

Improving diets and nutrition through an integrated poultry value chain and nutrition intervention (SELEVER) in Burkina Faso: A cluster randomised control trial.

Livestock, Sanitation, Hygiene, and Child Growth: Exploring the complex underlying causes of child stunting.

1/3/2018, University of Florida.

Aulo Gelli, IFPRI.

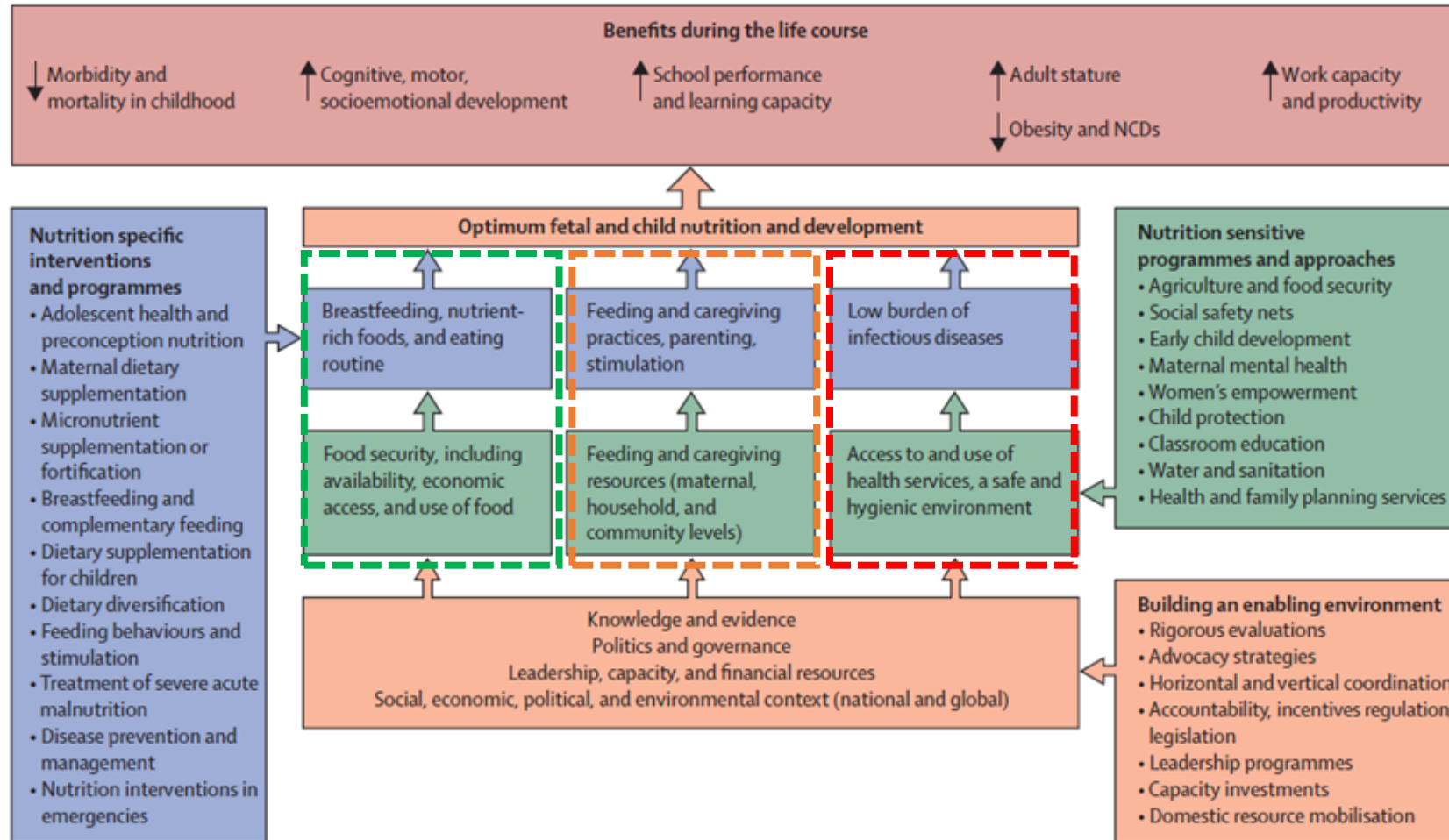
Rationale

- Scaling-up nutrition specific interventions will not meet global targets for improving nutrition outcomes (Bhutta et al., 2013)
- Other sectors are required and agriculture has strong potential due to the many ways it can influence underlying determinants of nutrition (Black et al., 2013)
- Livestock a key sector in nutrition-sensitive agriculture
 - High-quality protein and bioavailable micronutrients
 - Potential source of income and productive assets
 - But may also increase health risks through exposure to zoonotic diseases

Rationale

- WASH sector has focused little attention to livestock management and animal feces disposal
 - Elevated health risks for children, including diarrhea, environmental enteric dysfunction (EED) and respiratory infections
 - EED thought to reduce appetite, inhibit nutrient absorption, impair immune system function, associated with stunting
 - Scavenging poultry are a particular concern...

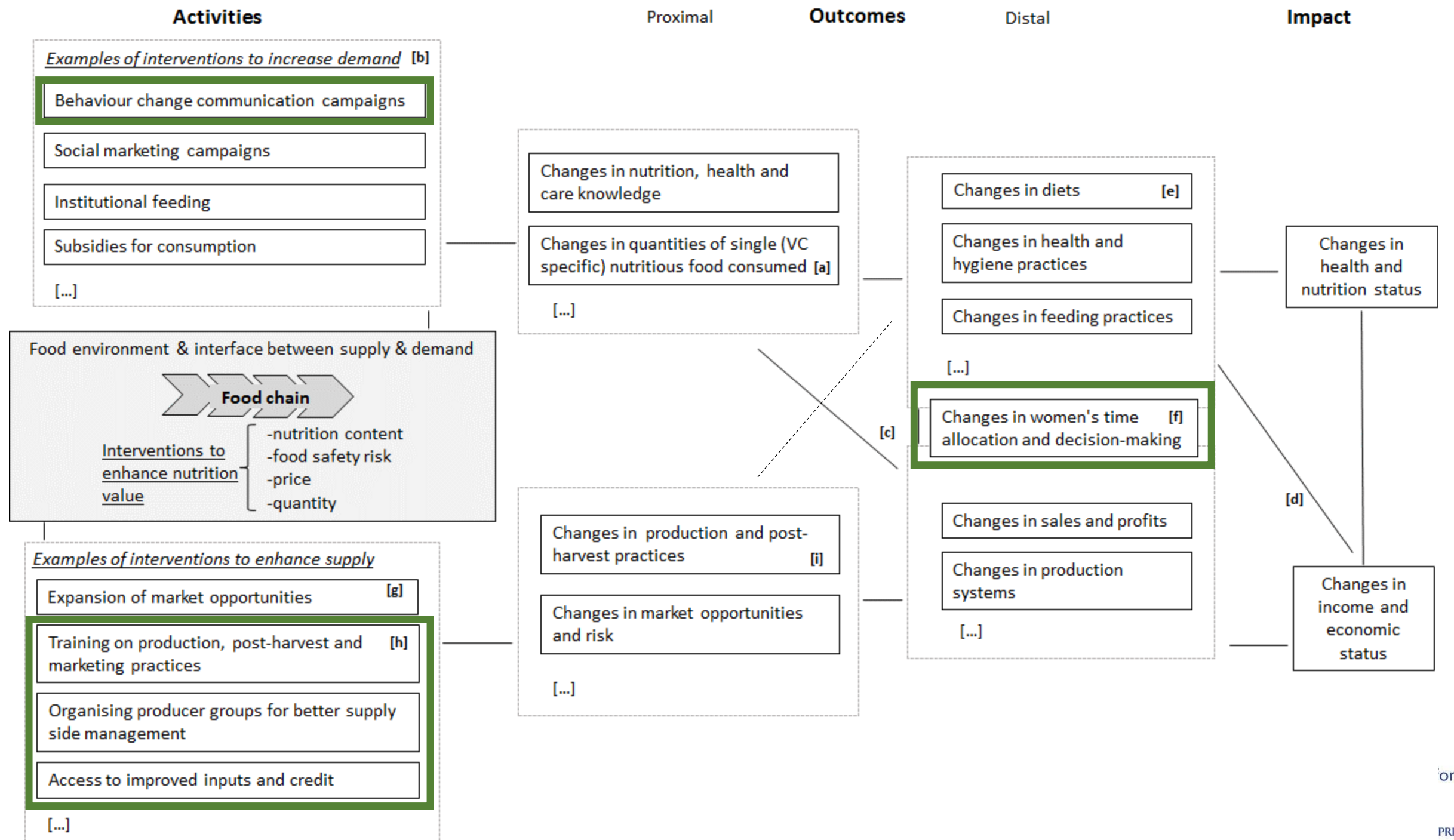
How can livestock interventions affect nutrition outcomes?



SELEVER impact evaluation

- Cluster randomized controlled trial design implemented in 120 rural villages within 60 communes in 3 regions of Burkina Faso
 - Evaluate impact of an integrated poultry value chain package on the diets, health and nutritional status of women and children





Formative research

- Identify needs for additional nutrition-sensitive WASH interventions
- Guide intervention design



Formative research findings

- Children's exposure to poultry and poultry feces is ubiquitous in Burkina Faso
 - 80% of rural households owned poultry, and most poultry could roam freely throughout compounds
 - Visible animal feces were reported in 84% of compounds
 - WASH practices and general hygiene were very low: Toilet ownership was extremely low (22% nationally), water supply was a major constraint, and handwashing with soap was very rare (only 2% of households reported having soap for handwashing)
 - Household observations confirmed the poor state of WASH, extreme exposure to poultry and poultry feces, and poor knowledge of the risks associated with children's exposure to animal feces

(Source: Gelli et al., 2017)



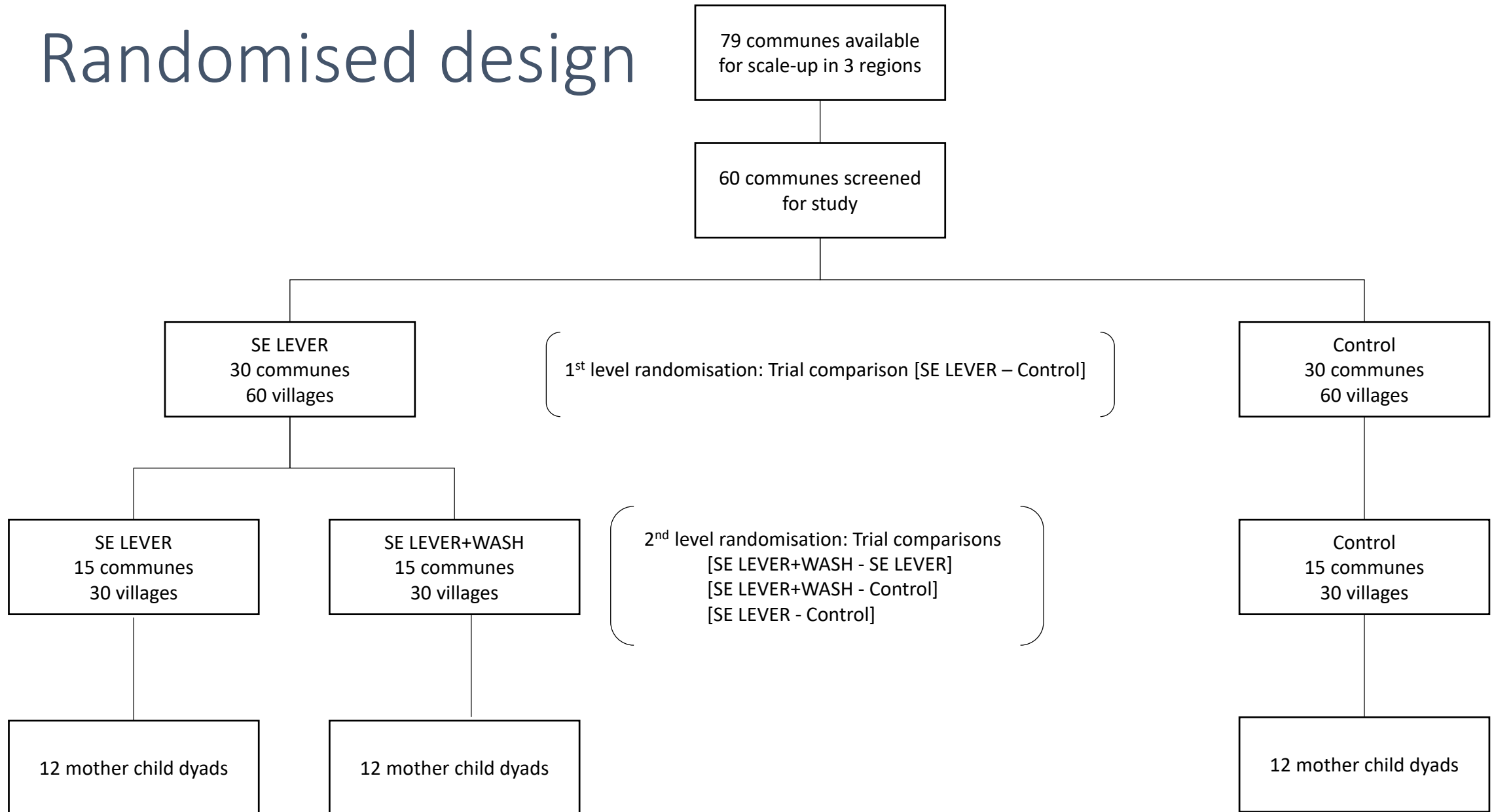
RESEARCH
PROGRAM ON
Agriculture for
Nutrition
and Health

Led by IFPRI

Enhanced WASH component

- *Information only...*
- Two main objectives:
 - Improving the WASH environment at community and household level (through CLTS)
 - Reducing children's exposure to poultry and livestock feces at household level (through specific hygiene-related messaging)

Randomised design

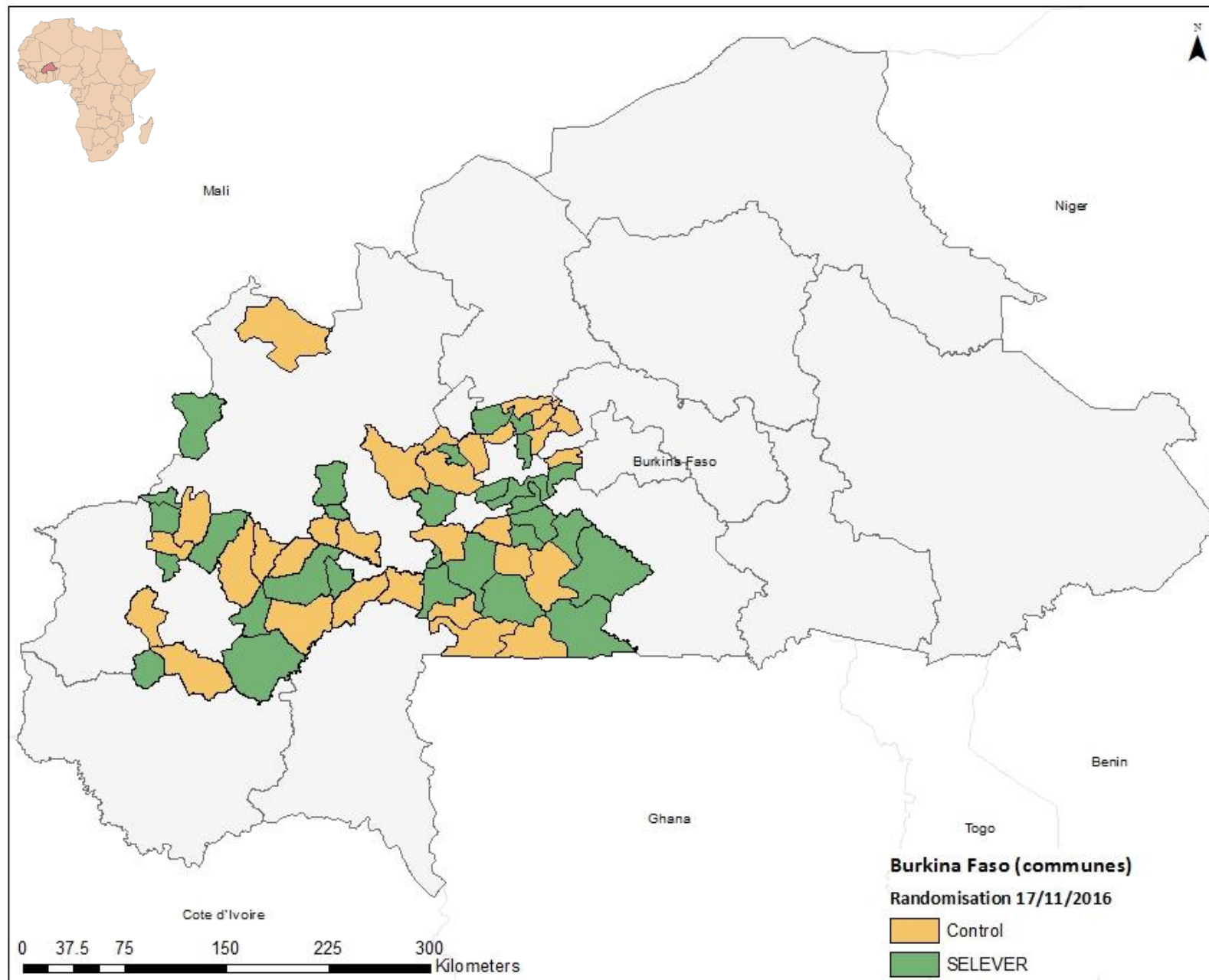


Study outcomes

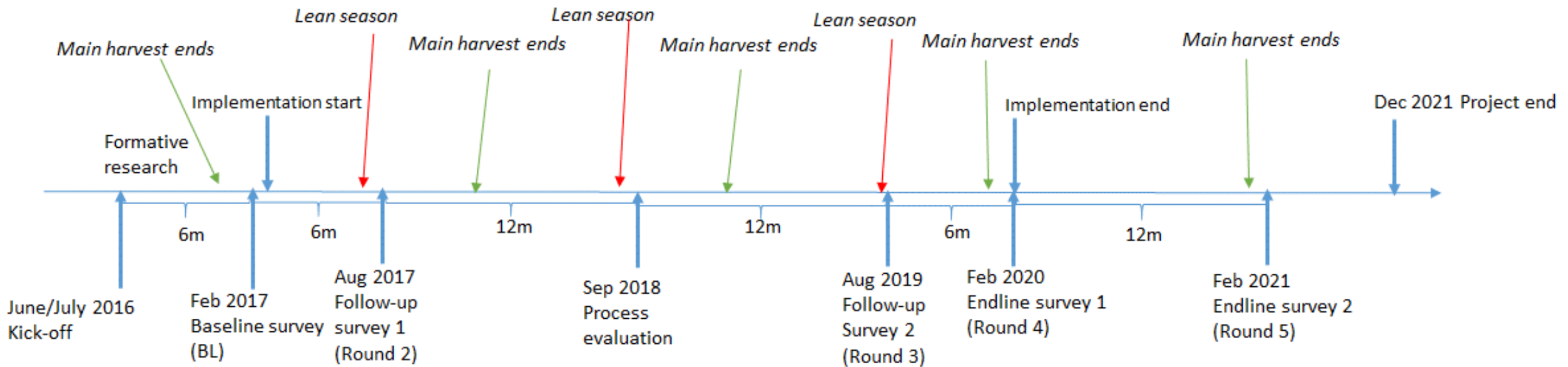
- Based on analysis of programme theory, the primary indicators for the study include:
 - Women's probability of adequacy (PA) for iron, zinc and vitamin A, and mean probability of adequacy (MPA) in micronutrients intake.
 - Children's (2-4 year olds) PA for iron, zinc and vitamin A and MPA in micronutrients intake.
 - Children's (6-24m) dietary diversity and other IYCF practices.
 - Household poultry production, sales and profits.

Study outcomes (cont.)

- Secondary outcomes relevant to intervention package include:
 - *Women's empowerment and wellbeing*
 - *Poultry value chain system*
 - *Health status, hygiene and exposure to fecal contamination*
 - *Nutrition knowledge, feeding and food consumption practices*
 - *Nutrition status*
 - *Household welfare*
 - *Male perspectives and support for nutrition and women's empowerment*
- Also assess a number intermediate indicators along pathways



Study timeline



In conclusion...

- Emerging evidence suggests that important trade-offs exist in terms of effectiveness of livestock interventions on child nutrition and development
 - Benefits in terms of animal source food consumption, income and diets may be offset by exposure to livestock feces and other contaminants
 - More research needed to clarify pathways (including seasonality)
 - Plenty of scope to improve measurement: Hygiene spot checks; parental reports, morbidity symptoms ...etc.
- Experimental research needed to identify:
 - Effects of livestock exposure on child nutrition and development
 - Obstacles to more nutrition-sensitive livestock rearing
 - Most effective means of overcoming these obstacles

Thank you!

- Slides based on Gelli A, Becquey E, Ganaba R, et al. Improving diets and nutrition through an integrated poultry value chain and nutrition intervention (SELEVER) in Burkina Faso: study protocol for a randomized trial. *Trials*. 2017;18(1):412.

Extra slides

Baseline results

WASH environment descriptives	
Chicken feces in compound (%)	72
Human feces in compound (%)	15
Clean toilet (%)	26
Any toilet (%)	59
Use of soap for hand cleaning (%)	1
Treat drinking water (%)	11
Mother fully clean (%)	49
Child fully clean (%)	36
House fully clean	15

Regression model for presence of Feces (logit)	
Owens Poultry	0.39**
Owens cattle	0.21
Owens Goat/ sheep	0.19**
Own donkey	0.17**
Own porc	0.26*
Mother fully clean	0.03
Child fully clean	-0.52***
Treat drinking water	0.39**
Clean toilet	-0.65***
SES/wealth effects?	Yes
Mother's education effects?	No

Models for nutrition, infection and child development

	6-24m		24-48m	
	HAZ	WHZ	HAZ	WHZ
Malaria				
Age	-0.09***	-0.02***	0.002	0.002
Girl	0.2**	0.249***	0.016	-0.012
Chicken feces	0.01	0.04	-0.015	-0.087*
Child clean	0.12	-0.12*	0.175**	-0.103**
Treated water	-0.01	0.25**	0.114	0.055
Latrine clean	0.11	-0.02	0.064	0.065
Exp. quintile	0.01	0.07**	0.043**	0.049**
Mum completed primary	0.11	-0.12	0.21**	-0.145**

24-48m				
AGP	CRP	Hb	Anemia	Language
0.341***	5.477***	-0.603***	0.19***	-0.972*
-0.012***	-0.02	0.026**	-0.007**	0.525***
0.003	-0.127	0.137*	-0.042	0.246
0.077	1.628**	-0.184*	0.078**	-0.825**
-0.036	0.51	-0.05	0.011	-0.035
-0.15**	-0.745	-0.285**	0.079	0.787
0.009	1.728**	-0.102	0.038	-0.037
-0.008	0.002	0.034	-0.011	0.379**
0.045	0.262	0.112	-0.05	0.715

Very Preliminary, do not cite!

In summary...

- Emerging evidence suggests that important trade-offs exist in terms of the effectiveness of livestock interventions on child nutrition
 - Benefits in terms of animal source food consumption, income and diets may be offset by exposure to livestock feces and other contaminants
 - More research needed to clarify the mechanisms and identify the scale of the problem, including seasonality
- Plenty of scope to improve measurement: Hygiene spot checks; parental reports, morbidity symptoms ...etc.
- Experimental research needed to identify:
 - Effects of livestock exposure on child nutrition and development
 - Obstacles to more nutrition-sensitive livestock rearing
 - Most effective means of overcoming these obstacles

WASH, diarrhea and nutrition

- Fecal contamination of the household environment is an important source of diarrheal pathogens (Curtis, Cairncross, and Yonli 2000; Marquis et al., 1990; Pickering et al. 2012)
- Strong evidence that poor WASH conditions contribute significantly to the burden of diarrheal morbidity and mortality (Esrey 1996; Checkley et al. 2004; Fink, Gunther, and Kenneth 2011; Mara et al. 2010; DFID 2013; Curtis and Cairncross 2003; Fewtrell et al. 2005; Aeillo et al. 2008; Ejemot et al. 2008; Cairncross et al. 2010)
- Evidence linking diarrhea to linear growth is less clear with several studies claiming that height is a more sensitive indicator of the health benefits of improved water and sanitation than diarrhea (Esrey 1996)

WASH, Acute Respiratory Infections, and Undernutrition

- Co-occurrence of respiratory and gastrointestinal infections has been reported in Bangladesh (Leung et al. 2015), Pakistan (Ashraf et al. 2013), and India and Nepal (Walker et al. 2013). Diarrhea was associated with increased risk of acute lower respiratory infections (ALRIs) in Indian and Nepali children (Walker et al. 2013) and in undernourished child populations in Ghana (Schmidt et al. 2009). The risk of comorbidities increased with the severity of the diarrhea (Walker et al. 2013). Recent diarrhea was also associated with increased risk of pneumonia in Pakistani children under five years old (Ashraf et al. 2013).