



Key Highlights from the presentation:

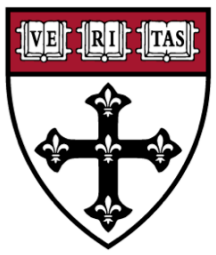
Stunting Children, Stunted Nations

Pr. Subramanian

Day 1 - Session 1

Dr. Ame Stormer, Regional Director for Programs, Asia Pacific, Helen Keller International

- Most of the focus related to stunting has been on proximal determinants not on distal- heavy emphasis on downstream endeavors- less on upstream
- Looked at one factor at a time- not multi-factoral approach
- Economic growth doesn't trickle down to change stunting- growth not equal across sectors, no redistribution of growth, economic growth doesn't change proximal factors, doesn't deal with supply side deficiencies
- Focus on individual behavior means that systems have not been addressed- example of everyone started using toilets- supply side needs to be investigated
- Upstream causes effecting stunting directly – maternal height, maternal BMI, wealth index, maternal education.
- Balance short vs the long term strategies- substantial investment on short term, often proximal interventions. Negligible investment on long term upstream interventions.
- Need for equity-based public health approach. The three themes of the workshop feed directly into this.



Reducing the Burden of Stunting: Lessons Learned

S V Subramanian, PhD

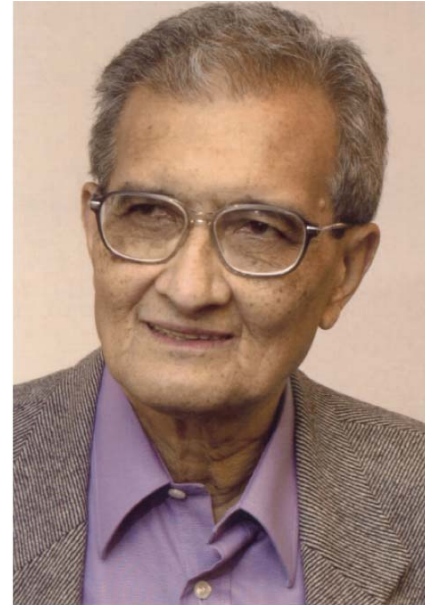
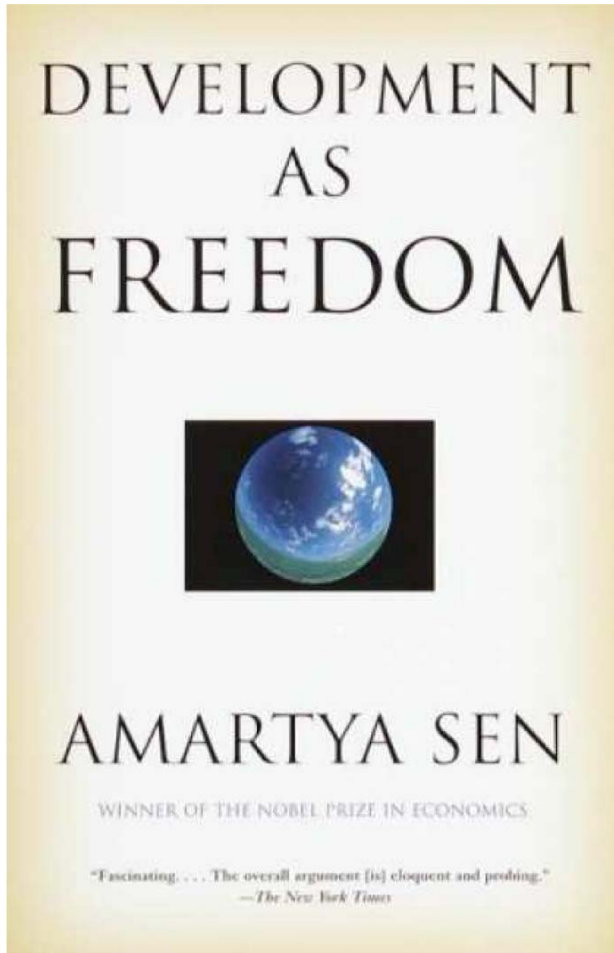
Professor of Population Health and Geography

Harvard University

**STOP STUNTING: Improving Child Feeding, Women's Nutrition, and
Household Sanitation in South Asia"**

UNICEF Regional Office for South Asia

November 10-12, 2014, New Delhi, India



	OECD	Kerala
Total Fertility Rate	1.7	1.7
Complete Immunization	95%	84%
School Enrollment	100%	96.9%
Literacy Rate	98.5%	90.9%
HDI	0.87	0.773
Life Expectancy (Male)	77.0	73.7 y
Life Expectancy (Female)	82.5	75.5 y
Infant Mortality Rate	6.8 per 1000	14 per 1000
Underweight		
Stunting		

http://planningcommission.nic.in/plans/stateplan/sdr_pdf/shdr_kerala05.pdf

http://stats.oecd.org/Index.aspx?DataSetCode=HEALTH_STAT

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Life Expectancy (F)	82.5	75.5 y
Infant Mortality Rate	6.8 per 1000	14 per 1000
Underweight	0 - <1%	23.5%
Stunting	0 - <1%	26.8%

http://planningcommission.nic.in/plans/stateplan/sdr_pdf/shdr_kerala05.pdf

http://stats.oecd.org/Index.aspx?DataSetCode=HEALTH_STAT

WORLD DEVELOPMENT REPORT 1993

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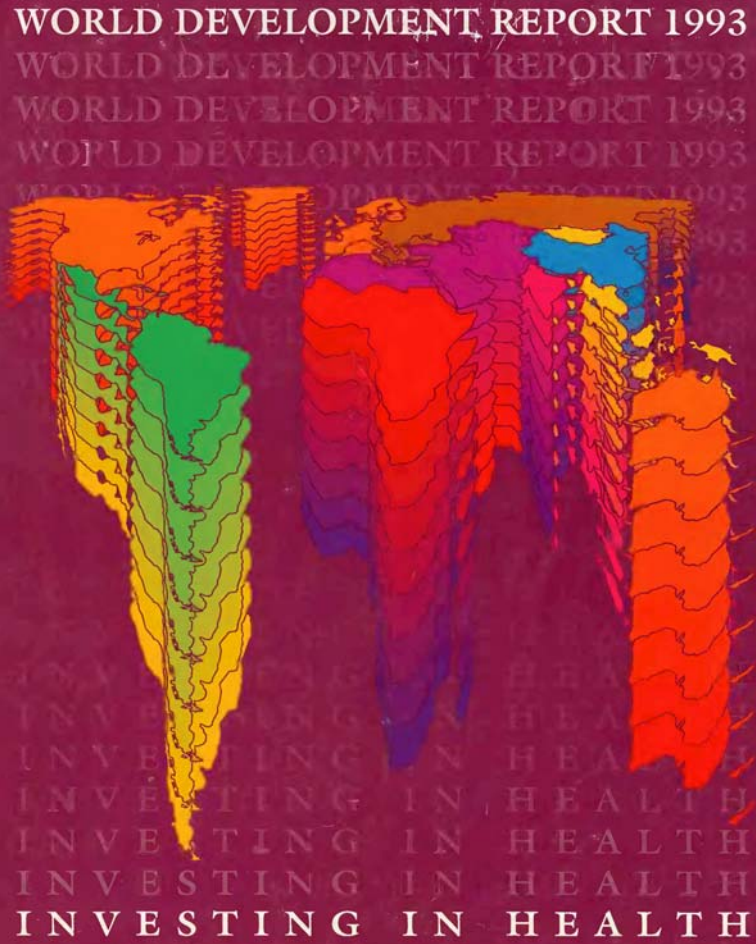
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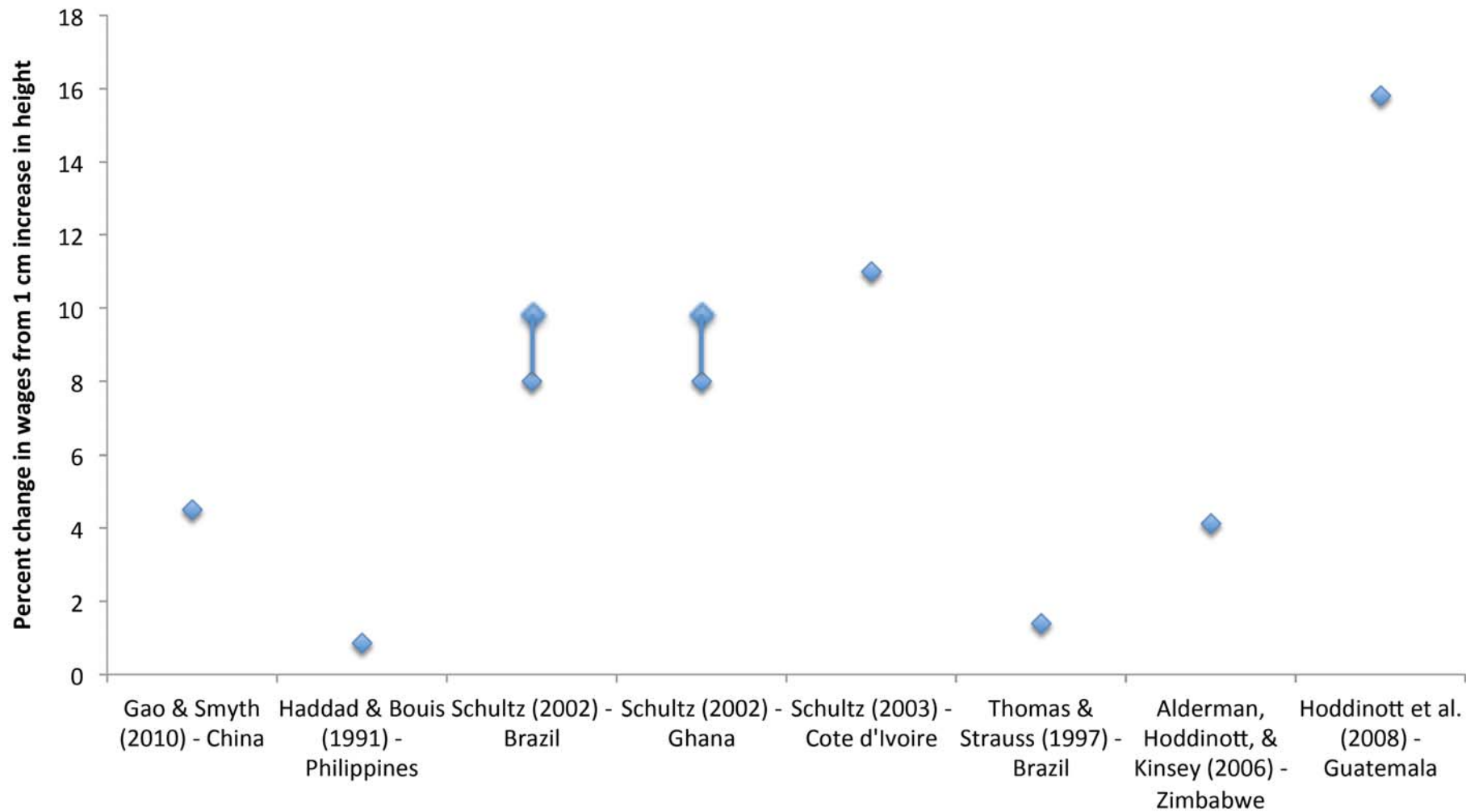
WORLD DEVELOPMENT REPORT 1993

WORLD DEVELOPMENT REPORT 1993



INVESTING IN HEALTH

WORLD DEVELOPMENT INDICATORS



Horton S, Steckel R. 2011. Global Economic Losses Attributable to Malnutrition 1900-2000 and Projections to 2050. Assessment Paper. Copenhagen Consensus on Human Challenges.

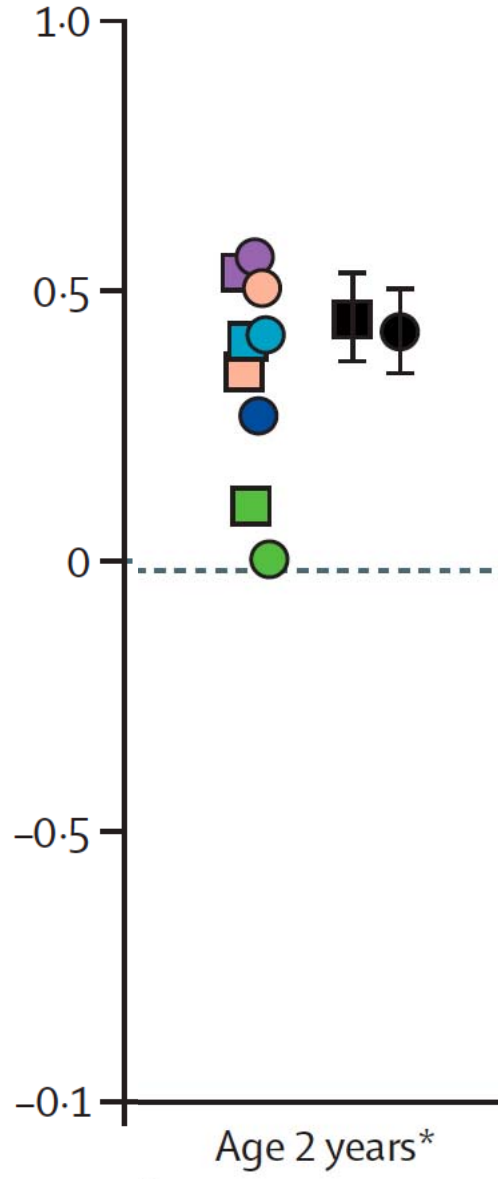
Associations of linear growth and relative weight gain during early life with adult health and human capital in countries of low and middle income: findings from five birth cohort studies

Linda S Adair, Caroline H D Fall, Clive Osmond, Aryeh D Stein, Reynaldo Martorell, Manuel Ramirez-Zea, Harshpal Singh Sachdev, Darren L Dahly, Isabelita Bas, Shane A Norris, Lisa Micklesfield, Pedro Hallal, Cesar G Victora, for the COHORTS group

Lancet 2013; 382: 525–34

Faster linear growth was strongly associated with a reduced risk of not completing secondary school (age 2 years: 0.74, 0.67–0.78; and mid-childhood: 0.87, 0.83–0.92).

Change in completed years of schooling per SD
change in conditional growth variable



□ Men ○ Women

— Pooled data for all men with 95% CI — Pooled data for all women with 95% CI

■ Brazil ■ Guatemala ■ India ■ Philippines ■ South Africa

Annual Status of Education Report (Rural) 2012

Provisional

January 17, 2013



Eliminating stunting is critical to realizing
the “**demographic dividend**”

Current perspectives to address stunting

- Growth-mediated strategy to reduce stunting
- Heavy focus on “downstream” or “proximal” risk factors (often one at a time)

Can we “trickle-down” our way out of the misery of stunting?



PLoS Medicine March 2011 | Volume 8 | Issue 3 | e1000424

Is Economic Growth Associated with Reduction in Child Undernutrition in India?

Malavika A. Subramanyam¹, Ichiro Kawachi², Lisa F. Berkman³, S. V. Subramanian^{2*}

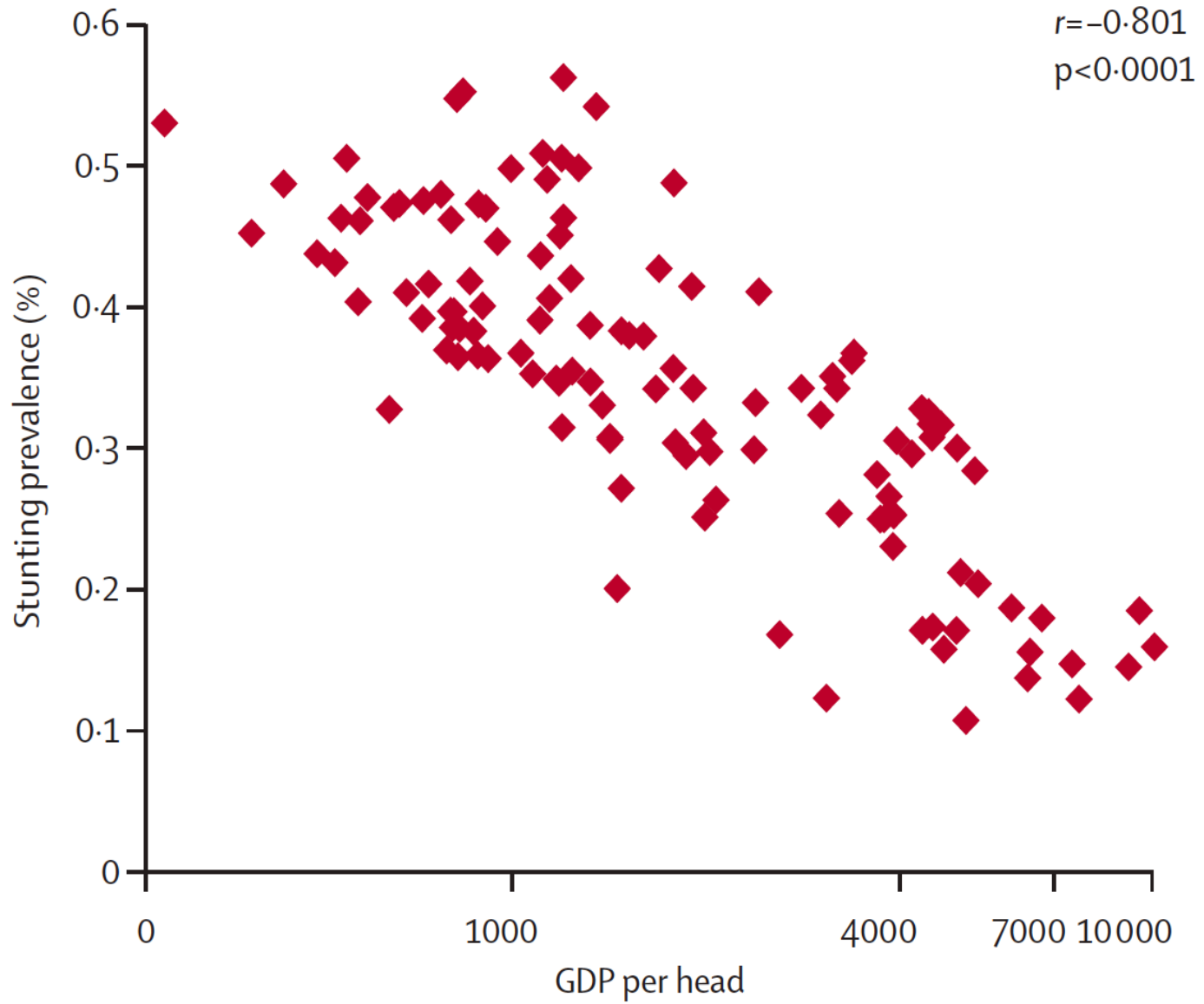
Stunting**Any****Severe**

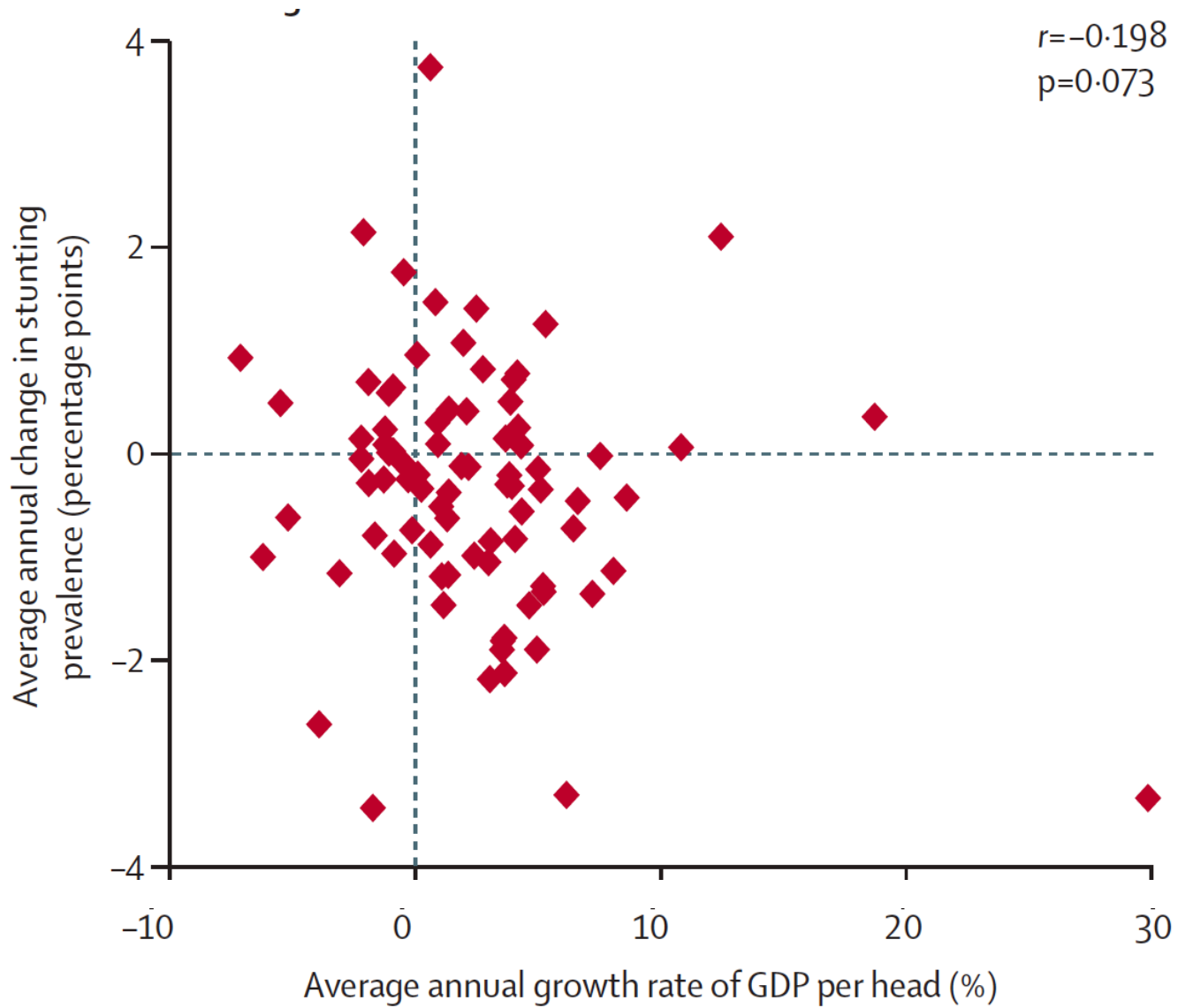
Year adjusted ^a	1.02 (0.99, 1.05)	1.06 (1.02, 1.10)
Year, age and sex adjusted ^a	1.02 (0.99, 1.05)	1.06 (1.02, 1.10)
Fully adjusted ^b	1.04 (1.01, 1.07)	1.08 (1.05, 1.12)
Fully adjusted ^c	1.03 (1.00, 1.06)	1.07 (1.04, 1.11)

Association between economic growth and early childhood undernutrition: evidence from 121 Demographic and Health Surveys from 36 low-income and middle-income countries

Sebastian Vollmer, Kenneth Harttgen, Malavika A Subramanyam, Jocelyn Finlay, Stephan Klasen, SV Subramanian

***Lancet Glob Health 2014;
2: e225-34***





For a 5% change in per-capita growth

	Odds Ratios (95% Confidence Intervals)
Full Sample	0.996 (0.993-1.000)
Poorest Wealth Quintile	0.997 (0.990-1.004)
Richest Wealth Quintile	0.997 (0.997-1.001)
0-11 months	0.991 (0.981-1.001)
12-23 months	0.989 (0.979-1.000)
24-35 months	0.997 (0.994-1.000)
Sub-Saharan Africa	0.996 (0.994-0.997)
Asia	0.999 (0.999-1.000)

In short, economic growth has not trickled down to reducing stunting among children within India or between LMICs.

Why did economic growth not matter?

- **Average** economic growth hides the huge imbalance in growth across different sectors (***i.e.*, not at all inclusive**)
- No evidence of income re-distribution (direct or indirect) to compensate for the non-inclusive growth
- Economic growth did not change any of the proximal risk factors of stunting

Why did economic growth not matter?

- Average economic growth hides the huge imbalance in growth across different sectors (***i.e., not at all inclusive***)
- No evidence of income re-distribution (direct or indirect) to compensate for the non-inclusive growth
- Economic growth did not change any of the proximal risk factors of stunting
- Income generation (even when it happens) cannot immunize from the broader “supply side” deficiencies

Critiquing the scientific discourse on the determinants of stunting

From being absurd

SIPA | School of International and Public Affairs
ISERP | Institute for Social and Economic Research and Policy

Working Paper No. 2012-04

The Myth of Child Malnutrition in India

Arvind Panagariya
Columbia University

- Faulty Reference Curves
- Mortality down so by extension kids must be growing
- Indian kids are just genetically small

To being myopic

- One factor at a time (*e.g.*, diet, open defecation, immunization, breastfeeding)
- **Proximal (downstream)** causes receive substantially more attention than **distal (upstream)** causes

Maternal and Child Nutrition 2

Evidence-based interventions for improvement of maternal and child nutrition: what can be done and at what cost?

Zulfiqar A Bhutta, Jai K Das, Arjumand Rizvi, Michelle F Gaffey, Neff Walker, Susan Horton, Patrick Webb, Anna Lartey, Robert E Black, The Lancet Nutrition Interventions Review Group, and the Maternal and Child Nutrition Study Group

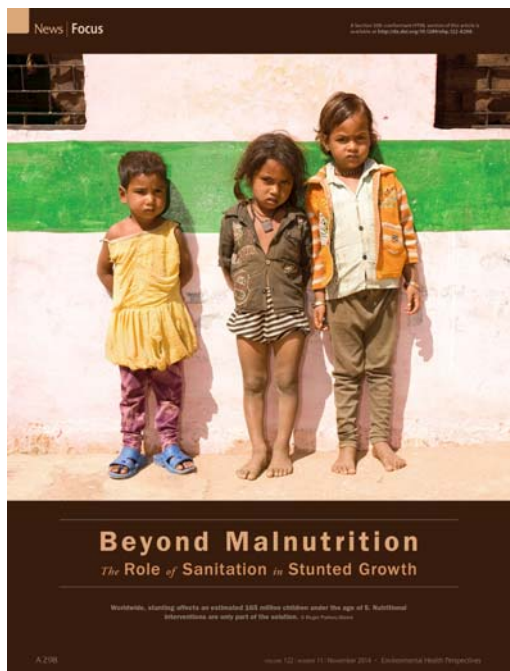
Women of reproductive age and pregnancy	Neonates	Infants and children	Disease prevention and management
<ul style="list-style-type: none">• Folic acid supplementation• Iron and iron-folate supplementation• MMN supplementation• Calcium supplementation• Iodine through iodisation of salt• Maternal supplementation with balanced energy protein	<ul style="list-style-type: none">• Delayed cord clamping• Neonatal vitamin K administration• Vitamin A supplementation• Kangaroo mother care and promotion of breastfeeding	<ul style="list-style-type: none">• Complementary feeding promotion (6-24 months)• Preventive vitamin A supplementation (6 months – 5 years)• Iron supplementation• MMN supplementation• Zinc supplementation	<ul style="list-style-type: none">• WASH interventions• Maternal drowning• Deworming in children• Feeding practices in diarrhoea• Zinc therapy for diarrhoea• IPTp/ITN for malaria in pregnancy• Malaria prophylaxis in children

- “Open defecation explains it all”

The New York Times

Poor Sanitation in India May Afflict Well-Fed Children With Malnutrition

By GARDINER HARRIS JULY 13, 2014



IDS WORKING PAPER
Volume 2014 No 450

Reframing Undernutrition: Faecally-Transmitted Infections and the 5 As

Robert Chambers and Gregor von Medezza
October 2014

Followed by the RCT...



The Effect of India's Total Sanitation Campaign on Defecation Behaviors and Child Health in Rural Madhya Pradesh: A Cluster Randomized Controlled Trial

Sumeet R. Patil^{1,2*}, Benjamin F. Arnold², Alicia L. Salvatore³, Bertha Briceno⁴, Sandipan Ganguly⁵, John M. Colford Jr.², Paul J. Gertler^{2,6}

THE LANCET **Global Health**

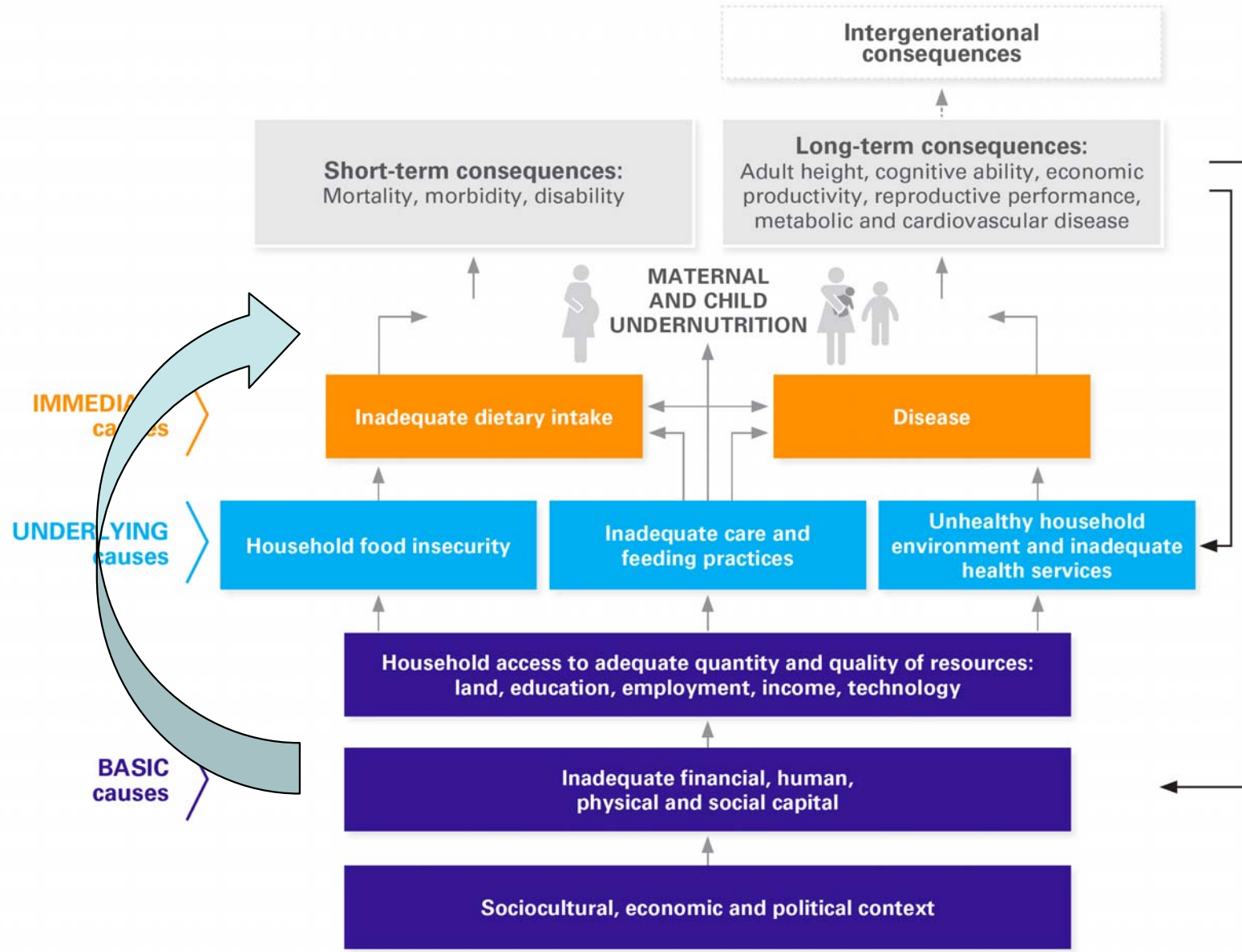
Effectiveness of a rural sanitation programme on diarrhoea, soil-transmitted helminth infection, and child malnutrition in Odisha, India: a cluster-randomised trial

Thomas Clasen, Sophie Boisson, Parimita Routray, Belen Torondel, Melissa Bell, Oliver Cumming, Jeroen Ensink, Matthew Freeman, Marion Jenkins, Mitsunori Odagiri, Subhajyoti Ray, Antara Sinha, Mrutyunjay Suar, Wolf-Peter Schmidt



**What do we learn when we shift from a
“single-cause” to a “multi-factorial”
approach to addressing stunting?**

Source: UNICEF. Improving child nutrition: the achievable imperative for global progress. 2013. New York: UNICEF.



Population Attributable Fraction (PAF)

- Assuming exposure effects are **CAUSAL (?)**
 - Percent reduction in proportion of stunting cases following elimination of an exposure.
 - Percent reduction in proportion of stunting cases if ALL of the exposures were to be simultaneously eliminated.
[Note: Exposed group consists of those exposed to at least one of the factors]

Reference: Rockhill et al *Am J Pub Health* 1998 88 1: 15-19

**Does household richness provide immunity
from poor upstream environmental
(shared) conditions?**

Reflections on next steps

Balancing short- *versus* long-term strategies

- Substantial investment on short-term (often proximal) interventions
- Negligible investment on long-term (upstream) interventions
- Consider a “CCT” approach to incentivize governmental investment in basic infrastructure

Equity-based “public health approach”

- Food insecurity (quantity and quality)

Circle of Welfare

A ranking of 10 states based on key indicators for five entitlement programmes, from birth to retirement, 2003-13.

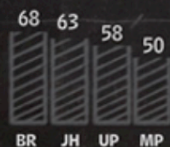
■ Leaders ■ Learners ■ Laggards



INFANT CARE

ICDS Integrated Child Development Scheme
(₹18,691 cr)

% of mothers who said activities regularly take place at the anganwadi*



NUTRITION

MDM Mid-day Meal Scheme
(₹13,152 cr)

% of people who said mid-day meals are served regularly in the local school



FOOD

PDS Public Distribution Scheme
(₹1,15,000 cr)

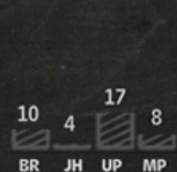
Foodgrain buys of BPL, Antyodaya households, as % of entitlements



WORK

NREGA National Rural Employment Guarantee Act
(₹34,000 cr)

Average days of work per household in 2012-13 (self-reported)



PENSION

Old Age and Widow Pension
(₹10,635 cr)

Average pension earnings across schemes*



Who was in charge, 2003-13

TAMIL NADU (TN)

DMK, AIADMK



HIMACHAL PRADESH (HP)

CONGRESS, BJP



CHHATTISGARH (CG)

BJP



ORISSA (OR)

BJD



RAJASTHAN (RJ)

CONGRESS, BJP



MAHARASHTRA (MH)

CONGRESS, NCP



BIHAR (BR)

JD (U)



JHARKHAND (JH)

MANY

UTTAR PRADESH (UP)

BSP, SP



MADHYA PRADESH (MP)

BJP



(a) Among those with a child below six years, enrolled at the anganwadi (b) Standard pension amount, multiplied by the proportion of widows and elderly persons who get a pension. For PDS, we report the 'food subsidy' figures. © BJP, Congress, JMM, All Jharkhand Students' Union, JDU, among others. Source: PEEP Survey, 2013. States are ranked from best to worst, based on a simple average of their rank in terms of each indicator.

Figures in brackets show central govt expenditure on these programmes in 2014-15.

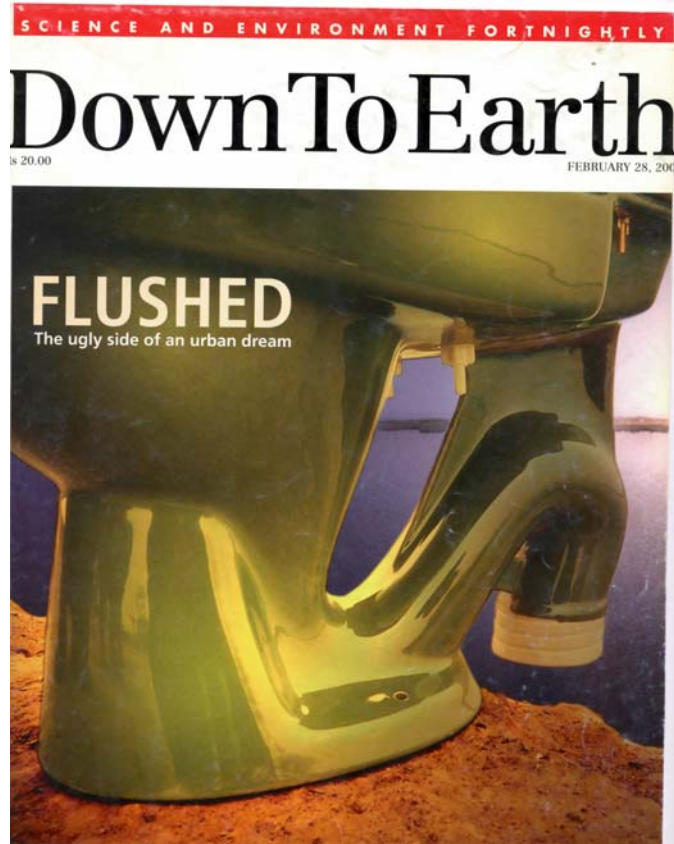
Equity-based “public health approach”

- Food insecurity (quantity and quality)
- Sanitation insecurity

Sanitation for all

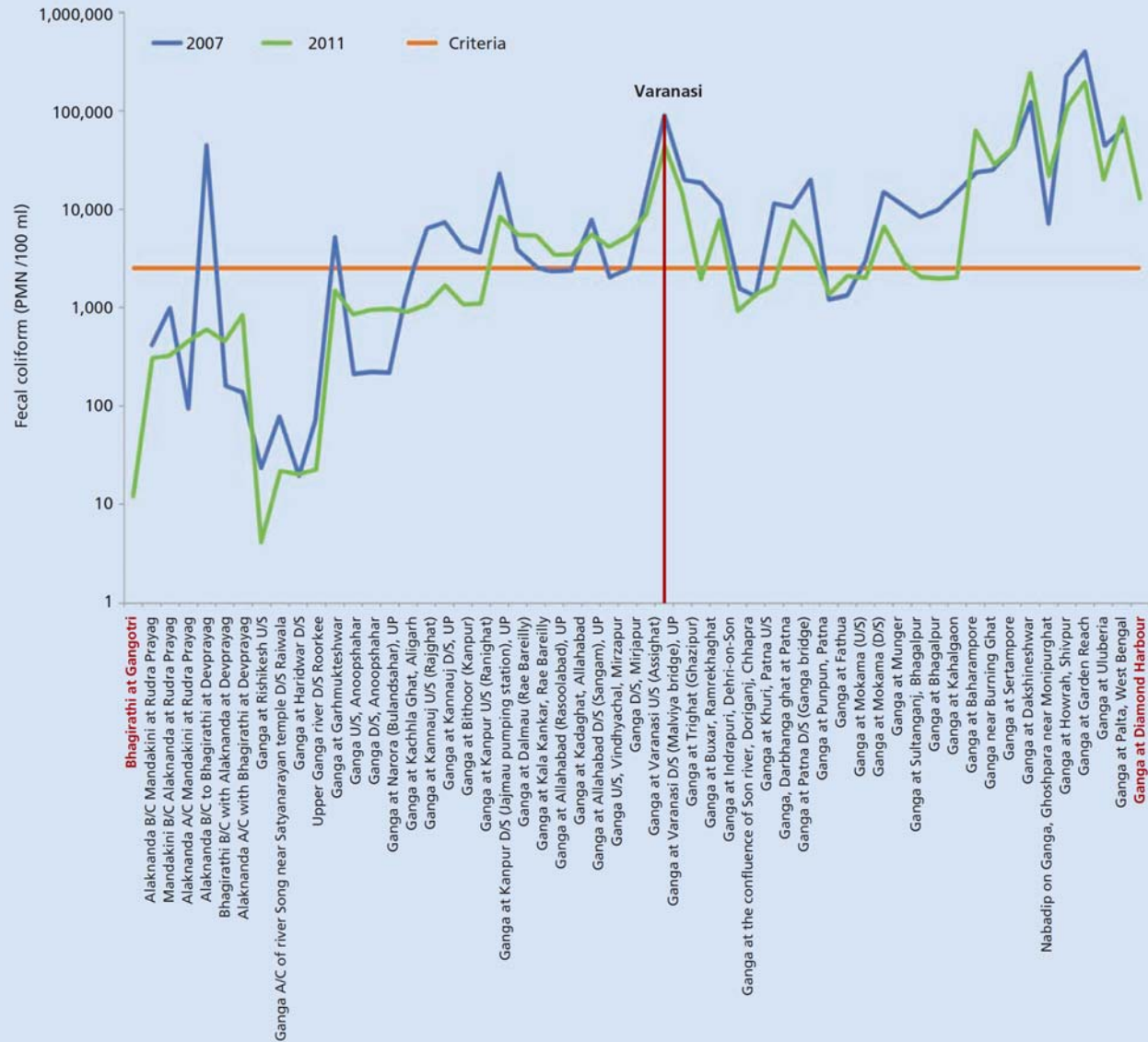
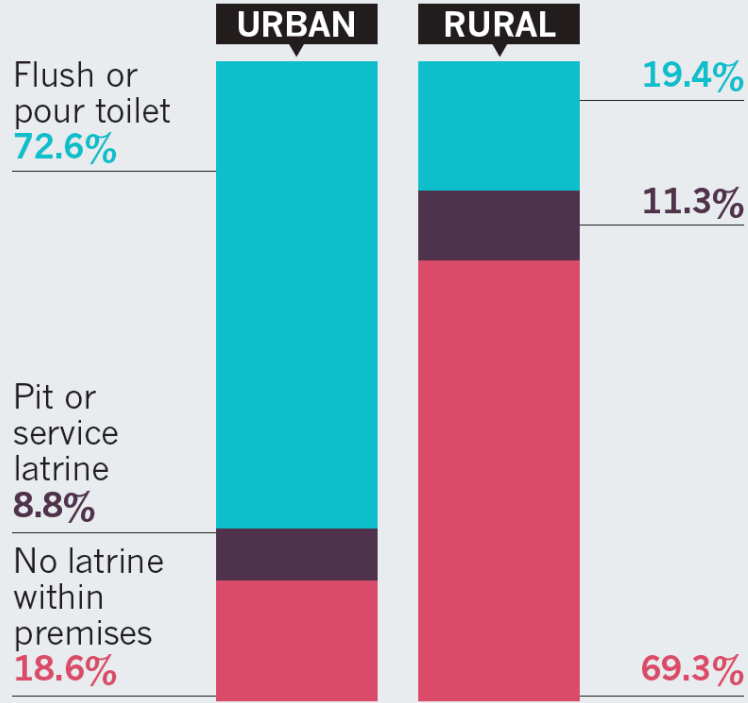
Water pollution from sewage is causing great damage to India. The nation needs to complete its waste systems and reinvent toilet technologies, says **Sunita Narain**.

14 JUNE 2012 | VOL 486 | NATURE | 185



INDIA'S SANITATION DIVIDE

City dwellers are more likely than people in rural areas to have flushing toilets, but only one-third of those toilets are connected to underground sewers; the rest go to septic tanks.



Current solutions

- Change individual “behavior”
- Build a billion toilets

What's wrong with that?

- We will drown in our own waste!
- Relatively well-treated water required to transport waste

INSTALLED CAPACITY OF STPS	OFFICIAL SEWAGE LOAD	GAP
1,208 MLD	2,723 MLD	55%
	MEASURED SEWAGE LOAD	GAP
	6,087 MLD	80%

Annually, a family of five using flush water toilet contaminates more than 150 thousand litres of water to transport 250 litres of excrement.

Equity-based “public health approach”

- Food insecurity (quantity and quality)
- Sanitation insecurity
- Let's not forget Water!

MDG 7c for safe drinking water in India: an illusive achievement

THE LANCET
Vol 383 April 19, 2014

**Mira Johri, Dinesh Chandra,
SV Subramanian,
Marie-Pierre Sylvestre, Smriti Pahwa*

Site	Household	Anganwadi Centre	
	“Improved water” MDG Target 7c	Water contaminated (rapid test)	Water contaminated (rapid test)
Kirti Nagar, New Delhi	682 (99.6 %)	284 (41.5 %)	17 (51.5 %)
Hardoi district (rural), Uttar Pradesh	1165 (97.7 %)	715 (60.0 %)	41 (47.7 %)

**Combination of “conventional” and
“out of the box” solutions based on
principles of equity**



<http://www.bbc.co.uk/programmes/p00hhrwl>