Summary of the

Regional Public Health Consultations with the CGIAR Research Program on Agriculture for Nutrition and Health (A4NH)

July 2015

Table of Contents

Abbreviations and Acronyms

A4NH	Agriculture for Nutrition and Health
AMR	Anti-microbial resistance
BCC	Behavior change communication
CCHF	Crimean-Congo hemorrhagic fever
CDC	Centers for Disease Control and Prevention
CIP	International Potato Centre
CRP	CGIAR Research Program
EID	Emerging infectious disease
FAO	Food and Agriculture Organization of the United Nations
GMO	Genetically modified organisms
IEC	Information, education, and communication
IFPRI	International Food Policy Research Institute
IITA	International Institute of Tropical Agriculture
ILRI	International Livestock Research Institute
IWMI	International Water Management Institute
KAP	Knowledge, attitude, and practices
LCIRAH	Leverhulme Centre for Integrative Research on Agriculture and Health
NCD	Non-communicable disease
PHFI	Public Health Foundation of India
PMU	Program Management Unit
POPs	Persistent Organic Pollutants
RVF	Rift Valley fever
SRF	Strategy and Results Framework
TB	tuberculosis
ToC	Theory of change
VBD	Vector-borne disease
WHO	World Health Organization

Background and purpose

In April and May 2015, the CGIAR Research Program on Agriculture for Nutrition and Health (A4NH) convened three regional consultations, the purpose of which was to make progress in developing ideas for a joint research program on better human health through good agricultural practices.[1] The consultations brought together regional experts from human health and agriculture to discuss the assumptions driving the health research agenda in A4NH and get feedback on how to design an integrated, holistic and interdisciplinary research approach that is consistent with public health priorities and meets public health standards and rigor.

Part of the impetus for these meetings was a desire to respond to the opportunity presented in the new CGIAR Strategy and Results Framework (SRF) for 2016-2030, which places increased emphasis on human health issues associated with agriculture. A4NH convened the first meeting for West and Central Africa in collaboration with the International Institute of Tropical Agriculture (IITA) in Cotonou, Benin, from April 22-24; the next was held for East and Southern Africa in collaboration with the International Livestock Research Institute (ILRI) in Nairobi, Kenya, from April 28-29; the last regional meeting was held for South Asia in collaboration with the Public Health Foundation of India (PHFI) and the IFPRI-South Asia office in New Delhi, India, from May 28-29. A synthesis meeting was held with European institutes with the Leverhulme Centre for Integrative Research on Agriculture and Health (LCIRAH) in London, England, on June 5. The summary of that meeting is included at the end of this report.

The expected short-term output from these meetings will be the development of the A4NH pre-proposal to the CGIAR Consortium Board for the second phase of the research program.[2] Thanks largely to inputs from these consultations, A4NH will be better positioned to submit a compelling agriculture and health research agenda as part of its pre-proposal for Phase 2 of the research program in August 2015. (Phase II will run from 2017-2022). Expected medium-term outputs from the meetings include the formation of new teams, funding strategies, and development of proposals on research looking at agriculture and health issues.

For each regional consultation meeting, a common agenda guided by a workbook prepared and circulated prior to the meeting was used. This provided some common structure and questions across the different regions while allowing for different regional perspectives and approaches on what and how agriculture and health research might be planned and supported.

This report was prepared by the A4NH Program Management Unit (PMU) to summarize the key ideas from the consultations, in particular the focus areas for research at the nexus of agriculture and health and potential partners that would need to be engaged if our research is to contribute to development impact. A list of participants is included as an annex to this report. Agendas, consultation workbooks, presentations, and background materials are available via a folder on Dropbox, which participants were encouraged to share and upload additional resources. The link to the folder is:
https://www.dropbox.com/sh/zqrzyief534kbpv/AABpAiZNaV9kLnKtDIiyayEaa?dl=0

[1] A4NH draws on expertise from 12 CGIAR Centers as well as partners from across the agriculture, nutrition and health sectors, collaborating on new research and developing joint solutions to reduce the global burden of malnutrition and disease. It is led by the International Food Policy Research Institute. http://www.a4nh.cgiar.org/

[2] Details about CGIAR's second call for proposals is available here: http://www.cgiar.org/our-strategy/second-call-for-cgiar-research-programs/

Issues in public health and agriculture

The purpose of this session was to share views on priority areas for collaboration between the public health and agriculture sectors. The areas identified in each region are summarized below.

West and Central Africa

- **Pesticides and other agricultural inputs**, including the use, overuse, and misuse of chemical pesticides, mineral fertilizers, and so on; water contamination; occupational health risks; and short- and long-term effects of consuming contaminated food. Related issues are use of counterfeit or non-released inputs.
- **Population growth, migration, and urbanization**, including the growth of urban and peri-urban agriculture, contamination of water bodies, zoonotic diseases, disease patterns is urban dwellings like slums, and pressure on land.
- **Malaria** and how changing agricultural practices influences parasite and vector behavior.
- **Intensification of livestock** and **nonconventional animal rearing** (rodents) and environmental health impacts and changes in zoonotic disease prevalence and patterns.
- **Issue of water use and reuse**, including unique issues in peri-urban and urban agriculture, contaminants in water used for agriculture, and quality of water for human use and consumption.
- Agriculture's role in promoting both **quality and quantity of food**, including but not limited to biofortification, value addition along the food chain, storage, and addressing the unique challenges faced in the Sahel to meet food security needs. Relatedly was the topic of **changes in food consumption patterns** that come with economic growth and demand among consumers for more protein-based, processed foods, which agriculture will meet.
- Emergence of non-communicable diseases (**NCDs)**, as it relates to changes in diets, production, and consumer preferences. Other NCDs linked to agriculture included the increase in food allergies linked to changes in production and preferences and increase in respiratory infections linked to insecticide sprays.
- **Multisectoral collaboration** and the clear need for adopting a One Health or Ecohealth approach, particularly among agricultural specialists.

East and Southern Africa

- **Malnutrition**, including undernutrition and micronutrient deficiencies, the diet-related NCDs, and sustainable diets
- **Shifts in added compounds/agricultural inputs**, including occupational hazards, anti-microbial resistance (AMR), pesticide use and misuse, and heavy metals
- **Vector-borne diseases (VBD)**, including neglected tropical diseases and climate associated diseases
- **Food safety**, including foodborne and waterborne diseases, emerging infectious disease (EID), aflatoxins, other plant toxins, foodborne zoonoses, and drug residues in food
- **Health issues related to zoonoses**, including EIDs like Rift Valley fever (RVF) and brucellosis
- **Increased irrigation**, including water pollution from agriculture
- **Agricultural intensification**, particularly livestock

South Asia

- **Health issues related to zoonoses**, including emerging zoonoses at the human-animal interface, the human-wildlife interface, and neglected zoonosis, like brucellosis.
- **Urbanization, wastewater, and health,** including hazards in water such as heavy metals, chemicals, persistent organic pollutants (POPs), and other pathogens and the food safety issues that arise when clean agricultural products can be made unsafe if they are washed

with polluted water in markets and sold to consumers. National and regional capacity to test for these contaminants was highlighted as a related issue.

- Use of antimicrobials in livestock and their contribution to **AMR** and relatedly, environmental contaminants from resistant bacteria
- Evidence to address controversies surrounding genetically modified organisms (**GMOs**) and biofortification.
- **Occupational health hazards and risks**, such as injuries from using unsafe agricultural implements, snake bites, and other occupational injuries.
- **Climate change and its impact on agriculture and public health**, including changing disease patterns**.**
- **Multidisciplinary action,** including training young researchers to use multidisciplinary approaches, like Ecohealth/One Health.
- **Marginalized populations** were mentioned as a particularly important area of consideration.
- **Fortification of animal products**, such as increasing the nutrient value of eggs and milk with omega-3 and iron through animal feeds.
- **Socio-cultural issues.** A number of issues fit in this category. The feminization of the labor force in certain agrarian sectors and its influence on maternal and child undernutrition; mental health issues associated with loss of land; and public health policies, like tobacco control, and how it affects farmers.

Identifying focus areas

The purpose of this session was to identify issues that could be explored collaboratively and form the basis for a collaborative research agenda between agriculture and public health. Some key criteria were proposed in the consultation workbook, such as strategic relevance, regional or sub regional issues of priority, availability of existing risk mapping, scale/extent of problem/targets, and expertise, capability and track record. The criteria applied by the consultation participants varied by region. Across all three regions, common issues were identified, such as prevention and control of zoonoses, safe management of agricultural inputs (e.g., chemicals, fertilizers), and control of vectors of human diseases, water management including quality and safety issues, and diet-related NCDs. The approach different regions took and the conclusions they reached are described in detail below.

West and Central Africa

The participants were divided into three groups by agro-ecological zone. The coast group looked at priorities by agricultural system, identified the health consequences, the driving forces of the problems, the risk factors, and then applied two criteria: the scale of the problem (low, medium, high) and whether solutions would come from agriculture, health, or both sectors. They also considered the driving forces of the challenges in each system, which were primarily poverty, population and economic growth, and market demands.

This group also discussed the dietary transformation as a priority area, identifying the health consequences as mainly NCDs, obesity and overnutrition, and increased incidence of foodborne illness and the driving forces as urbanization, economic growth, and poverty. Solutions to this challenge could be provided by both sectors, but data/evidence would largely come from the health sector.

Focus areas identified by the coast group in the West/Central Africa consultation

Agricultural system – Health consequences	Risk factors	Scale	Responsibility
Peri-urban farming • Diarrheal diseases • Zoonoses • Parasitic infections • Skin diseases • Environmental poisoning	Pesticide/fertilizer misuse Use of contaminated water Lack of knowledge/awareness Lack of protective clothing	High	Both
Cash crop farming: food items • Pesticide contact – direct and indirect • Environmental health	Pesticide use/misuse Knowledge gaps Lack of protective clothing	Low	Agriculture
Cash crop farming: non-food items (oil) • Pesticide contact – direct and indirect	Pesticide use/misuse Knowledge gaps Lack of protective clothing	Low	Agriculture
Lowland farming • VBDs • Allergies • Parasitic infections	Agricultural practices (e.g., influence on breeding sites) Lack of protective clothing		
Intensified livestock production • Respiratory infections • Zoonoses • AMR • Animal waste • Environmental health	Direct contact (lack of protective clothing) Misuse of antibiotics, other inputs Consuming undercooked foods Poor disposal of animal waste No control over inputs No control over food safety	Medium	Both

The forest group looked at four topical areas and identified sub-areas of research and target populations, then applied four criteria: relevance (low, medium, high); regional priority (low, medium, high); the extent of risk mapping (low, medium, high, unknown); and the level of expertise on this topic among those at the consultation (low, medium, high).

Focus areas identified by the forest group in the West/Central Africa consultation

PESTICIDES					
Sub areas	**Target populations**	**Relevance**	**Regional priority**	**Risk mapping**	**Expertise**
Intoxication by ingestion	Consumers Users	High	High	Unknown	Medium
Chronic exposure	Consumers Users	High	High	Unknown	Medium
Pesticide resistance	Entire population	Medium	High	Unknown	Medium
Environmental contamination	Entire population	Medium	Medium	Unknown	Medium
WATER USE/MANAGEMENT IN AGRICULTURE					
Sub areas	**Target populations**	**Relevance**	**Regional priority**	**Risk mapping**	**Expertise**
Water quality in farming/agriculture in marshlands/dams/riversides	Farmers Entire population	High	High	High	High
Water quality in livestock	Entire population	High	High	Unknown	Medium
Breeding sites for disease vectors and hosts (non zoonosis)	Entire population	High	High	High	High
ZOONOSES					
Sub areas	**Target populations**	**Relevance**	**Regional priority**	**Risk mapping**	**Expertise**
Aviculture (flu, allergies, etc.)	Entire population	Medium	High	Unknown	Medium
Porciculture (helminths, scabies, etc.)	Breeders Consumers	High	Medium	Unknown	Medium
Boviculture/capriculture (TB, etc.)	Breeders Consumers	High	Medium	Unknown	Medium
Pisciculture (emerging infections)	Consumers	Low	Low	Unknown	Low
Rearing of small animals (guinea pig)	Breeders Consumers	Medium	Low	Unknown	Low
DEFORESTATION					
Sub areas	**Target populations**	**Relevance**	**Regional priority**	**Risk mapping**	**Expertise**
Impact on medicinal plants	Rural population	High	Medium	unknown	Medium
Exposure to silvatic vectors	Rural population	Medium	Medium	unknown	Medium

The Sahel group identified four areas - pesticides, water management, dietary diversification, and zoonotic diseases – and focused on the first three.

Focus areas identified by the Sahel group in the West/Central Africa consultation

Issue	Sub issues	Impacts on…
Pesticides	Environmental contamination	Biodiversity Health of communities
	Poisoning (acute and chronic)	Technicians Agricultural labors Anyone in contact with pesticides or contaminated products
	Resistance (among disease vectors)	Intensification of transmission
Water management	Irrigation	Proliferation of vectors
	Contamination	Drainage: acidification, nitrate deposits, food chain
	Shared water points	
Dietary diversification	Dietary deficiencies	Malnutrition Vulnerabilities to other health problems (ebola, lassa fever)

East and Southern Africa

The first group applied six criteria, and ranked them from 1 to 5 (low to high): strategic relevance; size of the problem and importance to the region; availability of data and mapping; expertise and tools; feasibility of an agricultural solution; and donor interest. The results of that ranking are in the table.

Focus areas identified by the first group in the East/Southern Africa consultation

Areas of focus	Relevance	Size	Data	Expertise	Agriculture	Donor Interest
AMR	5	5	1	2	3	5
EID	3	3	1	1	1	2
Climate sensitive diseases	5	5	4	4	3	4
Hazards in food, physical and chemical	4	4	1	1	4	4
Hazards in food, biological	5	5	3	4	4	3
NCDs	5	4	2	3	3	4
Malnutrition	5	5	4	3	5	4
Occupational hazards	3	2	1	<1	5	3
Plant toxins	1	1	1	<1	5	1
Water, including wastewater	3	3	Human:4 Ag: 1	Human:4 Ag: 1	Human:1 Ag: 4	Human:4 Ag: 1

The group did a second round of ranking to distinguish between issues that were important and need immediate intervention and issues that were important, but more evidence was needed. The top three issues that fell into the first group were: malnutrition, climate-sensitive diseases, and biological hazards in food. The top two issues that fell into the second group of needing more evidence were: AMR and physical and chemical hazards in food.

The second group applied three criteria: niche - would our role be to lead or support; scale of the problem – don't know (DK), low, medium, or high; is there a solution through agriculture – yes or no.

Following this exercise, they eliminated malnutrition as a focus area and generated a list of research priorities under the five topics, which are summarized below.

Focus areas identified by the second group in the East/Southern Africa consultation

Areas of focus	Niche	Scale	Solution
Malnutrition	support	high	yes
Water and soil quality	lead	DK	yes
Added compounds	lead	DK	yes
Vector-borne diseases	lead	high	yes
Food safety	lead	high	yes
Zoonotic diseases	lead	high	yes

Topic	Research priorities
Zoonotic diseases	Evidence on prevalence, distribution, and burden for targeted interventions
	Developing new tools
	Testing interventions and tools, including diagnostics and determining which combination of tools and/or interventions work best in which context
Food safety	Evidence on prevalence, distribution and burden
	Policy, especially in the informal sector, research on different approaches
Vector-borne diseases	Control within agricultural systems and identifying best components of integrated vector management
	Surveillance systems and diagnostics
Agricultural input use and misuse	Alternative control strategies to pesticides and fertilizers
	Evidence on prevalence, distribution and burden for targeted interventions
	Regulating the informal sector through policy mechanisms and education
Water and soil quality	Impact of irrigation on disease
	How to encourage good agricultural practices
	Scale of water quality problems and prevalence over time

South Asia

The first group applied four criteria: health burden (low, medium, high, or unknown); economic burden (low, medium, high, or unknown); responsibility (agriculture, health, or both); and risk (low, medium, high, potentially high, or unknown).

Focus areas identified by the first group in the South Asia consultation

Areas of focus	Health burden	Economic burden	Sector	Risk
Zoonoses	H	H	Both	H (p)
Food-borne disease	H	H	Both	H
Occupational health hazards	L	L	Both	L
Veterinary drugs/chemicals	U	U	Both	H (p)
Water pollution	H	H	Both	H
Food adulterants	M	M	Both	M
AMR	H	H	Both	H (p)
Climate change	U	U	Both	U

Following this, the issues were re-classified and ranked in order of priority as (1) foodborne diseases; (2) zoonotic diseases; (3) water pollution; (4) AMR; (5) veterinary drugs/chemicals/pesticides; and (6) climate change.

The second group identified the following priorities under a broader topic of “healthy agri-food intensification.”

- Emerging diseases, and neglected diseases associated with livestock intensification
- Food system transformation / obesity and NCDs

- Intensification of agriculture for healthy food supply – existing peri-urban and trade/markets; efficiency of production and supply chains; price
- Soil health and management
- Water and waste-water management
- Food safety
- AMR
- GMO policy and regulation

The third group focused on the health issues facing marginalized populations in agrarian sectors. The group identified one research focus as mapping burden and risk in priority populations in order to understand their vulnerabilities to agriculture-associated diseases. Gender issues and landless labor were two more issues, in addition to psychological health (as it relates to loss of land), and the lack of access to animal and human health services and care among these marginalized groups. Assuming that the smallholders and women would be two logical target populations, the group started to discuss certain approaches that could be taken.

Theory of Change

The purpose of this session was to introduce a general theory of change (ToC) for how we think collaborative research between agriculture and public health can address development changes and to use this theory of change to shape a research agenda (goals and research questions) and what stakeholders need to be engaged and how we should work together.

West and Central Africa

Three topics were selected for developing ToCs – under- and over-nutrition, VBDs, water quality in peri-urban vegetable production, and emerging diseases from livestock production.

Addressing under and overnutrition. This ToC described the links between improved nutrition and health status and activities that would create more diversified and balanced diets. The starting points for research are food composition surveys (including indigenous foods), risk and cost-benefit analysis, and then support to nutrient-rich foods production and effective training. The next step in the pathway would focus on making evidence available, including food composition and health impacts, and activities to address the availability and price of quality (safe and nutritious) foods. Capacity changes would come about through health education and promotion and infrastructure improvements. The assumption is that there are existing means by which information is shared with consumers, producers, traders, policy makers and so on. Behavior changes would be expected among those same target groups with the assumption that the right or influential people would be targeted for trainings and sensitization, adoption and compliance of nutrition information would occur, and that an enabling environment exists to support these changes. The assumptions between these changes in behavior and the direct benefits of improved diets are that nutritious foods are available and affordable. In order for diversified diets to lead to improved nutrition and health status, water and sanitation programs and infrastructure have to be in place and populations also must have access to adequate health care.

Reducing vector-borne disease in marshlands. This ToC described the links between improved human health and reduction in VBD. Following evidence-generating activities, improved control tools would be developed and tested. The capacity changes expected could be increased knowledge of VBD prevention and control, more positive attitudes towards VBD, improved skills, and more opportunities for populations to control VBD. Training among users and consumers, plus improved training of trainers methodologies, need to be implemented in order for these capacity changes to occur. The expected behavior changes include improved knowledge, attitudes, and practices among

target populations, increased investments in VBD control among policy makers, and proper use of VBD control tools among target populations. As a result, VBD would be reduced, fewer hospitalizations due to VBD would occur, and mortality and morbidity due to VBD would be less. One major assumption is that VBD control would make a significant contribution to improving public health.

Water quality in peri-urban vegetable production. This ToC described how human health and nutrition could be improved through activities designed to address water quality in peri-urban vegetable production, primarily from reductions in diarrheal diseases and increased consumption of micronutrients from vegetables. The underlying assumption is that contaminated vegetables are a significant contributor to diarrheal disease. Other assumptions are that better designed storage systems could improve water quality, less competition between animals and humans for water could improve water quality, and that improvements could be measured. The behaviors of consumers, farmers, and policy makers would be expected to change, but this relies on assumptions that target groups have the means to apply the advice given and that training is well-received and appropriate. Other assumptions are that there is a knowledge gap, we can identify the appropriate people for training, and that training can be delivered properly.

Reducing risk of emerging disease from livestock production. This ToC described how human health could be improved by reducing the incidence of key emerging diseases associated with livestock and rodent production, including brucellosis, Q fever, RVF, and Crimean-Congo hemorrhagic fever (CCHF). In order for this to be achieved, the assumptions are that appropriate equipment is available to farmers to secure contacts between animals and humans, appropriate systems are in place to address animal health (hygiene, case detection and treatment), rodent production can be controlled, and drinking and feeding spots for animals are well-designed and maintained. Target populations for behavior changes would be farmers, pastoralists, butchers, extension workers, traders, and consumers, which would be achieved through training of trainers approaches, informing policy makers, and getting appropriate communication strategies in place. Capacity change could only come about if innovations and technologies developed from research are successfully transferred to target communities. Research activities and outputs expected to contribute to reduced incidence of emerging disease would be targeted studies on understanding priority diseases (lassa fever, Q fever, RVF, CCHF, and brucellosis), behavior change communication (BCC), and strategies to improve drinking and feeding spots for animals and animal keeping spaces.

Sample researchable questions and partnership considerations for two ToCs for zoonosis and EIDs

Researchable questions	**Partnership considerations**
Public health importance of zoonosis for human population - Scoping studies, situation analysis, identification of gaps to fill	• National Institute of Health, vet labs, research institutions • Joint agreement between partners to share knowledge, output on current situation
Emerging diseases can be controlled by technologies and change in attitudes and practices - Assessing and classifying modes of transmission of emerging diseases from animals to people - How can training be effective in reducing the risks of transmission of emerging diseases at community level - Risks assessment of communities through socio-anthropological surveys - Training of communities using join models such as Radio-TV, farmer field schools - Training of health agents on other causes of fever	• National Institute of Health, vet labs, research institutions, NGOs, farmers, community leaders • World Health Organization (WHO), social scientists, NGOs, farmers, community leaders

East and Southern Africa

Two topics were selected for developing ToCs - AMR and cysticercosis.

AMR. This ToC described the links between improved human health and activities that would reduce, or at least not increase, AMR in humans. The underlying assumption is that antibiotic misuse in agriculture makes a significant contribution to AMR in humans, but this is clearly a researchable assumption. More evidence on the burden and scale of the problem needs to be generated as a starting point. The next step in the pathway would be that interventions would be developed that lead to changes in capacity and behavior among three groups of actors: farmers (both smallholders and large, commercial farms), actors in the animal health value chain (agrovets, drug manufacturers and importers, veterinarians, and animal health extension workers), and policymakers/regulators. Some of the assumptions are that governments are interested in controlling AMR and resources could be mobilized for such a research agenda. Assumptions at the capacity and behavior change level are that the evidence would be compelling enough for people to act and that misuse in smallholder agriculture (vs commercial farms) is making a significant contribution. Assumptions at the direct benefits and impact level are that AMR will reverse the epidemiological transition, eliminating it will improve human health, and that it will continue to grow globally, and in Africa, leading to more deaths and higher health system costs to manage.

Sample researchable questions and partnership considerations for a ToC for antimicrobial resistance

Researchable questions	Partnerships
- What's the scale of antibiotic use in livestock and how does it contribute to AMR in humans? - What are the smallholder practices related to antibiotic use in livestock?	• Existing groups working on these issues – CDC, WHO, Global Antibiotic Resistance Partnership • National research institutes, agrovet providers and suppliers, policy makers and decisionmakers

Cysticersosis. This ToC started with a general impact pathway describing how improved quality of pork products could lead to reduced exposure to tapeworms in humans and pigs and eventually to improved human health. In the process, they recognized there are different aspects of the pathway related to traders, the policy environment, producers, gender issues, and the environment. So, their ToC focused on sanitation and how improved sanitation and hygiene could reduce infections in humans. Some of the assumptions in this ToC are at the level of behavior change, there is local demand for improved sanitation and infrastructure is in place to support improved sanitation and hygiene. At the knowledge level, the assumptions are that communication strategies and pathways are clear. At the outputs level, one assumption is that other programs on sanitation are already in place where cysticercosis is suspected to be a persistent problem. The essential part of this ToC is related to changing knowledge, attitudes, and practices (KAP). It was also clear to the group that a joint agriculture and health research program would have to fit into the prevailing sanitation agendas in local communities and in the region.

The second ToC described how improved quality of pork products could be achieved through interventions targeted at traders, which included butchers and those cooking pork at point of purchase. The behavior changes would include empowering traders so they could reject contaminated products, open up the interactions between traders and farmers, and proper cooking of meat at the points-of-sale. Interventions would be targeted at changing knowledge, attitudes and practices of traders.

Sample researchable questions and partnership considerations for a ToC for cysticercosis

Researchable questions	Partnerships
- Where are the hotspots? - Who are the target groups? - What's the role of the private sector? - What tools exist? Do they need to be developed? - What are the KAP among traders about healthy pigs? What are the common pig problems that they encounter? What do they think are the big challenges in pig trade? - What are the added benefits of sanitation? Does it decrease other diseases besides cysticercosis?	• Other groups working on sanitation that would be interested in co-locating activities • How to find our niche? There's a lot of existing investment and activities – so maybe map those and see where this overlaps with cysticercosis hot spots.

South Asia

Both groups focused on zoonotic diseases for ToC development, but one focused on the evidence angle and the other on marginalized populations.

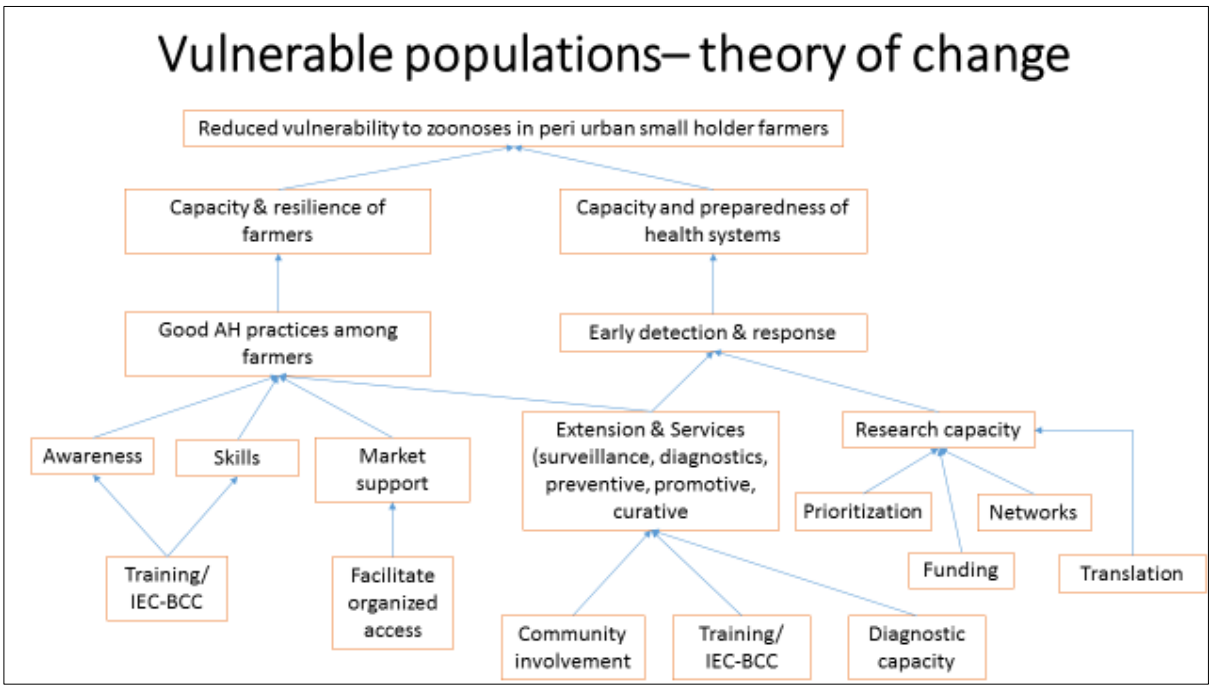
The evidence angle group described how improved human health could be achieved by reducing the burden of zoonotic disease. Research activities such as behavior studies, impact assessments of diseases, and risk assessments could be used to develop information, education and communication (IEC) and BCC strategies for particular target populations, such as processors and supply chain actors in this case. These actors would become more aware of best practices, adopt those best practices, and the availability of *safe* food products would be increased. Evidence could also be used to make policy makers more aware of the issues and in a better position to adjust disease prevention and control priorities. This could lead to the establishment of better surveillance systems, lab systems, reporting, and One Health linkages and the development and testing of diagnostics, treatments, and vaccines. The improved surveillance and awareness could result in better on-farm management practices, resulting in a reduced human burden of zoonotic diseases among livestock workers.

Sample researchable questions and partnership considerations for a ToC for zoonoses

Researchable questions	Partners
- What are the impacts (social, economic, health)? - What are the risks? - Why do people behave the way they do? - Which system changes are necessary? - Which interventions work? - Risk maps/hazard prevalence - Vaccine development - Cost effectiveness studies	• National research institutes • Animal health service providers • Policy makers • Commodity boards • Private sector, including animal health food chain actors, processing industries, and industry associations • Local leaders • NGOs

The marginalized populations group described a ToC that would reduce the vulnerability to zoonoses among peri-urban smallholders, which would come through increasing the capacity and resilience of smallholders and through increasing the capacity and preparedness of health systems. Their ToC started with thinking about activities related to research and extension services. Knowledge translation, prioritization, networks, and funding could increase research capacity. Diagnostic capacity, training, and community involvement could strengthen extension services' ability to conduct surveillance, use diagnostics, and other preventive, promotion, and curative activities. Together, these activities could improve early detection and response to lead to increased health

system capacity. Another pathway in the ToC was through smallholder farmers. Through training, IEC, and BCC, farmers' awareness of disease and skills to prevent and manage would be increased. Market-oriented support to increase market access and facilitate good practices would increase capacity and resilience of smallholder farmers, reducing their vulnerability to zoonoses.



Action items

Regional working groups were recruited to provide advice on the pre-proposal in consultation with other participants.

West and Central Africa. Rousseau Djouaka, Ousmane Ndoye, Bassirou Bonfoh, Peter Enyong, and Daniel Boakye, with Rousseau as the coordinator between A4NH and the region

East and Southern Africa. Eric Fevre, Samuel Mugisha, Samson Mukaratirwa, with Eric as the coordinator between A4NH and the region

South Asia. Manish Kakkar from the Public Health Foundation of India will serve as the coordinator between A4NH and the region

Key dates for A4NH in developing the pre-proposal for Phase 2

April to mid-June:	Engage working group members and key partners
June 30:	Draft circulated to stakeholders and to A4NH PMU for review and comment
July 20:	Revised draft sent to PMU for inclusion in the overall proposal
July 24:	PMU circulates full draft of pre-proposal to stakeholders for comment
August 7:	Stakeholders return comments to PMU
August 14:	PMU submits the pre-proposal to the CO

Summary of the synthesis meeting in London

London School of Hygiene and Tropical Medicine
15/17 Tavistock Place - Jerry Morris Room (G013/G014) on the ground floor
June 5, 2015

Background

In April and May 2015, the CGIAR Research Program (CRP) on Agriculture for Nutrition and Health (A4NH) convened three regional consultations, the purpose of which was to make progress in developing ideas for a joint research program on better human health through good agricultural practices.[3] The consultations brought together regional experts from human health and agriculture to discuss the assumptions driving the health research agenda in A4NH and get feedback on how to design an integrated, holistic and interdisciplinary research approach that is consistent with public health priorities and meets public health standards and rigor. A synthesis meeting was held with representatives from the regional consultations and European institutes, convened with the Leverhulme Centre for Integrative Research on Agriculture and Health (LCIRAH) in London, England, on June 5.

Part of the impetus for these meetings was a desire to respond to the opportunity presented in the new CGIAR Strategy and Results Framework (SRF) for 2016-2030, which places increased emphasis on human health issues associated with agriculture. A4NH convened the first meeting for West and Central Africa in collaboration with the International Institute of Tropical Agriculture (IITA) in Cotonou, Benin, from April 22-24; the next was held for East and Southern Africa in collaboration with the International Livestock Research Institute (ILRI) in Nairobi, Kenya, from April 28-29; the last regional meeting was held for South Asia in collaboration with the Public Health Foundation of India (PHFI) and the IFPRI-South Asia office in New Delhi, India, from May 28-29.

The expected short-term output from these meetings will be the development of the A4NH pre-proposal to the CGIAR Consortium Board for the second phase of the research program. Thanks largely to inputs from these consultations, A4NH will be better positioned to submit a compelling agriculture and health research agenda as part of its pre-proposal for Phase 2 of the research program in August 2015. (Phase 2 will run from 2017-2022).

A brief summary of the discussions that took place at the London meeting is presented below. Agendas, consultation workbooks, presentations, and background materials prepared for each regional consultation are available via a folder on Dropbox, which participants were encouraged to share and upload additional resources (https://www.dropbox.com/sh/zqrzyief534kbpv/AABpAiZNaV9kLnKtDIiyayEaa?dl=0).

Overview of issues identified by each region

Following introductions, John McDermott, director of A4NH, gave an overview of the context and background of the consultation. A representative from each of the regional consultations gave a brief summary on the issues identified in their respective consultations. Rousseau Djouaka and Daniel Boakye reported on the West and Central Africa consultation, Samson Mukaratirwa and Eric Fevre reported on the East and Southern Africa consultation, and Manish Kakkar reported on the South Asia consultation.

[3] A4NH draws on expertise from 12 CGIAR Centers as well as partners from across the agriculture, nutrition and health sectors, collaborating on new research and developing joint solutions to reduce the global burden of malnutrition and disease. It is led by the International Food Policy Research Institute. http://www.a4nh.cgiar.org/

The key issues identified, by region, were:

WEST AND CENTRAL AFRICA	EAST AND SOUTHERN AFRICA	SOUTH ASIA

• CHEMICAL PESTICIDES MISUSE AND OVERUSE
• IRRIGATION WATER QUALITY AND QUANTITY
• ZOONOSIS
Viral, bacterial, parasitic diseases; associations w/livestock and wildlife
• DEFORESTATION
Disappearance of medicinal plants, proliferation of some specific vectors of human diseases
• LOW DIETARY DIVERSIFICATION
Malnutrition, vulnerability to other diseases
• DIETARY TRANSFORMATION
Obesity, overnutrition, increase foodborne illness
	• ZOONOTIC DISEASES
	Evidence, tools, testing interventions
	• FOOD SAFETY
	Evidence, policy
	• VECTOR-BORNE DISEASE
	Control, surveillance
	• AGRICULTURAL INPUT MISUSE
	Alternative control strategies, evidence, policy mechanisms and education
	• WATER AND SOIL QUALITY
	Irrigation-disease, gaps, evidence on scale and trends over time
		• AGRI-FOOD INTENSIFICATION
		  • Emerging/neglected diseases
		  • Food system transformation, obesity, and NCDs; healthy food supply chains, including peri-urban
		  • Soil health, water, and wastewater management
		  • Food safety
		  • Anti-microbial resistance
		• DATA/EVIDENCE/DECISION MAKING on
		  • Food borne diseases
		  • Zoonotic diseases
		  • Water pollution
		  • Antimicrobial resistance
		  • Veterinary drugs and chemicals (pesticides)
		  • Climate change
		• VULNERABLE GROUPS IN AGRARIAN SECTOR such as Peri urban farming systems; smallholders; informal sector/markets; women – feminization of agriculture; and landless/migrant laborers

After the presentations, participants asked for clarification and discussed the focus areas that had been identified. A few of the general themes raised were about data (e.g., availability and quality, fundamental sectoral differences in data collection and sharing, economic data), investing in evidence and estimate generation on issues where less is known about scale and burden (e.g., human health impacts of peri-urban agriculture, prevalence of zoonotic diseases, agriculture's contribution to antimicrobial resistance (AMR)); and research that both reveals health impacts and can help address health impacts of agricultural activities.

The group discussed the lists above in light of what was perceived to be the big trends in agriculture for development in the next 20 years, such as water issues, urbanization (such as urban and peri-urban agriculture, urban demands and their impacts on production and health risks), intensification of agriculture and livestock (including government policies and priorities, emerging diseases), equity and social change (particularly those getting 'left behind'), and the changing demographic of those working in agriculture.

Ideas for some initiatives A4NH could explore in the near-term were: a meta-analysis of the health literature to identify studies linked to agriculture; a review on the challenges of linking agriculture and health data; a meta-analysis of case studies on peri-urban agriculture, particularly on the use and impacts of pesticides; a review of how some of the key issues identified have changed over time;

and a conceptual framework to describe how such a joint research program will address direct and indirect effects of agriculture on human health.

There were a few important comments made on the consultation process itself that A4NH should acknowledge. One comment was that the priority areas could depend quite a bit on who participated in the consultations. Across the regional consultations, the public health participants tended to come with more of an agricultural perspective rather than the traditional medical or public health perspective. Nevertheless, the regional consultations are only part of the process. A4NH will supplement these views with systematic reviews and reports from other entities working in this space of agriculture and health, like the upcoming report on the global burden of foodborne diseases from the World Health Organization (WHO) Foodborne Diseases Burden Epidemiology Reference Group (FERG). Even though the three regions arrived at similar research areas, the discussions reflected regional issues and priority topics, which was captured in more detail in the regional consultations summary.

Potential streams of research priorities for A4NH

The group came to general consensus around two streams of research priorities, which are summarized below. Even so, there were some observations that some things might be missing or need to incorporated more fully as these ideas are developed, such as the cross-cutting issue of climate change, residues (heavy metals, antibiotics) and the risk to consumers, and surveillance and suitable indicators.

1. Focused research on reducing health impacts of agriculture and food system change, especially intensification
    A. Water in production systems
        a. Irrigation and vectors
        b. Wastewater in agriculture
        c. Multiple use water schemes
    B. Zoonoses in animal production systems
        a. Food safety
        b. Emerging diseases
    C. Investigation of causalities by co-locating intervention activities
        a. Example: WASH with cysticercosis control and climate/nutrition smart interventions

2. Exploratory work on health impacts of agriculture, such as systematic reviews and integration and analysis of data
    A. Peri-urban/urban agriculture
        a. Wastewater - vegetable production
        b. Livestock production
    B. Farmer occupational health
    C. AMR across the animal-human interface
    D. Vector insecticide resistance management strategy for agriculture and health
    E. Review on the challenges of linking agriculture and health data
    F. Residues (antibiotics, pesticides, heavy metals) and risks to consumers

Platforms and partnerships

There was a lot of experience among the group on setting up platforms and partnerships. The advice was that it would be wise to engage the private sector (e.g., drug manufacturers), the large NGOs, and government ministries (e.g., veterinarians). Another idea was that part of this initiative could serve as a technical assistance platform for entities like the Economic Community of West African

States (ECOWAS) and the Africa Union's Comprehensive Africa Agriculture Development Programme (CAADP) to provide evidence-based guidance and research that supports or complements their mandate. Other suggestions included having a competitive grants scheme to identify partners and complete pilot studies, issuing an expression of interest to see what other groups might be interested, and mapping the locations of where the most influential public health actors have research structures and ways of working.

Perceptions on the CGIAR's comparative advantage in this sphere

As many of the topics identified by the group have not traditionally been part of the CGIAR mandate, the group discussed what might be the actual or perceived strengths CGIAR could offer. Some things that were mentioned were trust and relationships with farmers and the well-established links CGIAR has in specific countries with governments and policy makers. Negative perceptions CGIAR may have to address or at least acknowledge is its inflexibility and skepticism that it is committed to the issues. As an example, at one time water and health was an area of CGIAR research and suddenly it was not a priority, which some partners may remember.

There was an opportunity to discuss how donors might perceive this type of initiative and advice to A4NH on how to best describe the aims. First, A4NH must make the case that CGIAR, or CGIAR with partners, can deliver high quality research. Second, the case has to be made for why it is better to fund a consortium to take on this initiative rather than a number of individual institutions. Third, A4NH needs to demonstrate the research and development outputs and outcomes, articulating 'research for a purpose.' Fourth, as A4NH engages health funders, an understanding of where agricultural research for development fits in the bigger health picture and the links between the initiatives and players is absolutely essential.

Annex. Participant lists for each consultation

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