



RESEARCH  
PROGRAM ON  
Agriculture for  
Nutrition  
and Health

LED BY IFPRI

**CGIAR Research Program**

**Agriculture for Nutrition  
and Health (A4NH)**



# Outline

- **A4NH research portfolio** and fit within the CGIAR (John)
- **IDO, indicators and metrics** – effect of interventions and going to scale (**biofortification, integrated programs**) – Nancy and Stuart
- **Research areas** we want to accelerate (impact pathways / theory of change / research strategy and role (as appropriate))
  - **Food safety and Agricultural disease risk** – Delia
  - **Value chains and healthy diets** – Maximo
  - **Cross - sectoral policy processes** – LANSA (Prakesh) and other strategic issues (Stuart)
  - **Nutrition and health-sensitive landscapes** – John
- **Partnerships** (John)
  - Private sector
  - Country capacity – CAADP / SUN (initial discussions)

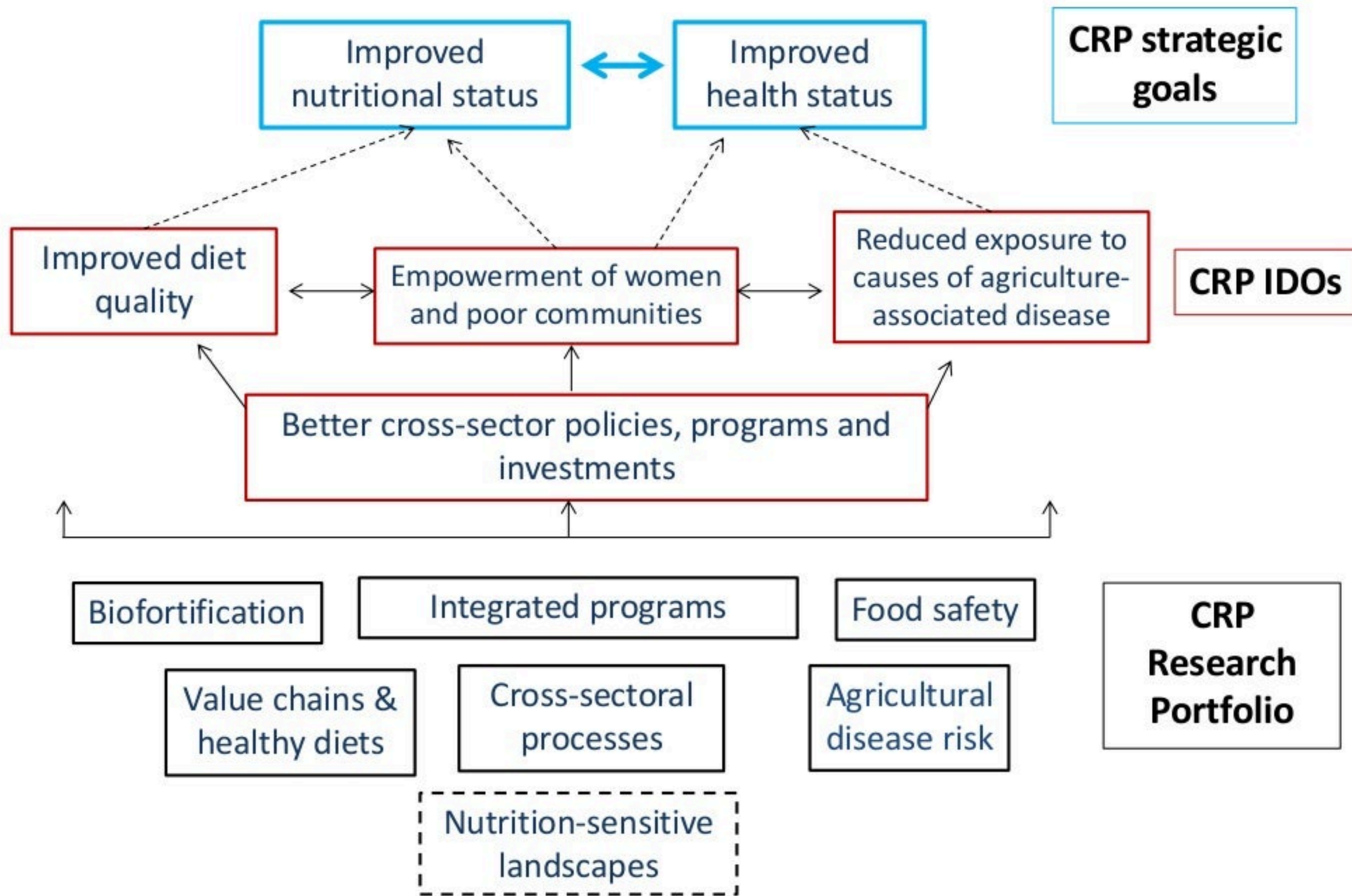
# CGIAR Research Agenda



## Common IDOs across CRPs

- Productivity (crop/system/ food system)
- Food security
- **Nutrition and Health**
- Income
- **Gender**
- Capacity to innovate
- Risk Management (adaptive capacity)
- **Policies – enabling environment/ institutions**
- Environment
- Future Options
- Climate

# Draft A4NH Results Framework



# Aflatoxin: a coordinated CGIAR agenda

MAIZE	GRAIN LEGUMES	AG/NUTRITION/HEALTH
<p>Control Technologies</p> <ul style="list-style-type: none"> <li>- Bio-control</li> <li>- Breeding / resistance</li> </ul> <p>Post-Harvest Technologies</p> <ul style="list-style-type: none"> <li>- Storage and Handling</li> </ul>	<p>Control Technologies</p> <ul style="list-style-type: none"> <li>- Bio-control</li> <li>- Breeding / resistance</li> </ul> <p>Post-Harvest Technologies</p> <ul style="list-style-type: none"> <li>- Storage and Handling</li> </ul>	<p>Understanding ag / nutrition / health effects</p> <p>Risk assessment (ag-health)</p> <p>– analysis and assessment of mitigation technologies</p>
<p>Surveillance/Diagnose Maize</p>	<p>Surveillance/Diagnose G_nuts</p>	<p>Methods ag-health impacts</p>
<p>Maize Value Chains</p> <ul style="list-style-type: none"> <li>- Organization of chains</li> <li>- Integration of control</li> <li>- Standards and certification</li> <li>- Economic incentives and risk assessment</li> <li>- Impact assessment</li> </ul>	<p>G-nut Value Chains</p> <ul style="list-style-type: none"> <li>- Organization of chains</li> <li>- Integration of control</li> <li>- Standards and certification</li> <li>- Economic incentives and risk assessment</li> <li>- Impact assessment</li> </ul>	<p>Prioritization and impact assessment of ag-health risks and impacts</p> <ul style="list-style-type: none"> <li>- In value chains</li> <li>- Cross-sectoral metrics and policy processes</li> </ul>

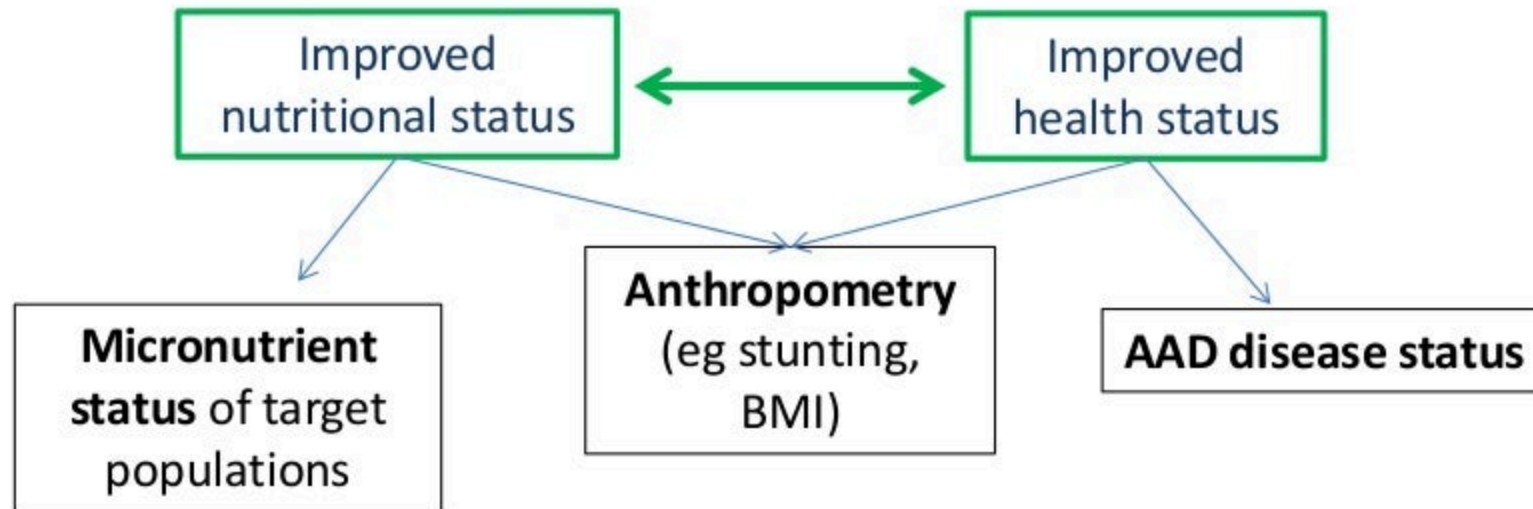
# Biofortification – Orange-Flesh Sweet Potatoes

	<b>A4NH</b>	<b>RTB</b>
<b>Breeding / germplasm development</b>	<ul style="list-style-type: none"> <li>Leads high-throughput diagnostics for vitamin levels (NIRS) platform and other minerals for most biofortified crops</li> </ul>	<ul style="list-style-type: none"> <li>Leads overall breeding program.</li> <li>Supports and uses high through put diagnostics for vitamin levels and other quality traits.</li> </ul>
<b>Nutritional efficacy and bioavailability studies</b>	<ul style="list-style-type: none"> <li>Primary responsibility</li> </ul>	<ul style="list-style-type: none"> <li>No role</li> </ul>
<b>Delivery and Evidence / Advocacy</b>	<ul style="list-style-type: none"> <li>Leads on the nutrition evidence and public delivery related to improving nutrition and health in target populations;</li> </ul>	<ul style="list-style-type: none"> <li>Leads on key agriculture value chain delivery</li> </ul>
<b>Value chain coordination</b> , food processing, food industry (like Rwanda Superfoods) and assessing nutrition and health outcomes	<ul style="list-style-type: none"> <li>Joint work, focus on looking at incentives and arrangements as they relate to consumption and improving nutritional quality (including gender),</li> <li>Standards for biofortified products, and food safety.</li> <li>Joint work on processing and foods .</li> </ul>	<ul style="list-style-type: none"> <li>Joint work, taking the lead among key value chain actors related to agri-business, with a particular focus on gender relations as RTB commercialization increases.</li> <li>Joint work on processing and foods.</li> </ul>

# **IDOs, indicators and metrics**



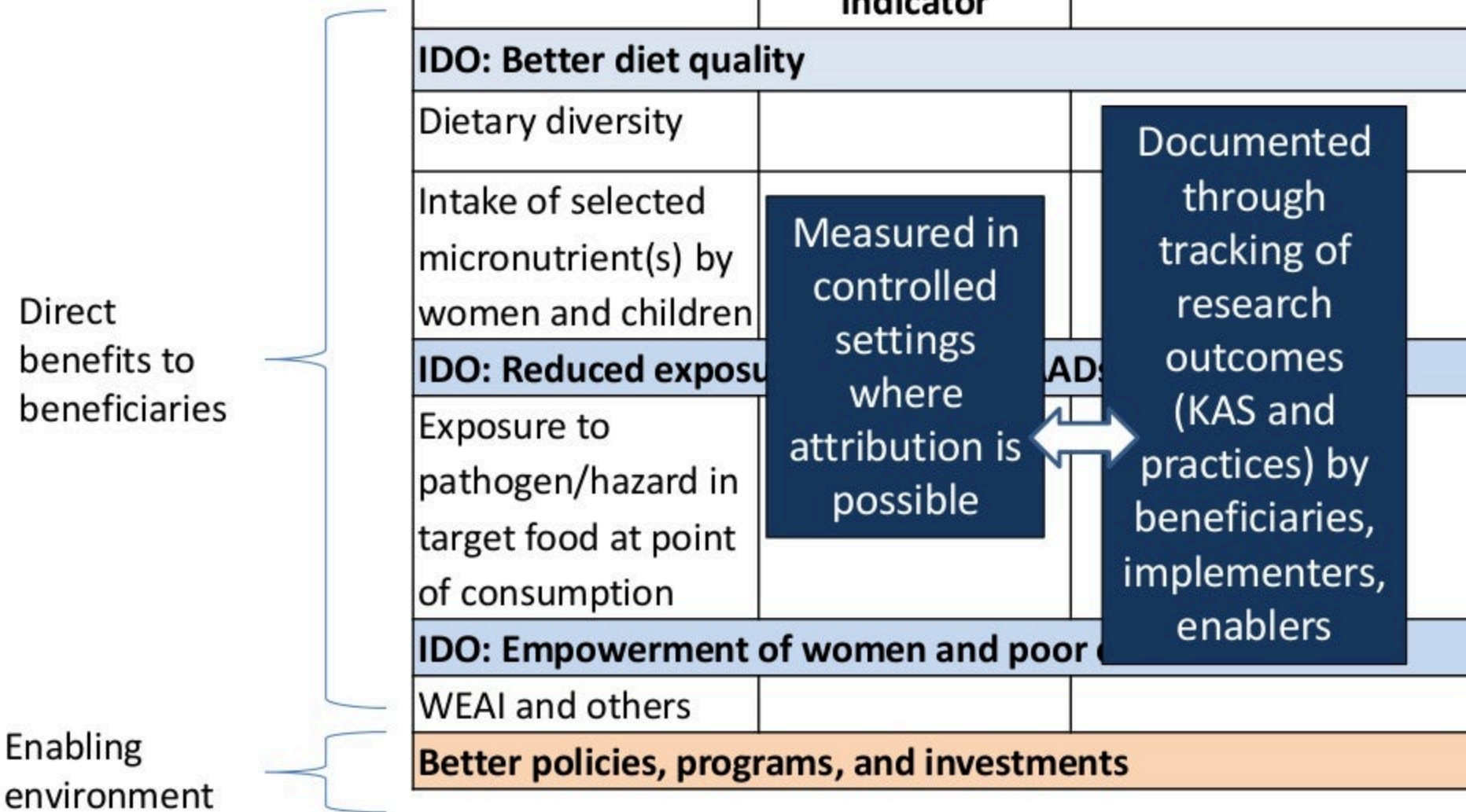
# Indicators for strategic goals



- Standard burden measures of prevalence or Disability-Adjusted Life Years (DALYs) lost
- Goal-level indicators collected as part of research but changes at scale unlikely. A4NH to actively seek joint efforts to reduce stunting in some sites.

IDO	Indicator	Metric(s)
<b>Better diet quality</b>	Dietary diversity	Individual dietary diversity score; prevalence of low dietary diversity (<4 on a 7 food-group scale for infants and young children (WHO indicator); and <4 on a 9 food-group scale in adults)
	Intake of selected foods and micronutrient(s)	Nutrient intake from consumption of target food(s)/total nutrient intake from all foods consumed ; prevalence of low micronutrient intake
<b>Reduced exposure to causes of agriculture-associated diseases</b>	Exposure to pathogen/hazard in target food at point of consumption	Prevalence of pathogen in food X quantity consumed per capita by target beneficiaries
	Direct exposure to pathogen/hazard in agri-food system	Prevalence of target disease in animal population on farm, at slaughter, at market
		Reduction in disease emergence and transmissions opportunities
<b>Empowerment</b>	Women's empowerment in agriculture index (WEAI)	Value of the index and main sub-indices
	Degree of participation in decisions related to food, nutrition, and health	Scale constructed from responses to individual questions
<b>Better policies, programs, and investments</b>	# of countries whose policies or policy processes were influenced by A4NH outputs # of CRPs /development programs/public health programs/donor investment portfolios that are influenced by A4NH outputs	# of countries or programs <i>Measure of degree of influence (TBD)</i>

# Measuring contribution to changes in IDO indicators



# Biofortification



**Cassava**  
Provitamin A  
DR Congo, Nigeria



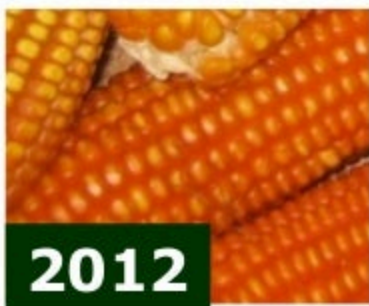
**Pearl Millet**  
Iron (Zinc)  
India



**Beans**  
Iron (Zinc)  
DR Congo, Rwanda



**Rice**  
Zinc  
Bangladesh, India



**Maize**  
Provitamin A  
Zambia



**Wheat**  
Zinc  
India, Pakistan

Research outputs: high micronutrient varieties of verified nutritional efficacy and strategies to enhance their adoption and impact

## Some estimates of the size and scale of impact on IDO indicators for Biofortification

<b>IDO: Better diet quality</b>		
<b>Indicator</b>	<b>Size of impact on indicator</b>	<b>Scale of impact</b>
Intake of selected micronutrient(s) by women and children		25 million micronutrient deficient people by 2018 in 8 target countries in Africa and Asia
<b>IDO: Empowerment</b>		
WEAI and others	To be determined	
<b>Better policies, programs, and investments</b>		
# of countries that enact biofortification programs		
# of breeding programs that include nutritional content in varietal evaluation criteria		

## Return on investment: example of ex-ante analysis

- Meenakshi et al 2010- (multi-country global); Stein et al 2011 (LAC); updated global study coming out end of 2013
- Change in micronutrient intake estimated based on changes in:
  - Micronutrient content of target crop
  - Processing losses
  - Per capita consumption of crop by target group
  - Expected adoption rate of biofortified varieties (proxy for % of consumption that is biofortified)
- Using modeling framework developed by Stein et al (2005) to relate micronutrient intake to health outcomes, estimate reduction in DALYs lost to micronutrient deficiencies due to work of HarvestPlus and partners

Reduction in DALY burden of micronutrient deficiency through biofortification under pessimistic and optimistic scenarios, by nutrient and country (%)

Crop	Country (or region)	Provitamin A		Iron		Zinc	
		Pess.	Opt.	Pess.	Opt.	Pess.	Opt.
Cassava	Congo, DR	3	32				
	Nigeria	3	28				
	NortheastBrazil	4	19				
Maize	Ethiopia	1	17				
	Kenya	8	32				
Sweetpotato	Uganda	38	64				
Beans	Honduras			4	22	3	15
	Nicaragua			3	16	2	11
	NortheastBrazil			9	36	5	20
Rice	Bangladesh			8	21	17	33
	India			5	15	20	56
	Philippines			4	11	13	43
Wheat	India			7	39	9	48
	Pakistan			6	28	6	37

Source: Meenakshi et al 2010

## Key biofortification costs, by category, nutrient and country (\$000 per year).

	Country	R&D costs (years 1-8)	Adaptive breeding (years 5-10) high assumption	Dissemination (years 11-18) high assumption	Maintenance breeding (years 11-30) high assumption
Crop (micronutrient)					
Cassava (provitamins A)	DR Congo	249	800	960	200
	Nigeria	303	1,200	2,663	185
	Northeast Brazil	387	1,000	1,468	100
Maize (provitamins A)	Ethiopia	314	600	545	60
	Kenya	301	600	474	100
Sweetpotato (provitamins A)	Uganda	317	736	1,882	147
Beans (iron & zinc)	Honduras	223	140	41	20
	Northeast Brazil	382	1,400	1,468	200
Rice (iron and zinc)	Bangladesh	300	200	285	100
	India	779	1,600	1,950	200
	Philippines	247	100	101	200
Wheat (iron & zinc)	India	749	1,600	1,150	200
	Pakistan	483	1,200	575	200

Source: Meenakshi et al 2010



Cost per DALY saved with biofortification, under pessimistic and optimistic scenarios,

Crop	Country (or region)	Provitamin A		Iron		Zinc	
		Pess.	Opt.	Pess.	Opt.	Pess.	Opt.
Cassava	Congo, DR	123.8	7.6				
	Nigeria	137.4	7.9				
	Northeast Brazil	1006.5	126.5				
Maize							
Sweetpotato							
Beans							160.2
							576.4
	Northeast Brazil			133.9	20.0	1899.7	152.6
Rice	Bangladesh			17.9	4.8	6.8	1.5
	India			16.7	3.4	5.7	1.3
	Philippines			234.4	54.5	55.0	12.2
Wheat	India			9.8	1.1	10.6	1.3
	Pakistan			14.0	2.0	48.6	4.6

In general, biofortification is a “very cost effective” intervention according to World Bank criteria.

## Integrated agriculture and nutrition programs



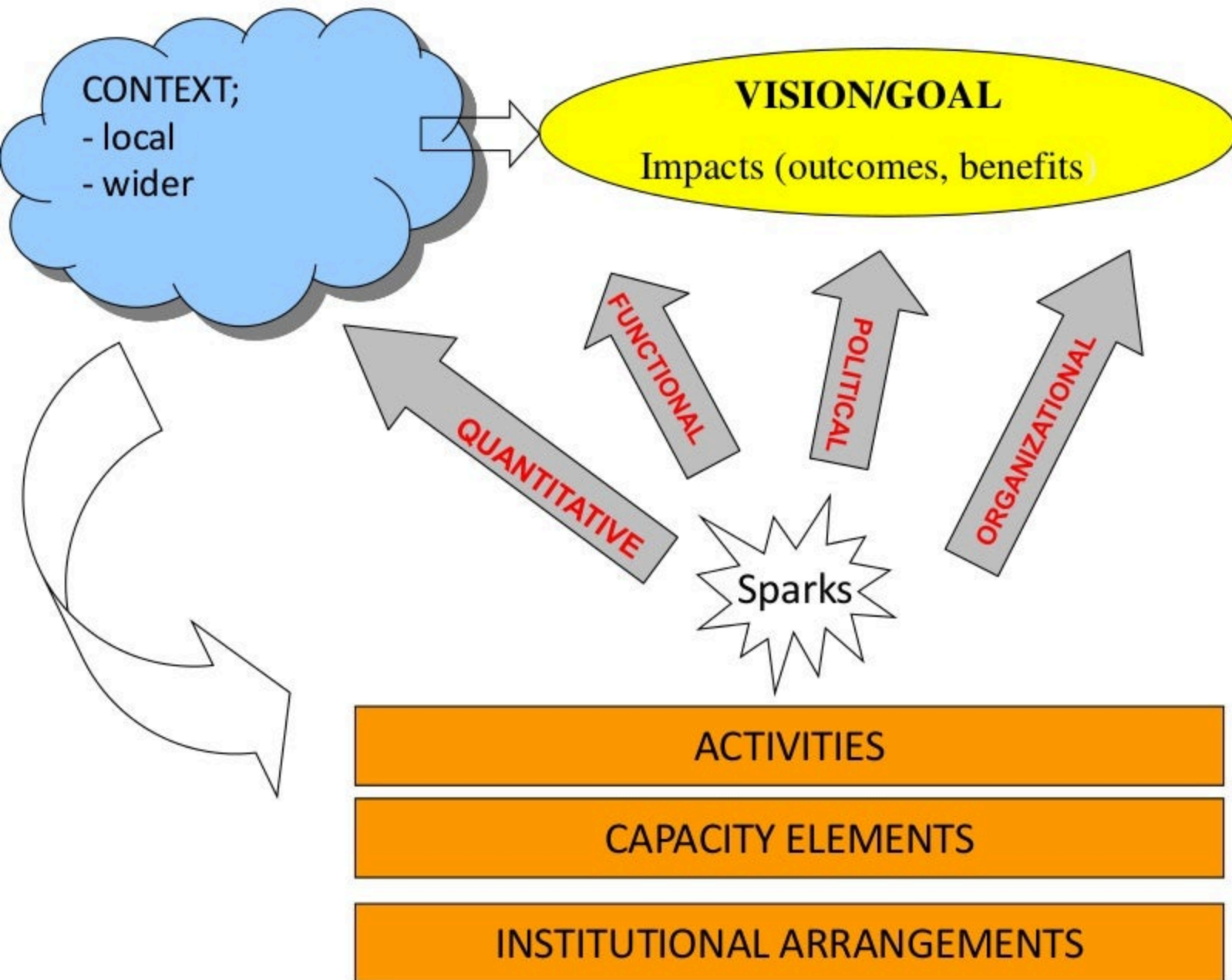
### Key outputs:

- A critical body of evidence on *what works, how, and at what cost* to improve nutrition for women and children during first 1000 days
- Innovations in program design, implementation, and evaluation that can be scaled up
- Improved awareness and capacity in partners, implementers and enablers

## Some estimates of the size and scale of impact in IDO indicators for Integrated programs

<b>IDO: Better diet quality</b>		
<b>Indicator</b>	<b>Size of impact on indicator</b>	<b>Scale of impact</b>
Dietary diversity	Mean dietary diversity increased by 1 food group; Low dietary diversity in young children (6-24 mos) and in women reduced by 10%	
Intake of selected micronutrient(s) by women and children	Reductions in % of mothers or young children at risk of inadequate intake of specific micronutrients	
<b>IDO: Empowerment</b>		
WEAI and others	To be determined.	
<b>Better policies, programs, and investments</b>		
# of countries that integrate nutrition in their agricultural policy		
# of development organizations that incorporate evidence from A4NH into their agriculture-nutrition programming		

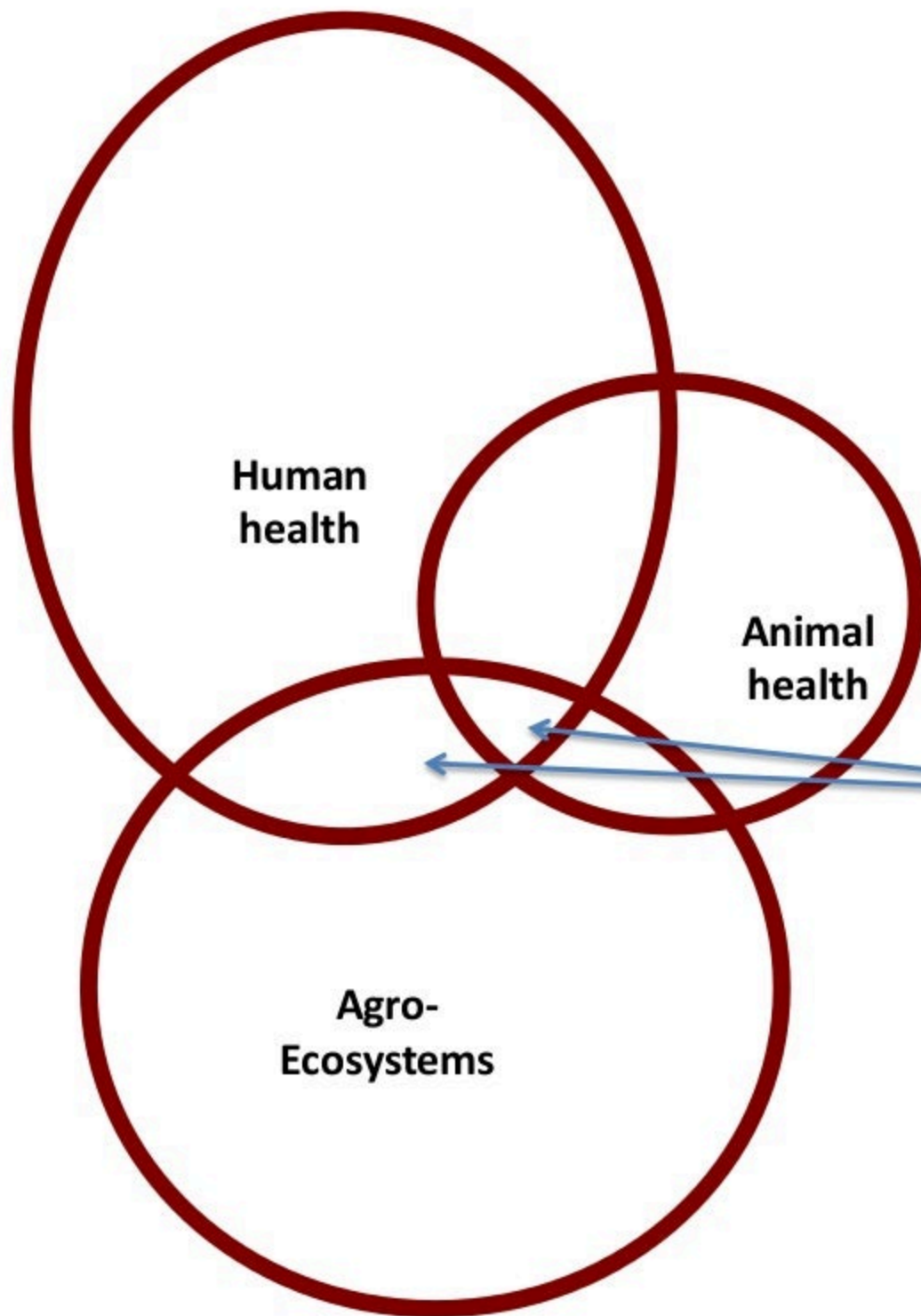
# Scaling up: a framework



# Taxonomy of scaling up

Quantitative (scaling out)	Spread Replication Nurture Integration
Functional	Horizontal Vertical
Political	From service delivery, to... .....community capacity development, to.... .....policy reform, to... social movements
Organizational	Internal management Financial viability Institutional diversification

**Other research areas**



**Human  
health**

**Animal  
health**

**Agro-  
Ecosystems**

## HEALTH STAKEHOLDERS

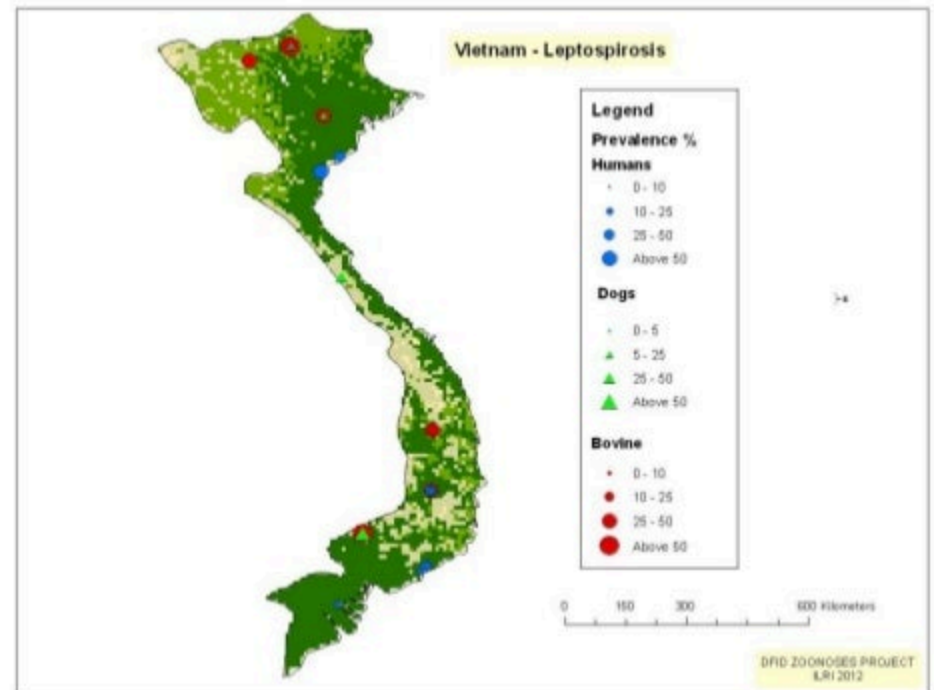
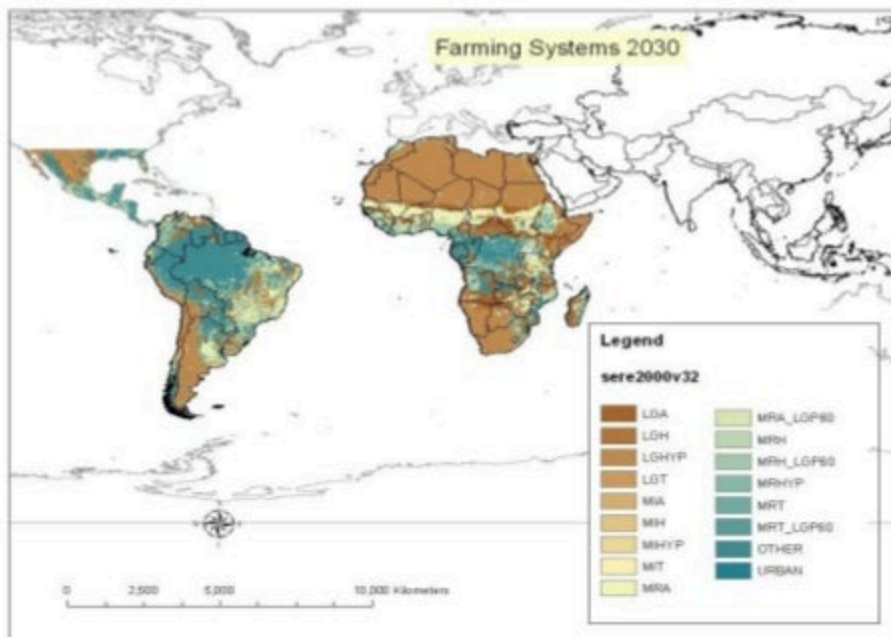
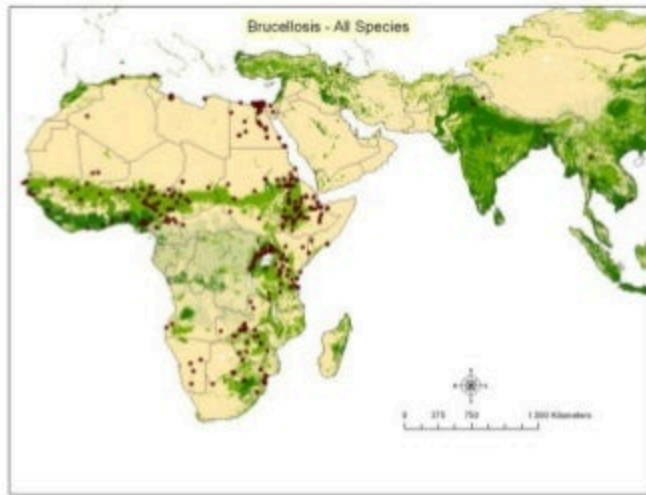
- International organisations
- Regional organisations
- Private sector health provision
- Public health
- Veterinary public health
- NGOs & CBOs
- Conservation
- Environment

**International  
agricultural  
health research**

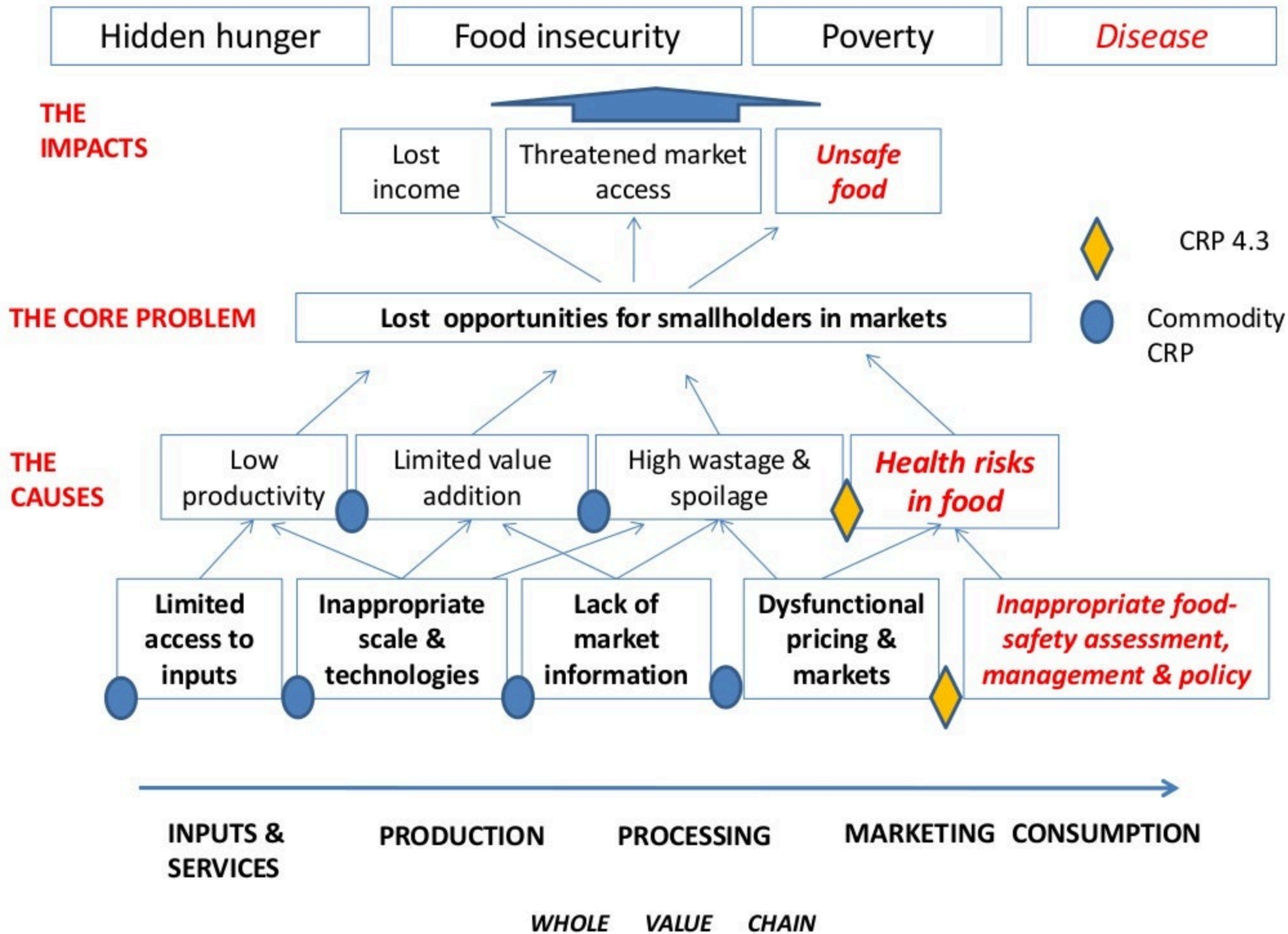
## RISK CREATORS

- Agriculture, intensification
- Natural resource management
- Industry
- Urbanisation
- ETC

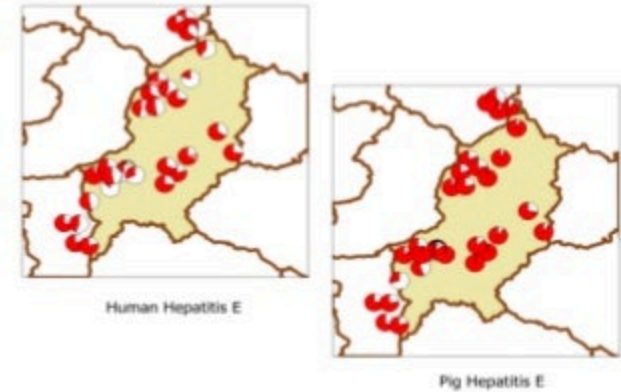
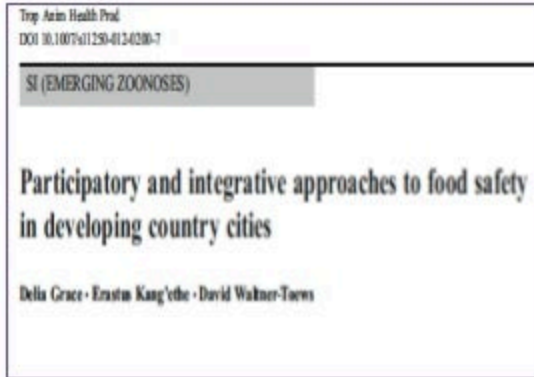
# Mapping & measuring the multiple burdens of FOOD BORNE DISEASE







# One Health approaches showing how to better understand and manage zoonoses and emerging infections



- Published special edition on assessing & managing urban zoonoses
- Starting new project on pathogen flows in Nairobi

- Investigating irrigation, climate change & disease shifts
- Made first estimate of DALYs for RVF in Kenya

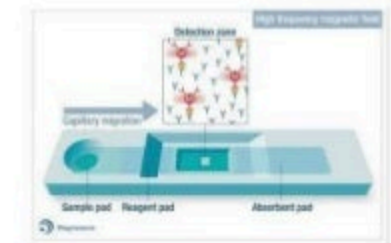
- Integrated human & livestock disease surveys: Kenya, Laos, Vietnam, China
- Slaughter house surveys: Kenya, Uganda, Thailand, Vietnam



- Supporting 2 EcoHealth/OH Resource Centers in SE Asia
- Assessed barriers & bridges to uptake of EH/OH by frontline staff

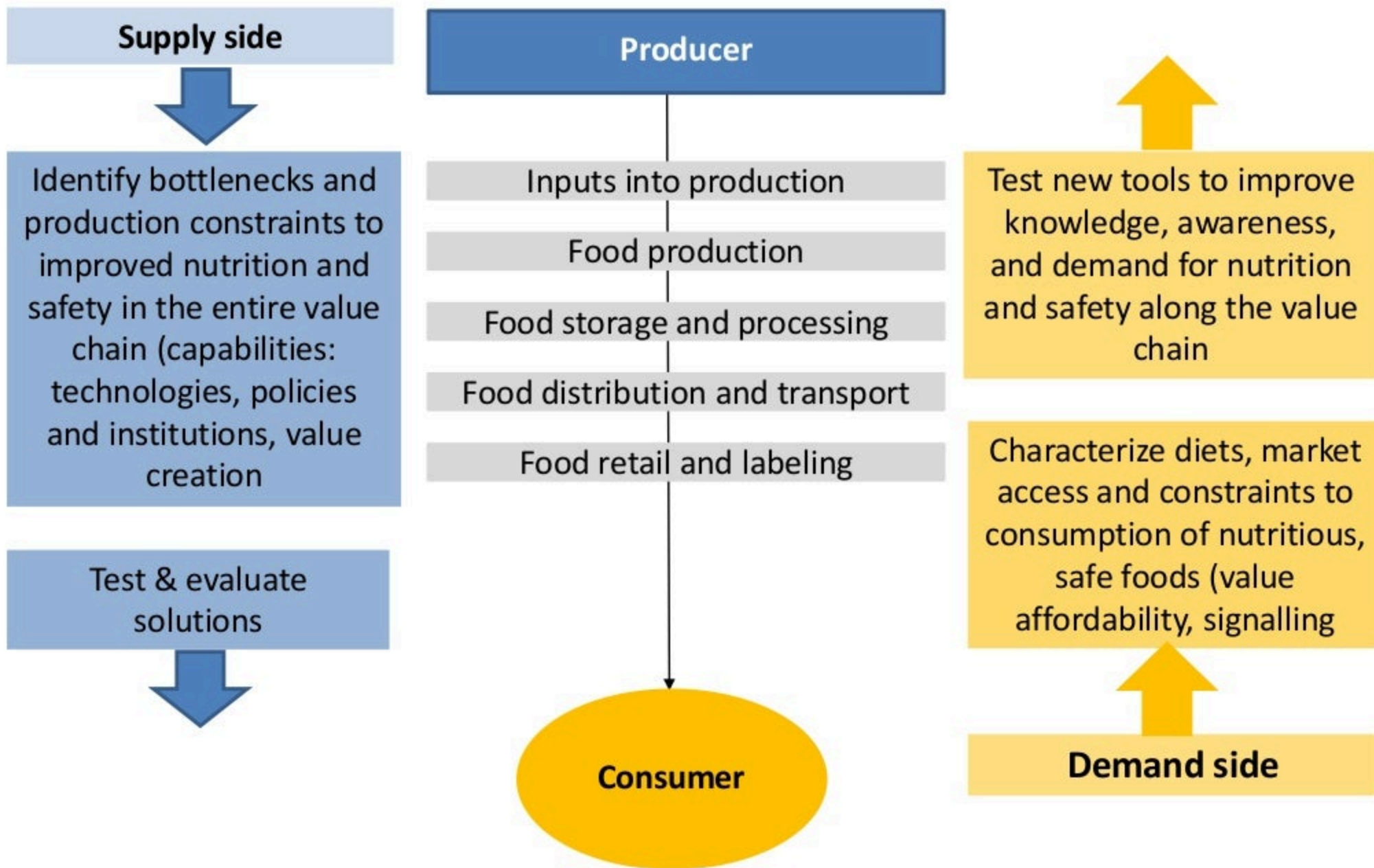


- Operating platform for pathogen discovery & bio-repository
- Discovered virus in novel host: implication for human health?

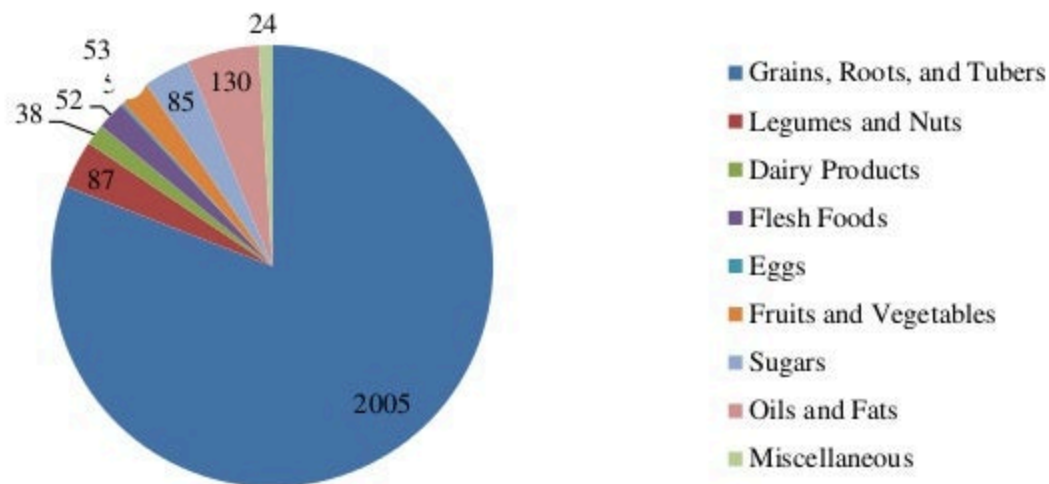


- Developing & testing novel cysticercosis diagnostic

# Value Chain Approach

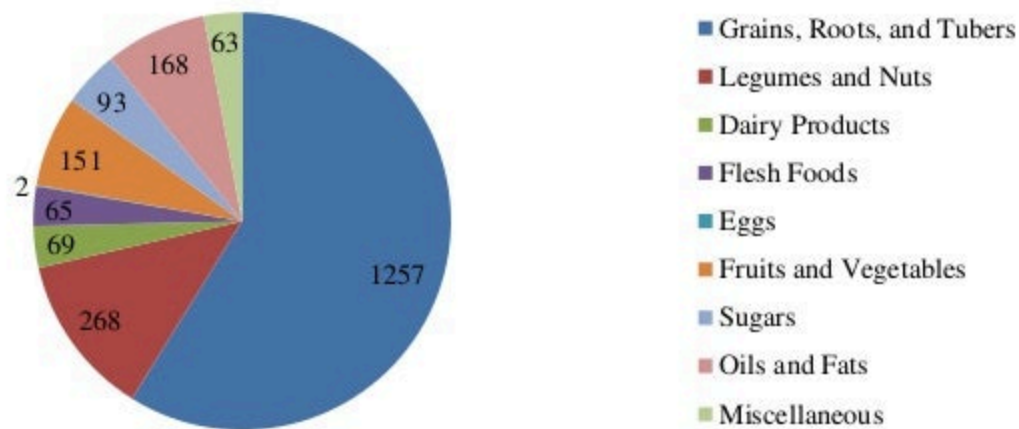


### Bangladesh: Food Group Shares of Total Food Supply (kcal/capita/day)



Data Source: [FAO Food Balance Sheets](#), 2009

### Tanzania: Food Group Shares of Total Food Supply (kcal/capita/day)



# LEVERAGING AGRICULTURE FOR NUTRITION IN SOUTH ASIA (LANSA)

DfID funded Research Programme Consortium

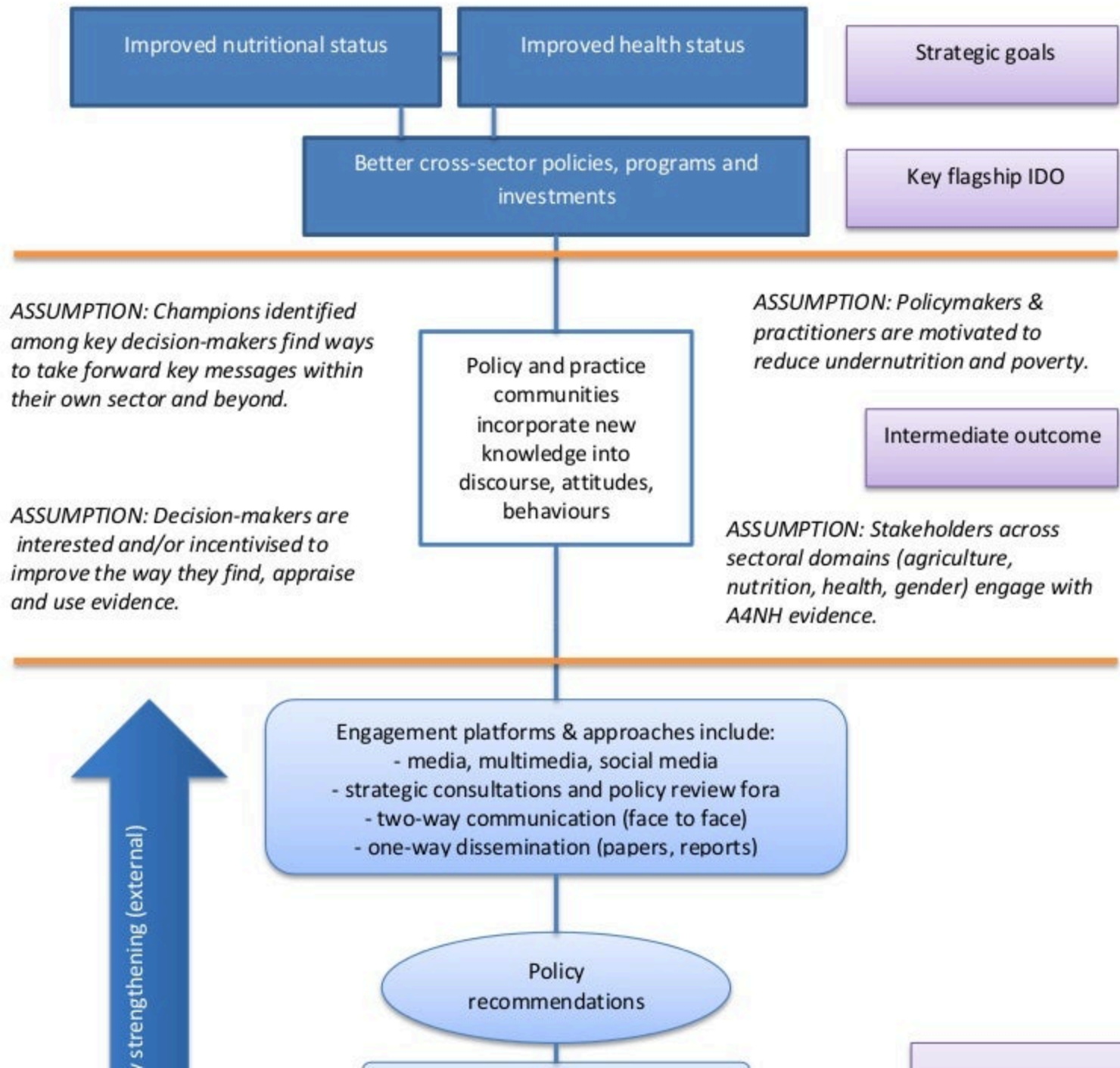
The core **question** that LANSA will address is:

*“How can South Asian agriculture and related food policies and interventions be designed and implemented to increase their impacts on nutrition, especially the nutritional status of children and adolescent girls?”*

# LANSA's Research Agenda

- Three Research Pillars:
  - **Pillar 1 : How enabling is the wider context in linking agriculture and food systems to other determinants of nutritional status?**
  - **Pillar 2 : How can the nutrition impacts of agriculture and agri-food value chains be enhanced through appropriate strategies and policies?**
  - **Pillar 3 : How strong is the evidence that agricultural interventions can be pro-nutrition?**
- Cross cutting themes:
  - Gender
  - Innovation systems
  - Fragility

**DRAFT: Theory of change for A4NH policy flagship**



among key decision-makers find ways to take forward key messages within their own sector and beyond.

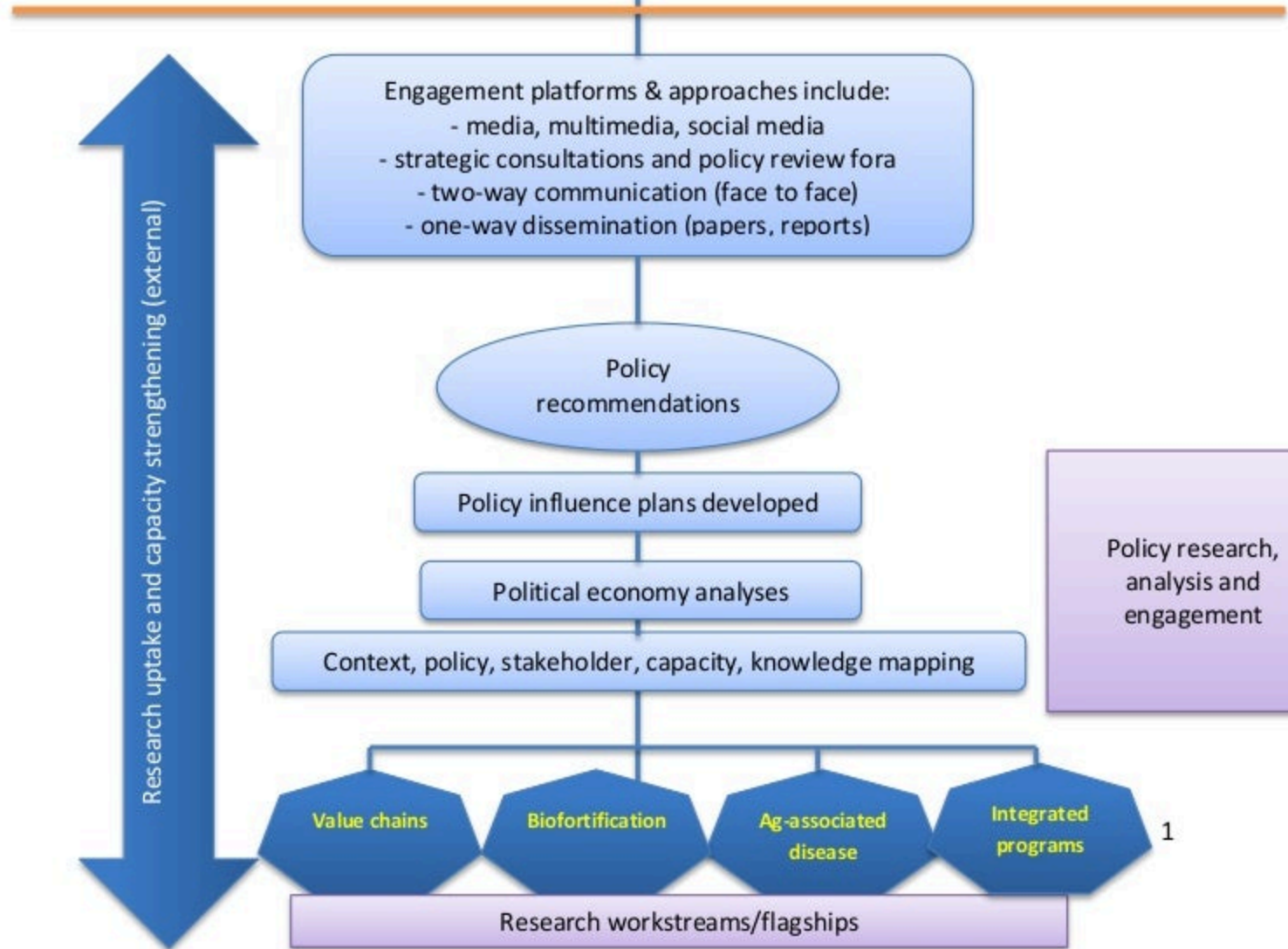
Policy and practice communities incorporate new knowledge into discourse, attitudes, behaviours

practitioners are motivated to reduce undernutrition and poverty.

Intermediate outcome

ASSUMPTION: Decision-makers are interested and/or incentivised to improve the way they find, appraise and use evidence.

ASSUMPTION: Stakeholders across sectoral domains (agriculture, nutrition, health, gender) engage with A4NH evidence.





# Partners

