011

Cohort 3 - Phase Two 3 NGOs

Cohort 4 - Phase Two 6 NGOs (Phase 2)

(including 10% estimated attrition each year)

Cohort	2010	2011	2012	2013	2014	2015
1	384	345	310	279	251	226
2		128	115	104	94	85
3			192	172	154	138
4				382	345	310
Total	384	473	617	937	844	754

Within subject change
 Comparing with additional cohort
 Testing for recruitment homogeneity
 Follow-up

CMS3 surveys conducted 3 times a year in March, July and October/November between March 2010 and 2012 with annual nutrition survey each year in March.

CMS3 Annual nutrition and socio-economic surveys

CMS3 Round 8 in 2013

Currently we are running the survey!

CMS3 Round 7 in 2012

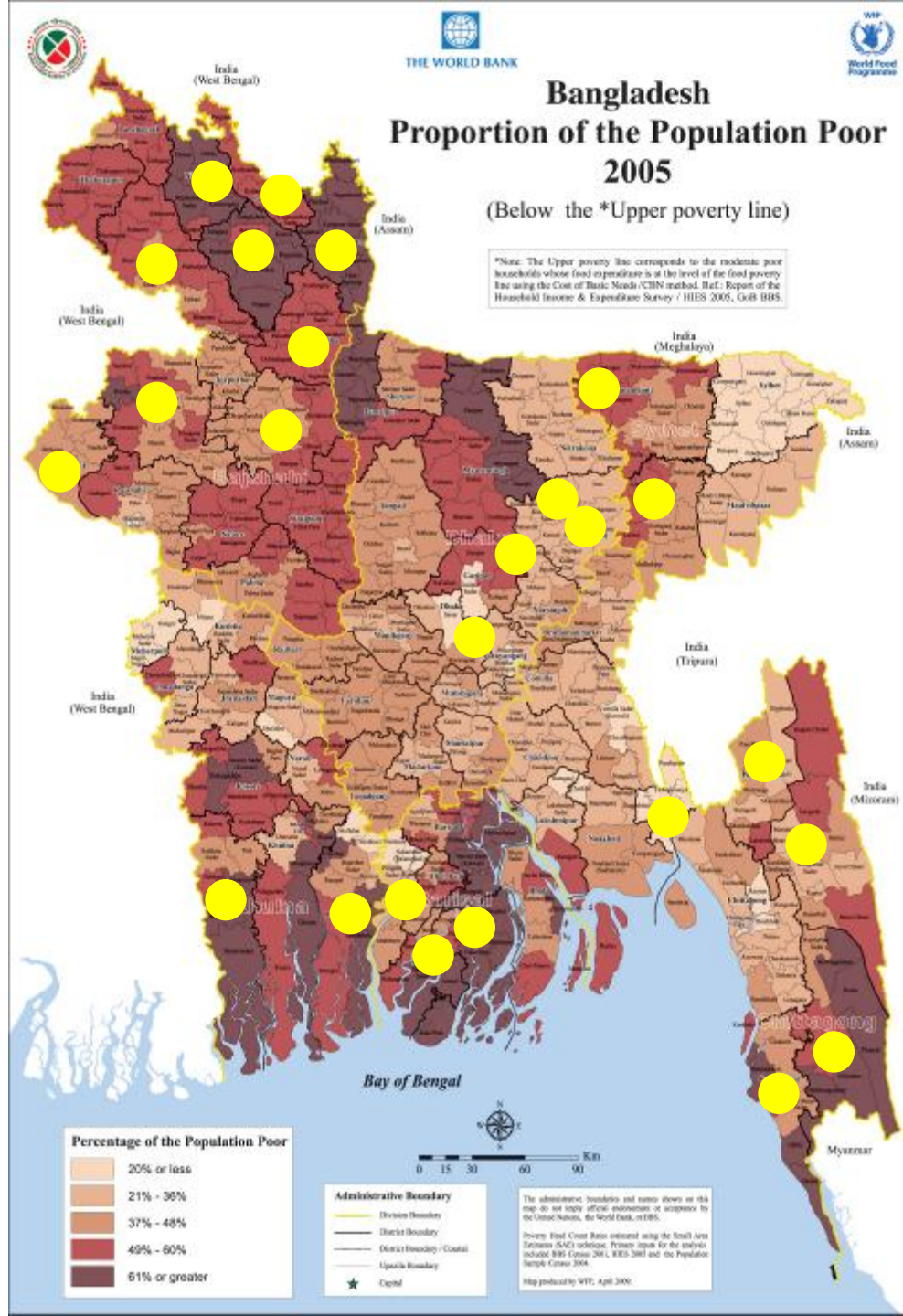
26 February-16 April 2012 (total 50 days including 12 days training)

CMS3 annual nutrition survey covered:

Cohorts 1&2 – 512 HHs

Cohort 3 – 128 HHs

It was a combined survey with Innovation Fund Round 1&2
Endline survey covering 25 Districts in Bangladesh covering 1472 HHs



Measurements Socio-economic questionnaire

- **Socio-demographic characteristics of the household** (including age, marital status, household/family size, education, disability, and occupation)
- **Morbidity** report
- Household and homestead **land ownership**
- **House condition** (size, structure, source of drinking water, electricity and toilet facilities)
- **Cash loans and savings**
- **Assets** – animals, working equipment and belongings (30 items)
- **Income** – cash and in-kind (31 items)
- **Expenditure** – covering food, household and work related (46 items)
- **Food intake and food security** (14 items)



Nutritional status

Head of household, spouse, under 5yrs children and their parents

- Anthropometric indicators: weight, length/height – **BMI** (adults) and **z-scores** (child below 5 years of age) and date of birth
- Biochemical indicators: **haemoglobin** using HemoCue (portable analyser)

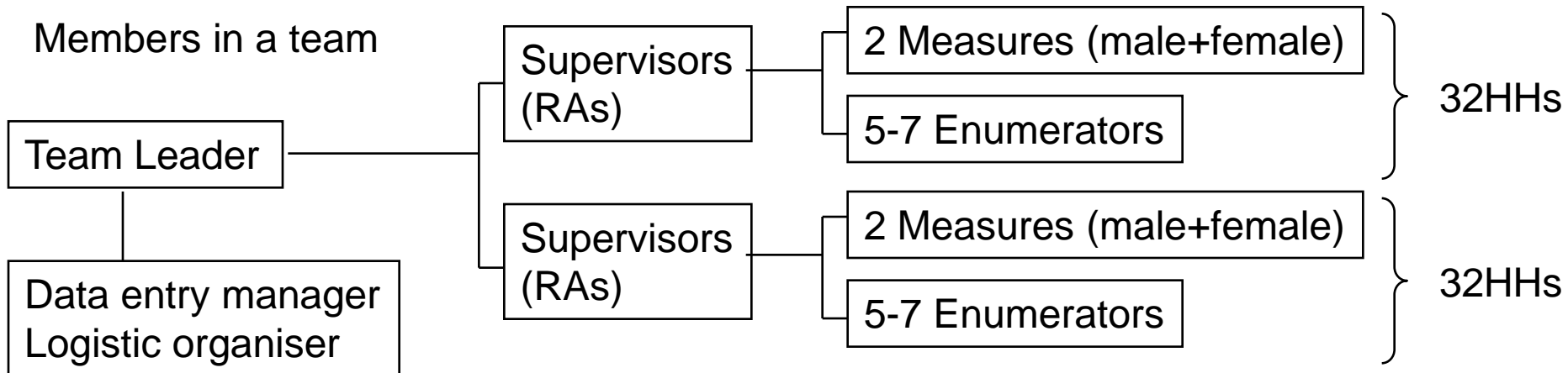


Team



Total 45 research members including international nutrition advisor (Cambridge University), shiree staff, NGO Research Associates, enumerators and measurers

Teams A&B cover North-west and South and Dhaka, South-east and North-east



For example, Data entry completed 1272 variables x 1472 HHs = 1,872,384 values

Equipment

Stadiometers



HemoCue and Consumables
(gloves, cotton, lancet, cuvette, lollipop
p etc.)



Scale and flat board



Training and Quality Control

Training of enumerating and anthropometric measurement



Field practices

All measures should ensure their technique of measurements with standard quality in the field.



Standardisation of measurements (quality control)

Equipment

Scales were checked the quality measuring with the same weights up to 65kg

Measurement - Technical Error Measurement

10 subjects were measured by all measures - then compared and the inter-technical error measurement (inter-TEM) determined



$$\sqrt{\frac{\sum_1^N \left[\sum_1^K M(n)^2 - \frac{\sum_1^K M(n)^2}{K} \right]}{N(K-1)}}$$

N : number of subjects

K : number of observers

$M(n)$: measurements of each subject by observers

Then calculate coefficient of reliability (R) – $R > 0.95$ is acceptable

$$R = 1 - \left(\frac{(TEM)^2}{SD^2} \right)$$

Randomisation

Using CMS1 baseline data, total sample were randomised based on;

- Gender of head of household
 - Age of head of household
 - Household size
 - Having under 5 years of age in the household or not
 - Income per person per day in the household
- and other information if available.

Then perform the statistical tests to check the homogeneity of all variable used.

Methods of analyses

Panel survey provides the information to analyse within-subject change.

Therefore,

Repeated Measures Analysis of Variances is useful technique to test; a) the variable are consistent or not (**'the within-subject effect'**), b) consistent within each group or not (**'the group interaction effect'**), and c) overall the variable means differ within groups or not (**'the between-subjects effect'**) over the period.

NGO	Attrition (%)	Female headed households (%)
CARE	25.0	16.7
DSK (Urban)	45.3	62.9
NETZ	14.1	58.2
PAB	10.9	28.1
SCF	17.2	45.3
UTTARAN	14.1	36.4
Total Rural	16.3	37.3
Total	21.1	40.3

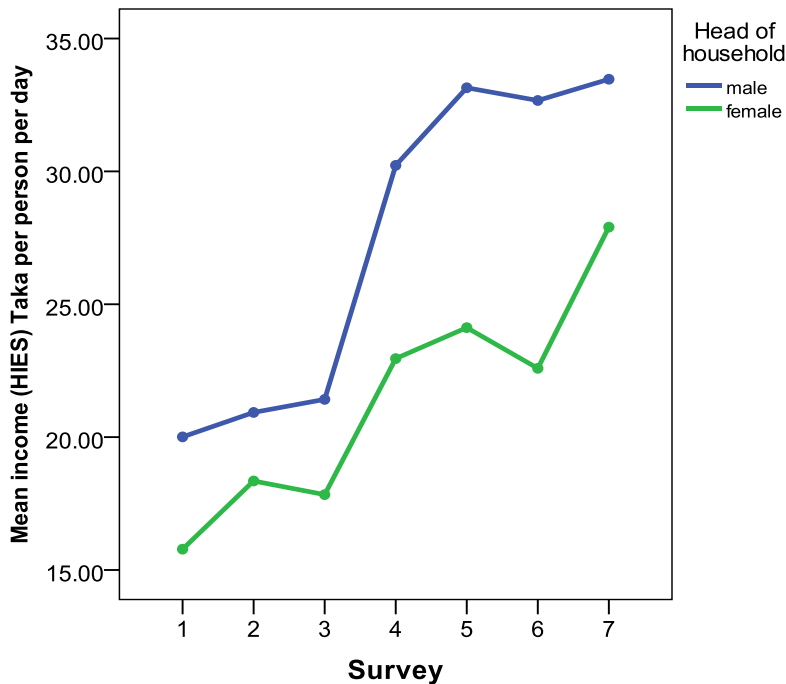
In total **303 households** participated in the seven surveys from the initial sample of 384 households, an **attrition rate of 21% between surveys 1 and 7**.

There was **greater attrition in the urban sample (45%) than in the rural areas (16%)**.

In total 303 households, information was collected on 1111 individuals of whom 634 were adults, 315 children aged between 5 and 15 years and 162 children under 5 years of age.

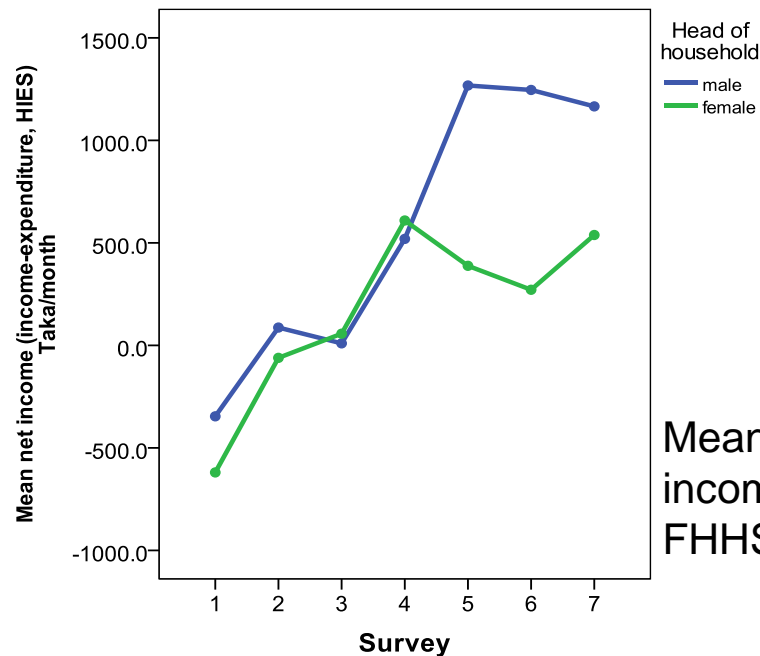
Results

Income per capita: Male headed households (MHHs) per capita income (27.4 Taka pppd) was significantly higher than Female headed households (FHHs) (21.4 Taka pppd) and the difference was apparent in all seven surveys.



Mean income pppd by MHHs and FHHs

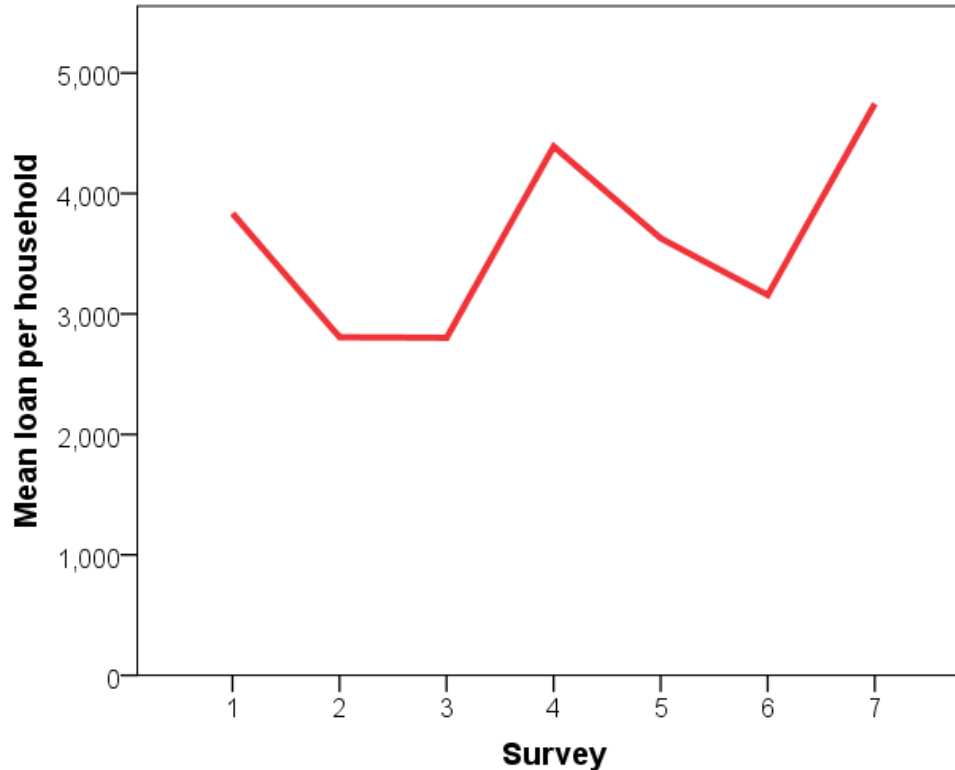
Net income: Households went from being a debt in surveys 1 to 3 (-437, -33, -52 Taka/month respectively) to increasing credit in surveys 4 to 7 (+565, +891, +989 and +1076 Taka/month, respectively).



Mean monthly net income by MHHs and FHHs

Loans and cash savings

Loans: There was **no consistent pattern** to either the number or amount of **loans** over the seven surveys.

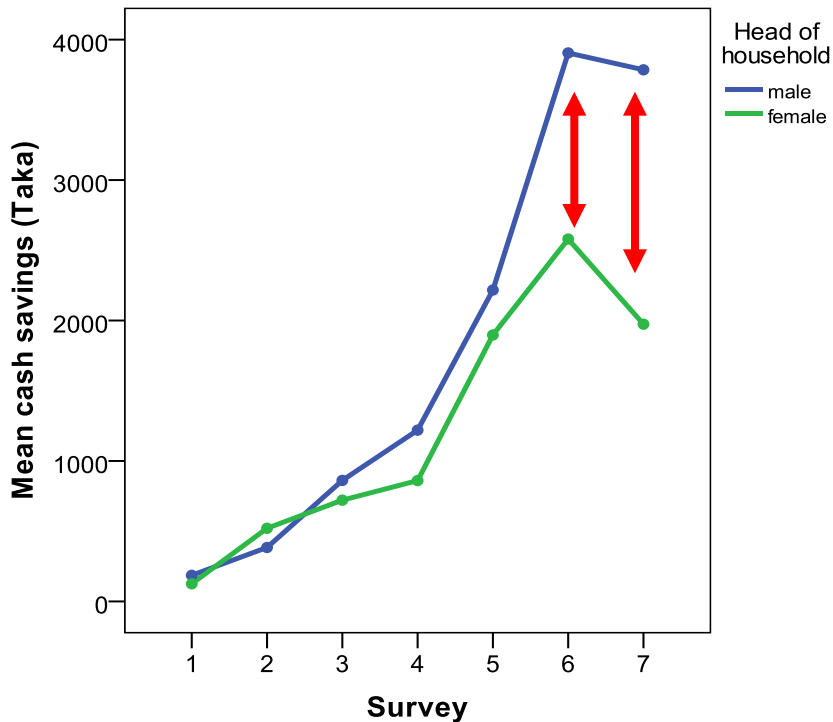


NB: Five sources of cash loan were identified (i) free informal (ii) informal loans with interest (iii) interest loans from samity (iv) interest loans from microfinance institutions and (v) interest loans from a bank or the Government of Bangladesh.

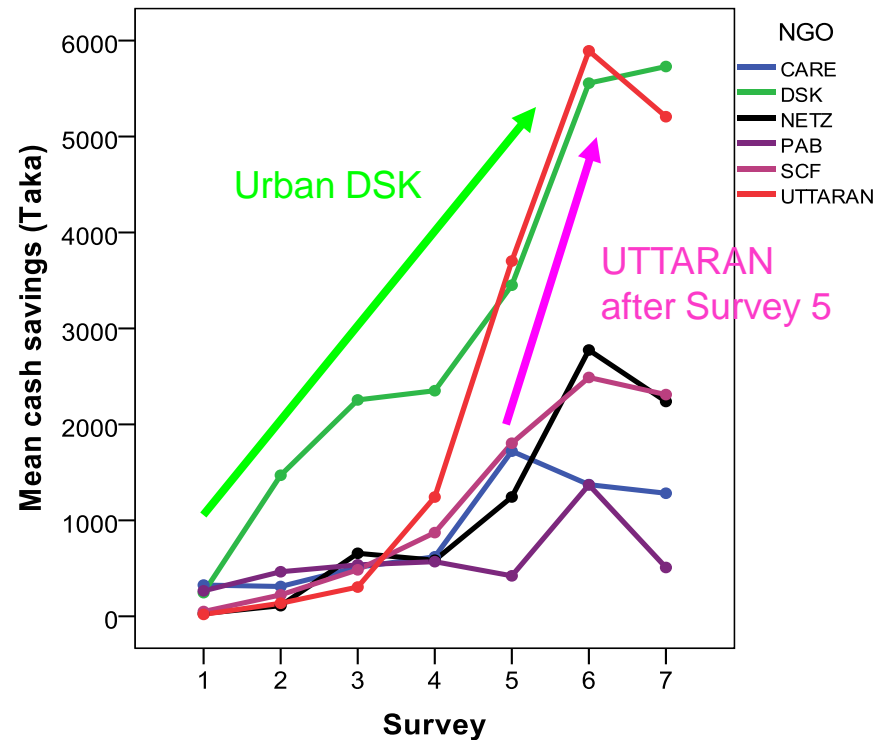
Cash savings: In survey 1, 36% of households had some cash savings increasing to 84% in survey 4 and falling to 81% in survey 7.

The mean amount increased significantly from 489 Taka in survey 1 to 4095 Taka in survey 6 and then fell to 3665 Taka in survey 7.

By male and female headed HH

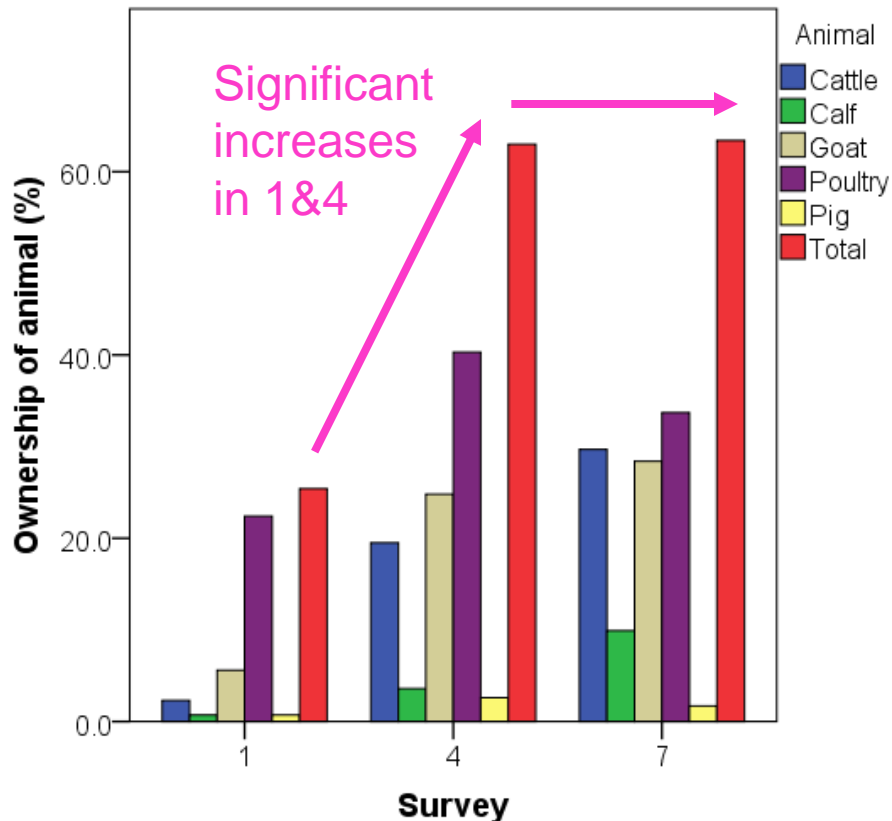


By NGOs



Assets

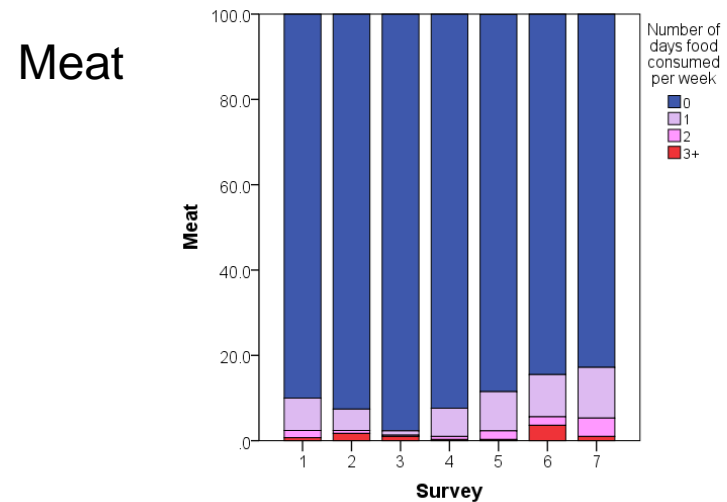
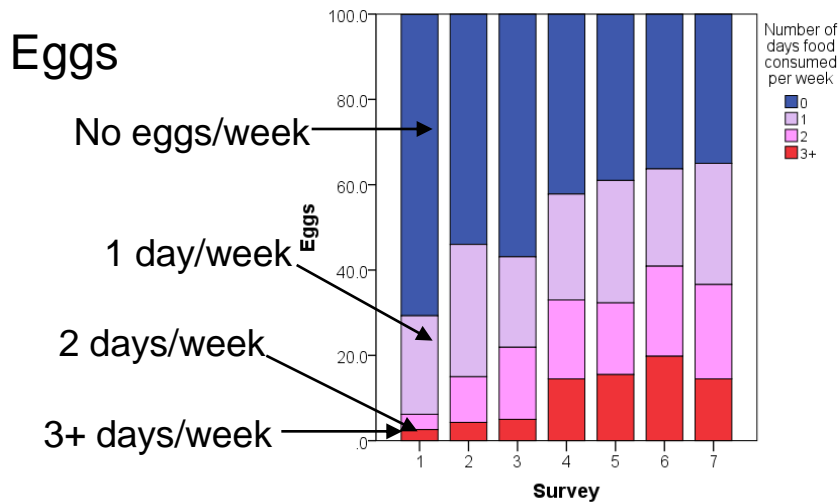
Animal ownership: There was a highly significant increase in animal ownership between surveys 1 and 4 (up from 28.4% to 63.9%) followed by a very slight fall in survey 7 (63.4%).



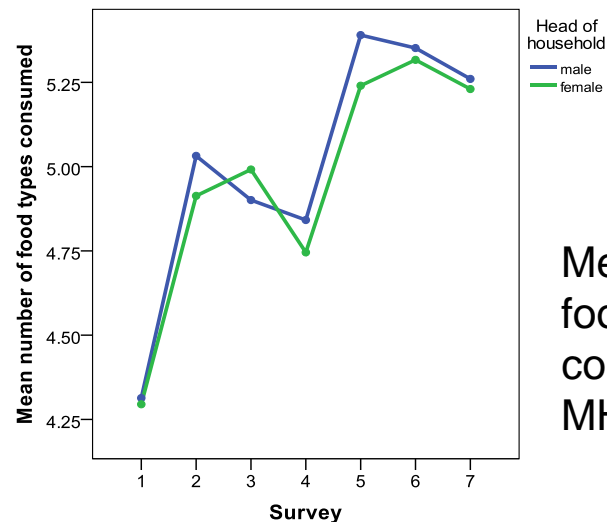
Survey	p (1&4)	p (1&7)	p (4&7)
Cattle	<0.001	<0.001	↑ <0.001
Calf	0.022	<0.001	↑ <0.001
Goat	<0.001	<0.001	ns
Poultry	<0.001	<0.001	↑ 0.042
Pig	ns	ns	ns
Total	<0.001	<0.001	ns

Household food intake and security

Food intake - comparison of March 2011 and March 2013 revealed an increased intake of pulses, green and other vegetables, fresh fish, egg and poultry consumption.



Food diversity – examined based on the 7 food groups (grains, roots and tubers, legumes and nuts, dairy products, flesh foods, eggs, vitamin A rich fruits and vegetables and other fruit and vegetables) as defined by WHO/UNICEF. **There was upwards trends with seasonal effects.**

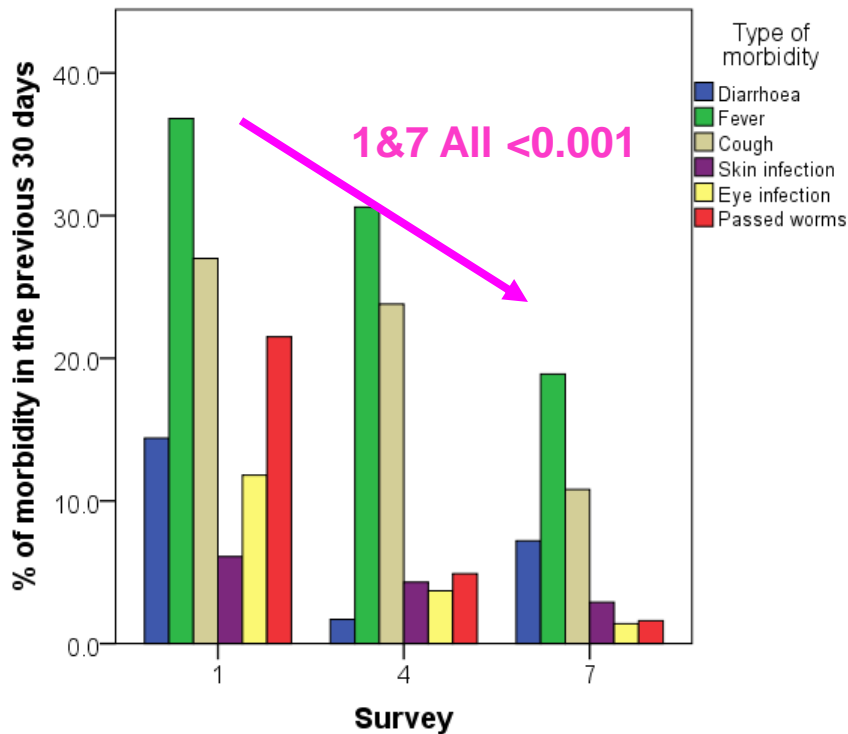


Mean number of food types consumed by MHHs and FHHs

Morbidity status

The health status of family members was determined on the day of the survey and over the previous 7 and 30 days.

Morbidity status (%) of all family member in the previous 30 days



All adults: fever, cough, eye and skin infections fell between surveys 1, 4 and 7 while passing of worms fell between surveys 1 and 4 only.

In children 5 to 15 years of age: the prevalence of fever and cough both fell between surveys 1 and 4 but not between surveys 4 and 7.

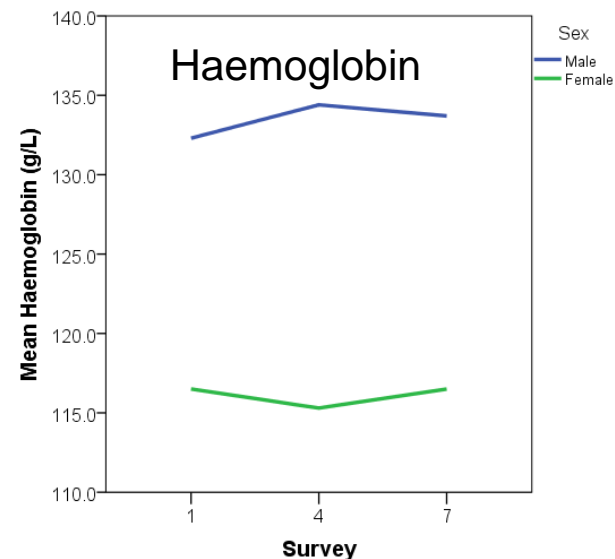
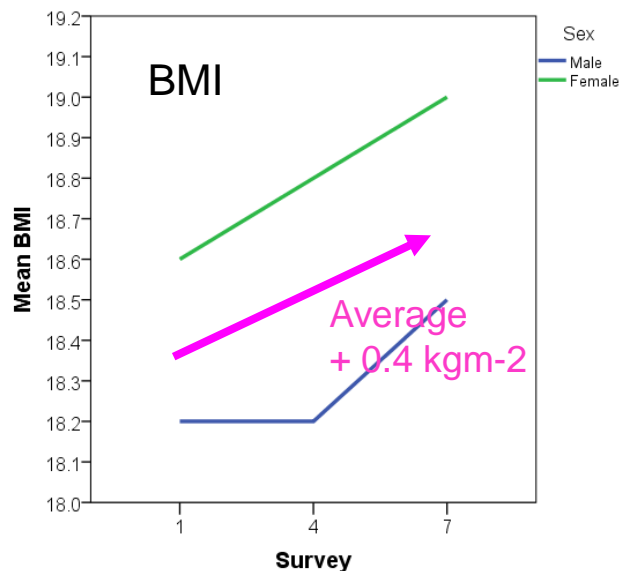
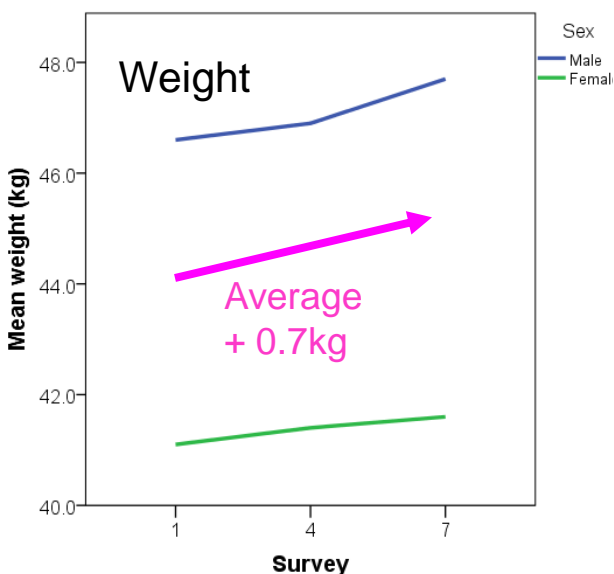
Under 5 year old children: there were reductions in fever and cough and passing of worms.

Adult nutritional status

Weight: The mean weights of head of household increased significantly over the three surveys in both male and female adults and the average weight gain between surveys 1 and 7 was 0.7kg.

BMI and Chronic Energy Deficiency (CED): Mean BMI is also increased significantly across the three surveys by 0.4 kgm⁻² and there were reductions in CED percentages.

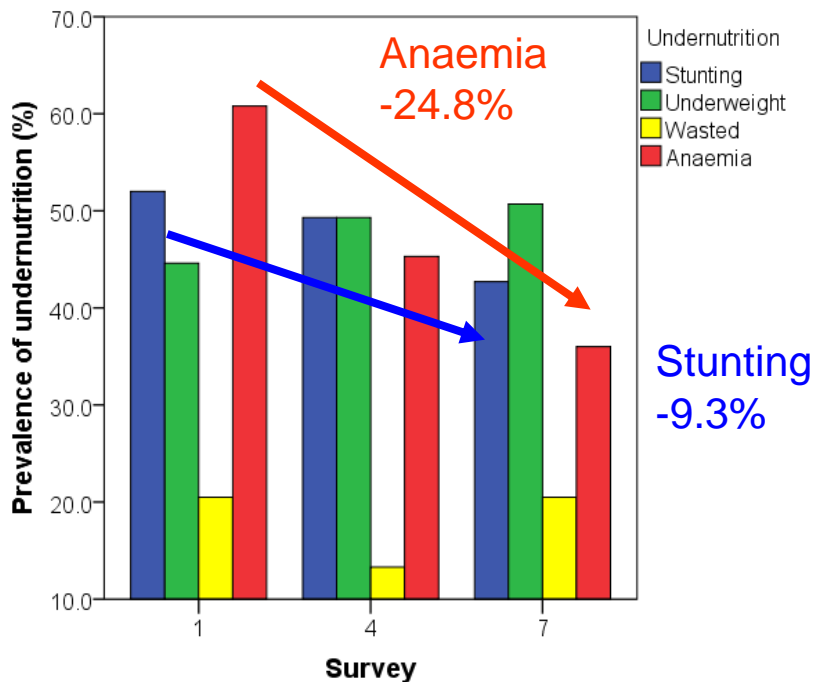
Anaemia: Mean haemoglobin did not show any significant change over the surveys but the percentage who were anaemic fell in males but increased slightly in females.



Child nutritional status

Stunting, underweight and wasting: The percentage of children who were **stunted fell significantly** between surveys 1 and 7 while the percentage of children who were **underweight increased**; the prevalence of wasting reduced between surveys 1 and 4 but increased back to baseline level in survey 7.

Anaemia: The prevalence of childhood anaemia **fell significantly** over the surveys.



- Reduction of stunting may be related the reduction in morbidity
- Child anaemia decreased dramatically, much less than national average (68%)

Discussions

(1) Many indicators of economical situation in households (e.g. land, saving, asset, income, expenditure) showed improvement after the 1 year of the intervention and generally maintained that improvement in year 2.

(2) Number of asset increased from survey 1 to 4 but not in survey 7, but the value increased in survey 7 – how much the assets generate income?

(3) Amount of cash savings, income/expenditure increased, but no change of loans.

(4) Household food intake and security also improved sharply after 1 year of intervention. BMI and weight in adults showed significant improvement, but not haemoglobin - intervention increased energy intake but still do not improve 'quality' of food such as animal protein.

Discussions

(5) After 2 years of intervention, child chronic undernutrition (stunting) showed an improvement which may be related the reduction in morbidity. However they also showed signs of acute undernutrition (wasting and underweight) at survey 7 – perhaps other factors such as breastfeeding and weaning practice and poor energy intake may also be playing a part.

(6) Child anaemia status improved at surveys 4 and 7 – less than national average (i.e. 68% of under 5 years of age in rural area).

Conclusions

(1) **When the duration of longitudinal and panel survey is long, the risk of compromising or ceasing survey becomes high**; for example, high migration rate and demolition of squatter settlements happen particularly in urban slum. Uncertain political situation may interrupt the survey plan. If funding does not cover throughout the survey, the design also may be modified.

(2) **Keeping same quality of measurement and enumerating throughout the longitudinal survey requires structured training and careful quality control.** The survey may not be able to have same fieldworkers and staff throughout. Setting up detailed protocol and make manuals of preparation etc. help to provide standard methods.

(3) **Sharing equipment** – shiree has good partnership with CLP to share equipment. Staff also have chance to develop their knowledge during communications. Sharing, of course, saves on budget.

(4) **Panel survey requires several skill of statistical analyses** (e.g. Repeated Measures Analysis of Variances). Variables increase by surveys and analyses (currently more than 10,000 variable in cohort 1) therefore skills of data management is also required.



Thank you to our beneficiaries and all the staff who contributed to making these surveys possible!

