Report on an ILRI/IFPRI Workshop

‘Realizing the Potential of Animal Source Foods for Human Nutrition in the Developing World’

London, 2-3 February 2015
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PURPOSE

To outline an immediate set of short-term research needs and opportunities and a more long-term research and coalition-building agenda that supports and strengthens the role of Animal Source Foods (ASF) in efforts to improve nutrition and food security for low-income populations in developing country settings.

OBJECTIVES

• Explore how such an agenda could be shaped as a major research and policy initiative.
• Develop a common list around research priorities for increasing access of the poor to ASF
• Create collaborative working groups around different topics related to ASF’s with a view to advancing a research agenda around ASF’s

DELIVERABLES

The output expected from the meeting was to stimulate debate and generate ideas on directions ways forward for: a coordinated research agenda; potential grant proposals; and options for a high-level event on the topic. The meeting was also planned to frame the ASFs and nutrition priorities for ILRI’s nutrition strategy for the five years of Phase II, to which this document will contribute.

SHORT SUMMARY

The two-day workshop on ASFs and nutrition convened 37 participants from different sectors (academia, donors, international institutions, etc.) and disciplines (production, health, food technology, etc.), to work together in outlining and prioritising short- and long-term research objectives for a joint actionable agenda. The List of participants is in Annex I. Over the first days there was a round of presentations to stimulate thoughts and discussion, organised around six key themes. The objective of this day was to generate ideas and research questions to position ASF in the global agenda. The second day consisted of three working groups with discussions revolving around three agreed overarching topics, to identify the best way forward and the next actions, and produce a 1-2 page document for each group. The key agreements on priorities where to:

1) Build a community of Practice to map what is known already, identify nutrition problems related to diets, identify gaps and develop a framework, including indicators.
2) Conduct a discovery phase: characterise diets, investigate drivers and constraints of consumption, identify primary and secondary population targets, analyse the potential roles of ASF (including more AFS efficacy studies to develop a convincing narrative/message, modelling of different scenarios, etc.), determine how ASF systems are likely to evolve and their capacity to meet demand, develop better tools to measure ASF intake, including FCTs and databases, assess the health and environment trade-offs etc.
3) Design and lead Interventions: analytical tools to model and measure impact (e.g. explore alternatives for influencing consumption from BCC from private sector; delivery strategies to link small scale producers to industry, etc.)

NEXT STEPS

ILRI, with support of its ongoing and prospective collaborators will develop a proposal for ILRI’s Nutrition strategy over the next five years, based on the outcomes of this meeting. This nutrition strategy will set the forthcoming priorities for ILRI in nutrition, in collaboration with various partners, to raise the profile of ASFs creating a competitive research platform and attracting funding for research projects that would lead to solutions to the most pressing problems related to ASFs.

The ultimate goal would be to bring on board a group of influential public and private partners who would be able to move a global agenda forward.
DAY 1: PROPOSED DISCUSSION TOPICS

AGENDA Day 1: February 2, 2015

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:00-09:15</td>
<td>Welcome and introductions</td>
</tr>
<tr>
<td>09:15-09:45</td>
<td>Setting the scene and expectations for the workshop</td>
</tr>
<tr>
<td>9:45--10:30</td>
<td>Summarizing the research, challenges, and gaps from A4NH and L&amp;F perspectives and introduction of topics to be discussed</td>
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<tr>
<td>10:30-10:45</td>
<td>Coffee break</td>
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<tr>
<td>10:45-11:45</td>
<td>Discussion Topic 1: <strong>What research and advocacy is needed to convince others that ASF are important to the poor?</strong></td>
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<tr>
<td>11:45-12:45</td>
<td>Discussion Topic 2: <strong>Pro-poor ASF food systems</strong></td>
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<tr>
<td>12:45-13:45</td>
<td>Lunch break</td>
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<tr>
<td>13:45-14:45</td>
<td>Discussion Topic 3: <strong>Improving indicators and methods for assessing intake</strong></td>
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<tr>
<td>14:45-15:45</td>
<td>Discussion Topic 4: <strong>Technologies to improve nutritional value and delivery of ASFs</strong></td>
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<tr>
<td>15:45-16:00</td>
<td>Coffee Break</td>
</tr>
<tr>
<td>16:00-17:00</td>
<td>Discussion Topic 5: <strong>Food safety strategies that improve quality while enhancing rather than restricting access by the poor</strong></td>
</tr>
<tr>
<td>17:00-18:00</td>
<td>Discussion Topic 6: <strong>Nutrition interventions to optimize use and benefits</strong></td>
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**Introduction** (T. Randolph, J Mc Dermott, A. De Brauw, A. Thorne-Lyman)

The CGIAR reform over the past few years has moved towards more “impact oriented” research and introduces specific aims to ultimately measure the improvement in nutrition and health with clear indicators. In this context, a smarter use of ASFs for nutrition could be an important contributor to impact. ASFs, currently considered a luxury, are being undervalued for nutrition in development settings with important livestock production, thus missing a huge opportunity. It is necessary to reflect in the strategic use of ASFs and to identify appropriate ways to address this mismatch.

Agriculture for Nutrition and Health (A4NH) and Livestock & Fish (L&F) are approaching this issue from a different perspective: A4NH are planning actions within the current framework and L&F are reflecting on a broader agenda for the Phase II research. This requires a coordinated effort among core partners to reflect on what we have learnt so far and join forces and design a relevant agenda to move forward, to increase ASF availability of the poorest. The momentum is also good, since there is growing interest on ASF and nutrition amongst donors and institutions.

The goal of this meeting is to brainstorm and discuss the best way to develop this common agenda around priorities for increasing access of the poor to ASF, and create collaborative groups around different ASF-related areas between institutions that might not have enough individual critical mass, to join efforts. This (non-preconceived) agenda should focus in improving consumer’s health,
through improved nutrition and reduction of agriculture-associated diseases, not pushing ASF but making sure they are available.

Income is not sufficient to improve diets and given the many market failures that can arise, and improvements in diet and in nutritional outcomes do not track perfectly with development and rising incomes: relative prices do not reflect nutritional value (need to get it right), consumer knowledge on which foods are good (nutrient content and safety) is incomplete, and supply constraints for nutrient rich foods such as ASFs exist (perishability, seasonality, variable nutrient content, food safety, transport). As a result, there is an under-provision of nutrient-rich foods.

A4NH and L&F views are synergistic. A4NH 'uses agriculture to sustainably improve nutrition through diverse diets and nutrient rich foods'. The role of ASFs depends greatly on the context, considering interlinkages between production and consumption. Integrated Programs and Nutrition Sensitive Landscapes need to incorporate livestock and other animals (e.g. Homestead Feeding Programs). Consumption of ASF is predicated on them being safe but perceptions can play an important role particularly for ASF. The value chains approach considers the supply side (identifying bottlenecks and production constraints to improved nutrition and safety in the entire value chain such as capabilities, technologies, policies and institutions) vs the demand side (characterize diets, market access and constraints to consumption such as affordability or signaling). The context is important in intervention design, and given the relative lack of ASF in the poor's diet, there is a clear need to consider their context. The context analysis includes features such as: intensive vs extensive production (transaction costs for getting to market), carrying capacity of environment, present diet, market environment and institutional context (prices, income, income trajectory). L&F 'realises the potential of ASF as a critical component through options and evidence'. The focus to date on value chain systems was mostly supply-side oriented (production). However, there is growing acknowledgement of the opportunity at the consumer-end and addressing the limited dietary diversity is a major CGIAR focus of, so helping them overcome challenges preventing their access to ASF’s is central to this agenda.

The time is right since ‘Agriculture for nutrition’ is gaining momentum. The Sustainable Development Goal (SDG) 2 aims at ending all forms of malnutrition by 2030, including achieving by 2025 the internationally agreed targets on stunting and wasting in children under five and address the nutritional needs of adolescent girls, pregnant and lactating women, and older persons. With only 20% of stunting being possible to prevent by scaling up 10 interventions to 90% coverage (The Lancet Series 2013), there is a gap that needs filling. Livestock and ASFs can also have potential to impact multiple SDGs (Goals 1, 2, 3, 5, 8, 10, 12, 13, 14, and 15).

In addition, the perceptions of ASF consumption are changing globally: there has been a recognition that “anti-fat” focus has had little to no success in preventing chronic disease or obesity, and negative perceptions about eating meat, eggs or butter are changing. Moreover there is recognition of micronutrients and essential fatty acids beyond the “big 4”. Dietary diversity has also grown importance with consensus as an indicator and as a goal in itself. Regardless concerns about the double burden of malnutrition, all this brings opportunities to ASFs.

This agenda will have to be connected to practical development and address cultural and gender aspects, as well as unattended consequences such as climate change or non-communicable diseases. This meeting should come up with the agenda building blocks, with common agreement on the first initiatives, and identifying who else should be at the table. Visibility needs to be considered in the joint portfolio for a 'big' proposal by a big Consortium.
Discussion topics

Topic 1: What research and advocacy is needed to convince others of the role that ASF needs to play? (LH Allen)

Compared to plants, ASF provide more energy and fat, vitamin B12 (only dietary source), riboflavin, vitamin A (performed source), vitamin E, iron (only source of heme iron), zinc (highly available), calcium, vitamin D (only dietary source). The micronutrient deficiencies predicted from food intake do not always correspond with deficiencies measured biochemically.

Observational studies found that even at usually low intakes, higher ASF intake predicted better functional performance, in all age, gender and psychological status group (Allen, Nutr Rev 1993). On African DHS datasets, ASF intake was also strongly related to dietary diversity and milk was the strongest diet predictor of height (Arimond, Nutrition 2004). Meat consumption was also found to be associated with a 36% reduction in stunting among toddlers in Guatemala, DRC, Zambia and Pakistan (Krebs, FNB 2011), comparing consumption 1-3 days/week or most days vs once a month or never.

In intervention studies, the evidence is mixed. Skau et al. (AJCN 2015) recently showed that introduction of ASF in complementary foods in Cambodia did not lead to differences in lean body mass, growth or iron status, and 6 recent studies on complementary feeding show that meat supplements have no effect on growth or iron, zinc or vitamin B12 status. However, milk has been shown to promote growth and cognitive function, and reduce micronutrient deficiencies, morbidity and mortality (Dror, FNB 2011). In addition is a product well tolerated and accepted by parents and a good medium for fortification. A meta-analysis of 12 studies on dairy products effect in physical stature in school children (de Beer, Econ Hum Biol 2012) showed and increase in weight of up to 0.4 cm which might be mediated by the Insuline-like growth factor (IGF). Neuman et al. (J Nutr 2003) showed in a school feeding intervention in Kenya over 2 years that meat could improve cognitive performance, school test scores, physical activity, initiative and leadership, arm muscle mass, and B12 status, whilst milk improved linear growth if stunted and B12 status.

Not all ASF are the same and comparing nutrient content of meat, milk and eggs (relative amount/Kcal), meat is very rich in heme iron and total iron, and zinc. Meat has also the highest content in vitamin B12. Milk however is richer in riboflavin, folate and calcium, whilst eggs are richer in vitamin A. Therefore, if ASF interventions are to be implemented, mixture of foods is better.

Over the last years of research on ASF we have found strong evidence that ASF intake correlates with infant and child growth and micronutrient status, but results among population groups vary substantially. There is no evidence that meat improves height, micronutrient status or development in infants or young children, whilst in school children however it can improve activity and leadership, cognitive function, etc. Increasing milk improves growth of both young children and schoolers even in industrialised countries.

Current research needs now require:

- Longer supplementation (2 years?) of infants and children to assess efficacy on development improvement.
- Maternal supplementation with ASF, pre-conception or during pregnancy is also needed,
- Effect of maternal ASF supplementation on breast milk composition (specially B vitamins)
• Research on best ways to add ASFs to diets in low income populations, where demand is high and resources limiting, e.g. small loans, education (nutrition and entrepreneurship), animal diversity, improved animal health, ASF preservation, etc. Interventions in Ghana to improve use of ASF for children have shown increase in height, weight, and protein, calcium, zinc and iron intake.
• Development of better indicators to assess adequacy and improve global balance of ASF intake – minimum and maximum quantities. It is necessary to develop guidelines for recommended range of ASF intake (i.e. at present excessive in wealthier regions and inadequate in poor countries). Dietary quality indicators do not capture ASF adequately and there is no real guidance on amounts of ASF needed. A woman could consume 6 or more food groups, yet have zero ASF. However, in 9 sites it was observed that if the dietary diversity score for women was 5, 84% had at least one ASF.
• Vitamin B12 status (plasma, breast milk) can be used as indicator for validation of usual ASF intake. Regarding how much ASF is needed, B12 deficiency prevalence is high if ASF contribution to energy in food supply is 10-15%.
• Trends in ASF consumption and effect on resources. How consumption can be influenced. We now need information on how food systems are likely to evolve and how can agri-food systems respond to needs. Price and production efficiency to ensure access needs to be assessed.
• Develop correct messages about importance of ASF and recommended intakes. Options for influencing consumption (increase or decrease) need to be explored, as are the health and environmental trade-offs, and the correct messaging on those.

The session was followed by time for brainstorming on research ideas (Box 1).

Box 1: Brainstorming discussion points Topic 1

<table>
<thead>
<tr>
<th>What research and advocacy is needed to convince others of the role that ASF needs to play?</th>
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<tbody>
<tr>
<td>• Need to establish dietary guidelines that can shape production systems: agreement on priorities. More research needed on the effect of ASF in levels of iron and other outcomes related to milk (B12, neuron development, pregnancy outcomes, bone development, head circumference growth, etc.)</td>
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<tr>
<td>• Importance of nutrition value assessment of different type of products (boiled milk, different indigenous ways of processing, preservation and preparation... is there loss of nutrients during the food processing?)</td>
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<tr>
<td>• Need to develop a narrative on nutrition value of ASF and to simplify the message: role to fight deficiencies, and role in sustainable diets in the poor (what is optimal can be very contextual)</td>
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<tr>
<td>• Less cost optimization: messaging using existing tools (e.g. Optifood for guidelines)</td>
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<tr>
<td>• Indicators: research on feasible M&amp;E tools but what does it mean for research/evidence</td>
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<tr>
<td>• Trajectory of population growth and diets. Population is aging, thus need for a life-course perspective, expanding the target population beyond the 1000 days</td>
</tr>
<tr>
<td>• Production systems: who’s driving the agenda? Challenging current ASF perceptions: cultural perceptions related to consumption, how ASF are prepared and food combinations in a meal, seasonality, intra household allocation, taboos related to eggs and meat</td>
</tr>
<tr>
<td>• Expand on other milk: Access through Breast milk and ASF maternal supplementation to young child nutrition</td>
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<tr>
<td>• Paternal supplementation?</td>
</tr>
<tr>
<td>• ASF: energy ratios and energy:protein ratio consumption studies: has this been done for specific ASFs? What is the difference between milk and meat?</td>
</tr>
</tbody>
</table>
• Messages: ASFs consumption in child and brain development as part of evidence and advocacy beyond efficacy studies. People pay a lot for education and this can be a powerful message. Better evidence is needed. Try new tools for observational studies
• How is it evaluated:
  o ASFs and cognitive development
  o Perceptions and understanding
• Importance of indigenous foods (not well studied) and replacement effects

**Topic 2: Pro-poor ASF food systems** (A de Brauw)

Interventions are often conducted through very controlled trials. But in reality ASFs do not always behave as “normal” goods (i.e. as demand increases, so does the demand for ASF) but sometimes are rather considered as a “luxury” good (i.e. not clear whether demand increases, or depends upon context). Prices tend to be higher for ASF than for other foods in the diet, and if prices increase, the poor demand even less.

Livestock (unlike fish) take on many uses for the poor: assets, draft/pack animals, ceremonial value, food or income. The use of ASF also depending on context, with a continuum from pastoralists to emerging economies, with rapidly developing supermarkets, or use of insects and bush meat. It is important to consider diet as a whole and note what is replaced in the diet when ASF increases: beneficial if ASF replace grains but if they replace fruits/vegetables or legumes, then positive effects could be muted. This is difficult to show because data on at least a repeated cross section over a growth period is necessary. There is however suggestive evidence that as meat/ASF consumption increases among migrants in Ethiopia vs those remaining in village (de Brauw 2013), grain declines, but this is not necessarily true in every context.

Also, the poor eat ASF that are less likely to be safe or perceived as safe. The problem is with both production and consumption side. There are also weak contract relationships in value chains. For example, in Vietnam milk industry distrust exists between producers and the milk collection agency, which pays to smallholders related to quality (fat content) and contamination. In this context, an intervention offering third party testing to smallholders showed that not many took up the offer but it had large impacts on feed inputs and fat in milk (outputs). Seemingly, threat of third party test was able to increase impacts (Saenger 2014).

Current research needs now require:

• How do the poor source ASF? How differs by context? What factors affect the availability and prices for ASF, and consumption of ASF by the poor and particularly targeted groups (women, young children)?
• What are substitutes in the diet for ASF? How does that change with income?
• Do the poor eat ASF that are less likely to be safe or perceived as safe? How does that perception affect demand?
• What interventions can be designed to target the groups most in need? Can these interventions be made in an environmentally and socioeconomically sustainable manner? Market connection to be sustainable through profit to enterprises, social enterprises or other institutional arrangements. Cultural component also needs to be considered (e.g. positive deviance)
• What indicators should we use to measure these changes (especially in markets and in terms of consumption)?
The session was followed by time for brainstorming on research ideas (Box 2).

**Box 2: Brainstorming discussion points Topic 2**

<table>
<thead>
<tr>
<th>Pro-poor ASF food systems</th>
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<tbody>
<tr>
<td>Place research to poor within a broader food system with scale/time sustainability</td>
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<tr>
<td>With economic growth, there is value addition beyond the farm: development of chain</td>
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<tr>
<td>Importance of policy, regulations and enabling environment- consumption/production</td>
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<tr>
<td>Differentiated populations (rural/urban poor) + employment issues</td>
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<tr>
<td>Evolution of diets –substitution</td>
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<tr>
<td>Market failures-nutrition/food safety values, perceptions matter</td>
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<tr>
<td>Value chain analysis methods useful –consumption/waste</td>
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<tr>
<td>What are the “institutional arrangements” needed to fed ASFs to the poor? Markets/sustainability</td>
</tr>
<tr>
<td>Business opportunities/value addition</td>
</tr>
<tr>
<td>Specificity of foods -different types of AFs– and diversity + how to measure (appropriate indicators – (type of meat: steaks vs offal)- also sourcing: insects/livestock. Small/large fish</td>
</tr>
<tr>
<td>Future of food systems: formal supermarkets (formal), wet markets (informal)</td>
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<tr>
<td>Sustainability issues –“unpack”</td>
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<tr>
<td>Diets/foods – substitution/elasticities</td>
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<tr>
<td>Consumer demand/taste etc.</td>
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<tr>
<td>Production/consumption tradeoff and benefits for rural poor</td>
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<tr>
<td>Fragmented evidence: missing information on what people wants, HH based knowledge, HH demand elasticities</td>
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<td>Missing evidence in egg</td>
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<tr>
<td>Analytic/systemic frameworks/ foods systems/value chains/local food systems and nexus water-energy-food</td>
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<tr>
<td>Food systems methods:</td>
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<tr>
<td>o Household Decision making in different context</td>
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<tr>
<td>o Dynamic increase demand/ supply consumption/behavior</td>
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<tr>
<td>Different livestock systems: e.g. Chicken/eggs</td>
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**Topic 3: Improving indicators and methods for assessing intake** (ID Brouwer, A Thorne-Lyman, F Krijssen)

There is a need to develop methods and indicators that accurately assess increasing access to and consumption of ASF’s by the poor. ASF support growth and development: milk promotes linear growth of children and vitamin B12 status, whilst meat contributes to vitamin B12 status and cognitive development and physical strength. The challenges of this type of studies is that growth is an insensitive indicator and large samples are needed, and there is a need for impact on whole households, not specific target groups alone.

Dietary diversity is a simply proxy indicator, validated to reflect (micronutrient) adequacy of the diet (in low end of diversity spectrum). It can be used in large scale studies allowing for only one household visit and provides a more direct impact pathway from agriculture/ASF to nutrition than stunting. The existence of common protocols allow for comparison across settings.
Food intake is highly complex and often requires semi-quantitative methods. The challenges in ASFs measurement are:

a) ASF’s maybe consumed infrequently (large within-person variation)
b) Quantity matters (but difficult to measure: proxy’s?)
c) Variation in nutritional content of different pieces of meat, species of fish
   - Need for improved food composition data
   - Assess specific nutrient-rich animal parts like liver, fish-heads, species?
d) ASFs often shared inequitably within households
e) Seasonality
f) Sensitiveness of DDS to changes over time
   - Do we know how and why diets are changing?
g) DDS not reflective of all aspects of dietary quality
   - Need for information on whole diets
   - Composition of breast feeding?
h) Impact on whole households vs target populations
i) Sample sizes?
j) Combine with FFQ?

Indicators early in the value chain (supply/access) can be:
- Nutrient gap can be assessed comparing household nutrient requirements to ASF acquisition and study whether increased ASF closes nutrient gap. However, intra-household food distribution can present a difficulty, as well as the requirements to use (EAR or RNI?)
- Nutritional functional diversity (Remans et al, 2011) can be assessed monitoring diversity in nutrients produced or supplied; identifying species/varieties that add nutritional diversity to the system; evaluating sensitivity/resilience of a system for providing nutrients. However, in development, interpretation of this complicated

  ▪ VC analysis needs to be oriented from a consumers perspective rather than a producer perspective
    - Where people buys their food needs attention: rural vs urban; preferences of what types of (ASF) products, are these available or affordable?; Nutritional impacts?

Opportunities in the measurement of ASFs are:
- Mobile technology (camera’s, tablets)
- Improving literacy, self-reported diet possible?
- Making use of youth for data collection
- GIS mapping
- Food composition data?
- Agriculture-nutrition linkages is HOT

Current research needs now require:
- What critical information is needed to assess increasing access to and consumption of ASF?
- Which additional indicators or approaches can assist in understanding ASF consumption by different populations?
- How do different methods compare in their ability to capture diet in different settings?
- Understanding links between ASF consumption and nutritional status (functional outcomes) incl. risk of double burden?
- Where do poor people buy ASF foods; are the preferred ASF’s available or affordable, nutritional impacts of these?
- How can VCs be adapted to better serve consumer needs?
The session was followed by time for brainstorming on research ideas (Box 3).

**Box 3: Brainstorming discussion points Topic 3**

<table>
<thead>
<tr>
<th>Improving indicators and methods for assessing intake</th>
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<tbody>
<tr>
<td>• Behavioural changes wanted (attitudes and perceptions): can it be turned into indicators? (i.e. what affects behavior or knowledge level need be captured)</td>
</tr>
<tr>
<td>• What are the problems with indicators?</td>
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<tr>
<td>• Observable intakes through mobile technologies.</td>
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</table>

**Topic 4: Technologies to improve nutritional value and delivery of ASFs (M Johansson)**

Traditional preservation techniques are fermentation, smoking (cold or hot), pickles, hermetisation (hermetically sealed container to which vacuum is applied), curing (salt and sugar), salting, drying. These methods have been very useful in environments without electricity. With electricity, refrigeration and freezing have also become important options. Either case, first thing is to produce food safe for human consumption and find solutions to increase the yields of food production such as breeding, selection of species, using alternative protein sources, adapting the animal nutrition, minimising the use of antibiotics and growth hormones and avoiding overuse and pollution of freshwater. Gender issues related to food processing also need to be taken into account. Recent statistics reveal that an estimated 70% of the poor are women, for whom livestock play an important role in the improvement of status and represent one of the most important assets and sources of income. Women also make up the majority of agricultural workers in many developing countries, but they are excluded from the processing systems on the industrial level. Raising women’s income and assisting women farmers could by a particularly effective way to reduce poverty and enhance food security. In developing countries, rural women represent approximately 43% of the agricultural labour force, and produce, process and prepare much of the food available, thereby giving them primary responsibility for food security. There is also a huge loss or waste of food calories from farm to table. In developing countries, two-thirds of food losses occur during harvesting, handling, and storage (World resource institute). Cutting down these losses along the value chain would be an immediate and cost-effective option for increasing food availability. Obtaining calories and protein through ASFs is also inefficient as it converts only around 1-11% of gross feed energy (converting feed to food) into human food. Switching the global consumption of beef to other meats, fish, or dairy is also one option to think about.

Food processing industries are one of the most important industries in developing countries, but the inefficiency frequently found in such a countries affects the productivity, availability, cost and nutritional quality of local foods. Development of these industries should decrease the food gap. There is a lack of basic processing technologies and food-processing centres where know-how can be transferred should be involved. Marketing improving product quality could help food companies increase their income and generate new employment opportunities. To promote food safety, assistance in implementing good hygiene practices and introducing food-safety systems based on risk analysis and prevention and traceability is necessary. Help the food companies in developing countries expand their access different markets and delivery strategies to link small scale producers to industries would also contribute.

Improving the hygiene throughout the value chain is also key: personal, animal, transport, handling of row materials, processing, distribution and household/storage/cooking. The use of food technologies to prevent food deterioration: UHT, ESL, sterilisation for canning, fermentation of...
milk, meat or fish, bactofugation/microfiltration of milk, meat packaging MAP, different eatable films and intelligent packaging indicating for example levels of microorganisms and smoking, sausages or canning of chicken. Many of the rural poor are food producers, family farmers or landless agricultural workers. They include fishermen, animal workers and forest-dependent peoples with limited access to productive means. Different pests, environmental factors and low productivity bring the small scale producers to permanent risk of food insecurity and nutritional problems. Technologies to produce the row food material, how to increase the row material and its quality, low costs technologies, are also of importance. Are there some strategies for these less formal supply chains? Optimize animal nutrition, feed quality, elimination of toxins in the feed; selection and choice of breed and species, handling of animals before slaughter, slaughter methods. Help the food companies in developing countries expand their access different markets and delivery strategies to link small scale producers to industries would also contribute.

ASFs, especially animal fat, are linked with human health risks, but the risk is only associated with overconsumption. At low to moderate intakes, meat, milk and egg products are highly beneficial, providing essential amino acids, minerals and vitamins. Obtaining calories and protein through animal products is inefficient as it converts only around 1-11% of gross feed energy (converting feed to food) into human food. Switching the global consumption of beef to other meats, fish, or dairy is therefore one option to think about. Food safety is also of concern, on biological and chemical contaminants. Aflatoxins, for example, are of major importance in humid and warm environments. Hazard Analysis Critical Control Point (HACCP) can help improve food safety along the entire food chain.

Increased consumption of ASF is desirable in reducing malnutrition due to high nutrition value. However there are technologies to improve the nutritional value of ASFs:

- In many facilities, by-products are created along-side the food being processed. To develop processes and technologies for mining of, for example, proteins from whey, a by-product from cheese-making, or iron from blood, could lower the food gap.
- Waste along the food processing can be used as feed for animals.
- Fortification in micronutrients and vitamins: in many countries, iodine deficiency is a major public health problem that can be cheaply addressed by purposely adding small amounts of iodine to the sodium chloride salt; milk fortification with vitamins A and D – D important for women in Muslim countries; fortification of milk with proteins.
- Use of probiotic products,
- Increase meat tenderness for children and elderly by using different packaging technologies.

Livestock ownership currently supports and sustains the livelihoods of an estimated 675 million rural poor. Livestock could be straight connected to consumption of animal protein and micronutrients, as well as it creates employment. Land availability limits the expansion of livestock numbers and we have to increased productivity through intensification of production and of both old and new technologies.

Current research needs now require:

- What are key challenges where food technology could play a role to increase the access of poor households to ASFs?
- What are the difficulties and the opportunities for food technology for ASFs that would merit further investigation?
• What are the trade-offs in the impact of food technology of ASF in nutrition and food safety that require investigation?
• How can we improve the delivery of ASFs (of quality, hygienic, preserved) for both urban and rural consumers?
• How can we keep the processing closer to the producers (bigger share of the profit and better access) at more affordable prices?

The session was followed by time for brainstorming on research ideas (Box 4).

**Box 4: Brainstorming discussion points Topic 4**

<table>
<thead>
<tr>
<th>Technologies to improve nutritional value and delivery of ASFs</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Balance standardization vs elimination of small producers</td>
</tr>
<tr>
<td>• Pilot studies w/o follow up -&gt; Scaling up?</td>
</tr>
<tr>
<td>• Indigenous foods (preserved) : food culture and knowledge, innovation on local technologies (e.g. Blood for iron)</td>
</tr>
<tr>
<td>o Attention to byproducts</td>
</tr>
<tr>
<td>o Small dried fish – seasonal gaps – drier units, salted cured</td>
</tr>
<tr>
<td>o Safety, losses,</td>
</tr>
<tr>
<td>• What market requires (e.g. goat cheese?)</td>
</tr>
<tr>
<td>• Incentives for producers and private sector</td>
</tr>
<tr>
<td>• Map technologies (strengths and limitations)</td>
</tr>
<tr>
<td>• Low cost low input technologies examples -&gt; transfer?</td>
</tr>
<tr>
<td>• Lack of exchange of know-how</td>
</tr>
<tr>
<td>• Portfolio of diversified technologies</td>
</tr>
<tr>
<td>• Nutrient profiling through feeding</td>
</tr>
<tr>
<td>• Probiotics in food and feed</td>
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</tbody>
</table>

**Topic 5: Food safety strategies that improve quality while enhancing rather than restricting access by the poor** (D. Grace, B. Haesler)

A framework which looks at food safety and nutrition at the endpoint of consumer, including the regulatory and institutional environment, the natural resources and inputs at a national and international (exports and imports) level was presented (see Figure 1).

In poor countries, small farms and wet markets provide most high value foods, including ASFs. Benefits of wet markets are the provision of cheap, fresh, accessible, ASFs, often from local breeds, that can be purchased in small amounts, where sellers are trusted and credit may be provided (results from PRAs with consumers in Safe Food, Fair Food project). In these countries there is also a growing concern about food safety and it has been observed that many/most reported concerns from consumers where over food safety, and they are willing to pay 5-10% premium for food safety guarantee. Also purchase can decrease by 20-40% during animal health scares.

The hazards are high and high percentages of samples do fail standards for microbiological or chemical hazards, and this is not always worse for informal markets than for formal ones. Actually, more rules could be associated with worse practices. Also, the risks to health may vary.
Improvements in the food safety throughout value chains are feasible, effective and affordable: peer-training, branding and innovation for Nigerian butchers lead to 20% more meat samples meeting standards. The cost of USD9 per butcher was outweighed by the resulting savings of USD780 per year from reduced costs in human illness.

Figure 1: Framework on food safety and nutrition

Current research needs now require:
- What is the nutritional impact of food borne disease transmitted by ASF on the poor and what are the main pathways?
- What ASF products and problems and contexts are most likely to be associated with food borne disease?
- How do food safety concerns affect public and private investments in ASF?
- What is the impact of conventional food safety regulation on nutritional outcomes?
- How can food safety be best assured in value chains by and for the poor without having a negative impact on nutrition outcomes?

The session was followed by time for brainstorming on research ideas (Box 5).

Box 5: Brainstorming discussion points Topic 5

Food safety strategies that improve quality while enhancing rather than restricting access by the poor
- Carrots not sticks
• Make local markets more effective in delivering quality nutrients
• Wet markets still the future
• Standards followed most for export: exporting best foods?
• How to prevent standards impacting on food security specially of poor people
• Value chain approach needed for food security
• Regulation: barriers benefits, private standards, quality + safety
• Evidence to address /counter misperceptions
• How to shift from export market mindset to domestic market mindset
• Equitable growth, nutrition health together
• People don't trust labels, and rightly so
• Role of refrigeration
• Packs + troughs in ASFs consumption because of perishability. Smoothing these will help nutrition
• Embed value chains + food safety
• Need information on attribution of diarrhea
• Technology research + diagnostics
• Evolution of supply chains: cold storage on energy dependent food systems are there other non-energy dependent
• Solar drying, fermenters
• Drying and smoking ASF: post harvest need to shift perspective
• Educating rural poor on food safety

### Topic 6: Nutrition interventions to optimize use and benefits (Aulo Geli)

The Lancet series 2013 provides a framework for actions to achieve optimum fetal and child nutrition and development. Possible venues for intervention are:

1) Social Safety Net Approaches
   - Supplementary feeding programs (specialized populations)
     - Food aid products with ASF (milk, fish powder) - inclusive of Complementary food products like CBS++
     - Fish powder for complementary foods
   - School based interventions
     - School supplementary feeding programs - fortified products (with ASF), provision of milk, yogurt, use of ASF in the food basket (agriculture linkages)
2) Community Based interventions
   - Heifer Model: agriculture based- livestock/poultry; provision of seed grants/livestock gifts; passing on of the gifts; training in vocational skills; growing vegetables; soil management; literacy training; education. This is a community based activity that is promoted by Heifer International. The aim is to provide inputs (seed grants and or livestock gifts) to a group of households, who manage the livestock/produce crops/vegetables and then pass on the output to another set of households (within the same community)- that is the passing on of the gift- this way, households are receiving some inputs but they are required to pass on the outputs to another set of households. Within the program, they also receive training on vocational skills (e.g. sewing) for income generation, literacy and other education classes. In the case of Heifer Nepal, the areas that they work in they focus on improving soil management practices and providing training on growing vegetables for income generation and consumption. Not much evidence in terms of impact.
3) **Market Approaches and Improving Market access**

- Private sector initiatives (e.g. Grameen-Danone Shakti Doi, fish powders) in Bangladesh:
  - this is a collaboration with Grameen - production of low cost fortified yogurt that is sold in individual cups – sourcing of the milk is local and on the farmgate side - farmers producing milk receiving training on optimal food safety measures in handling and processing of milk. On the market side, sales are through a community based network of sales ladies that reach out to mothers in households.

- Value chain improvements (Cold Chain, transport, Market infrastructure)
  - Fish powders - Small scale producers in Ghana who produce fish powders that are used for supplementation of complementary foods
  - Food safety and maintaining quality of ASF – most perishable commodity, in most countries- losses are very high. E.g. Ethiopia Livestock Market- Market-focused actions that will generate demand, improve supply linkages, incentivize and create market relationships that encourage greater productivity, add value, and promote investment throughout the value chain.
  - Post harvest value additions (Processing to meet consumer demands, to improve shelf life)- Processing meat, milk, fish into consumer preferred products- e.g. production of yogurt, cheese and/or value additions to increase shelf life e.g. drying fish,

4) **Large scale Multi-sectoral interventions** (the problem is not knowing for sure what brings the benefit: how does this combination of activities, including promotion of ASF, have an impact on maternal and child nutrition

- Integrated nutrition and health with homestead component (BCC, provision of inputs to food insecure households- poultry/goats, provision of training for food secure households, aquaculture training, pond maintenance coupled with improving market access). Food insecure households receive the inputs while food secure households receive training on how to better manage their existing resources/livestock. : how does these actions translate into change at the individual level (or do they?)

- Integrated nutrition and livelihoods (BCC, provision of mini grants to improve livelihoods for specific activities- could include livestock

- Integrated nutrition and health (BCC, provision of training to farmers, households, schools on homestead gardening) coupled with agricultural growth program (focused on productivity and improving market access to high value crops/livestock products)

How prevalent are each type of model; are any taking off in a big way? Where are the biggest ones being taken to scale? Are they all USAID FTF projects or has anyone else tried to go to scale? Where are the programs with opportunities for collaboration around studying the value chain?

School Feeding: managing multiple objectives: education, school feeding, agriculture, nutrition and health, business development. Looks a simple idea but programmes can be very complex

- There are important “trade-offs” in the objectives – optimisation problem, managing complexity is not straight forward

- Talk about evidence as well. For their annual Forum, the Global Child Nutrition Foundation (GCNF) gathered data from 36 school feeding programs in 29 countries. Most of the reports were completed by the national government while some were completed by the country WFP office, state government or a private NGO. Out of 28 countries, 13 reported purchasing or receiving ASF for use in their school feeding program

- The market opportunity: New markets for products and services along supply/value chains (constant, predictable)
- Financial value ~ $82* per child per year
- Quantities of food ~ 50 kg per child per year
- Constant and predictable ("structured") demand

- The answers are context specific:
  - Fully centralised model (government centrally buys and distributes foods to schools)
  - Decentralised third party model (caterers responsible for procurement and preparation)
  - Partially decentralised model (traders -> schools)
  - Integrated farm to school model (women's groups supply side package and provide schools with food supply and support preparation and distribution)

- Meal planning objective: optimising nutrition content of meals, whilst managing constraints including:
  - Per-child budget
  - Regional diversity of agricultural production and dietary customs
  - Seasonality, relevance to forecast smallholder harvest
  - Food safety
  - Identification of “nutrition gaps”
  - Identification of underutilised foods to fill gaps (e.g. vitamin A using orange flesh sweet potato, red palm oil)

- Technological issues and costs: Large Scale production, linking to Food technology and Private Sector:
  - Issues of perishability
  - Cost of production (e.g. fortified foods)
  - Cost of packaging
  - Price points are determined by the above two costs
  - Environmental costs associated with waste. E.g. Small sachet disposal (micronutrient powders, fish powders)

Current research needs now require:
- Which of these interventions is most likely to reach the population at most need and help achieve nutrition outcomes?
- What combinations of interventions are working?
- What is the sustainability of the approach?
- Reaching the non-beneficiary (can you have public health impact if you are not able to achieve public health level outreach)
- Scaling up and out
- Can this program/technology/food product/intervention be taken to scale?
- What are the drivers/facilitators versus challenges/hurdles for taking this to scale
- Cost effectiveness: What is the cost effectiveness of such projects/projects implementing programs/projects that target populations with ASF- at scale?

The session was followed by time for brainstorming on research ideas (Box 6).

**Box 6: Brainstorming discussion points Topic 6**

**Nutrition interventions to optimize use and benefits**
How to overcome perceived challenges by policymakers for uptake of ASFs?
Education, school feeding programs that stimulate local production, etc.
School feeding: a nutrition intervention? Vs conditional cash transfers
Lack of measurement is a key gap
Substitution effect
Food technology gaps: public-private partnerships
To what extent is scaling up of local production an opportunity? Local sourcing of ASFs?
Evaluation approaches:
  - Are novel approaches needed?
  - Convincing donors to invest in evaluation: to do well requires money
  - Looking at long term cognition
  - Meta analysis: what do we know> Heifer model
Fit for purpose: purpose/objectives of indicators, differences audiences
Complementary measures of experience well being
Nutrient gaps + market apps -> agricultural lense on diet
How far does agricultural sector take it?
Who validates? Bridge the disconnect
Trade off simplicity vs accuracy
Supply vs demand
Semi-quantitative indicators, biochemical indicators
Consumer behavior indicators
Phone technology
Policy indicators
Intrahousehold allocation
Understanding context (requirement vs intake) – balanced diet
What level of evidence is needed to convince different types of policy makers?
What institutional investments can promote affordability (move towards food environment)?
ICN2: capitalize on broad approach

General discussion on key priorities:
- Develop the idea of a program for co-funding of Consortium
- Address the issue of ASF from a system perspective (also including other foods)
- Generating evidence on the different options
- Create an advocacy network for visibility (for policy engagement and to affect decisions)
- We know that it is important but we need to package it (e.g. ASFs for pregnant and lactating women – relevant to the 1000 days // life cycle approach targeting)
- Sustainable diets and dietary quality
  - Decrease number of animals by increasing productivity = sustainable intensification (this is in the global agenda and needs to be documented)
- Involvement of community
- Toolkit to:
  - Evaluate L&F investments
  - Guide and give technical advice
  - Mainstream nutrition beyond poverty reduction.
    - Intensification needs to be promoted and guided to avoid negative side effects and contribute to good nutrition
• Nutrition demand should be the departure point to look at agriculture through food systems (distribution, access): Impact pathways -> focus into consumers and work backwards
  o How will consumers be in 20 years, how can we meet those needs?
  o What models tells us which are the gaps?

DAY 2: WORKING GROUPS

AGENDA Day 2: February 3, 2015

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>09:00-09:30</td>
<td>Summary of previous day’s session and outline of today’s agenda and objectives</td>
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<tr>
<td>9:30-11:00</td>
<td>Working groups: Propose work strategies and organization under the key topics and synergies between the topics</td>
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<tr>
<td>11:00-11:15</td>
<td>Coffee break</td>
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<tr>
<td>11:15-13:00</td>
<td>Working groups: Narrow down on what is achievable in ST and LT Identify potential partners not present</td>
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<tr>
<td>13:00-14:00</td>
<td>Lunch break</td>
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<tr>
<td>14:00-15:30</td>
<td>Working groups report back to main group and full discussion on action items and outreach</td>
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<tr>
<td>15:30-15:45</td>
<td>Coffee break</td>
</tr>
<tr>
<td>15:45-17:00</td>
<td>Summarize conclusions Discuss next steps towards a high level event, and ST action items</td>
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The objective is to design an appropriate set of questions/objectives of research for development as a work package with sets of activities, and recommendations of best way forward
  o 10 years of progress in 2 phases
  o Intermediate activities
  o Think of who should be involved

To achieve this objective it would be useful to to be put together a work package revolving around three key areas:
  • Group 1: Overarching conceptual framework on the role of ASF and trade-offs with environment
  • Group 2: Nutrition interventions and assessment
  • Group 3: Food systems and consumer context

First there was a general discussion on what the essential needs are. The overarching narrative needs a not too complex message, and be captured in a simple story to illustrate the complexity (high diversification of systems, different products consumed, different animal feed, different production systems, breeds, etc.). There is not at present a great deal of information on the
diversity of food systems, the heterogeneity, etc. It is necessary to define what ASFs encompass. The ASF consortium should be able to present better the existing evidence on how ASF contribute to fill in the nutrient gaps and provide further evidence which might be missing on the ASF comparative advantages. Given that the macronutrient approach is not working, this narrative would help to effective lobby of contribution of ASF to a food based approach, and issues of cost-effectiveness need be included. All these need to be summarised in a compelling package.

- Do micro nutrient supplementation have the expected effect in nutrition? And if not, why might this be?
- WHO protein recommendations
- Data on diets improvement with ASF, to challenge nutritional paradigms and highlight gaps. Food based as a key approach when even fortification gets limited results

Need to influence opinion for key actors to consider people using ASF as an important nutrition asset, since ASF use in a smart way can help solve problems that already exist. We need to focus in:

- Use of existing data to identify gaps. What else should be collected? Need to improve both data and our understanding to have a global picture (high number of different systems) of the production systems and the quality of what is produced.
- Three axis: Low input livestock ~ livelihoods ~ consumer use
- Model the dynamics of trends over the next few years
- Understand better the drivers of the target populations
- Identify the win-win scenarios
- Research uptake/scaling up
- Targeting/assessment
- Food systems/technologies / institution policies /current intervention strategies
- Need to look at existing data in a new way regarding products: eg. Chicken: broiler meat, indigenous meat, skin, legs, feet, necks, offal, etc.

What is needed in the short term to justify the long term? Seed grants for initial exploring? Work packages including nutrition, gender, environment, etc. Identify key issues!

What would be the outline of a proposal? Objectives, main research questions (broadly) that could contribute, after mapping gaps (what are the gaps?), activities, actors (and what each brings, what is their role)

General methodology:

- Framework development: dietary patterns, consumption data, intrahousehold allocation, food portions, choices...
- Impact pathways

Visibility strategy: Options and how to manage it smartly (legitimacy and recognition to the agenda needed)

**Group 1: Overarching conceptual framework on the role of ASF and trade-offs with environment**

Aiming at advocacy based on research by establishing a powerful narrative on how ASF fits in with bad and good aspects (social, economic, environmental sustainability and justice). Evidence and best practice vs getting politic (e.g. “food safety” instead of “social justice”). Need to reconcile conflicting message from overconsumption and underconsumption, environment etc. by focusing in:
• Typology of livestock systems and value chains (highlighting that the link from consumption to agriculture goes through food systems)

Steps:
1) Define the goal: improve nutrition and food security by means of ASF; improve governance throughout the value chain; understand barriers (including intra-household allocation); and consider broader role of animals in livelihoods
2) Create a platform/consortium to build the agenda
3) Workshop to discuss key messages
4) Overarching conceptual frameworks: understand whether they are appropriate
5) Policy briefs

3 groups of activities:
1) Develop framework: community of practice to identify gap and suggest indicators to measure; identify nutrition problems related to diets
2) Discovery: identify primary and secondary targets by characterizing diets (nutrition is a dynamic iterative process which has special and temporal dynamics), investigating drivers and constraints, analyzing the potential roles of ASF (model different scenarios and develop common tools), determining capacity of ASF systems to meet demand, developing FCT and databases
3) Interventions: analytical tools to model and measure impact (e.g. effects on breast milk etc.)

Actors to take this agenda forward:
• Include researchers, and policy and practice people across disciplines
• CGIAR centres, UN agencies (UNICEF, FAO, etc.), private sector, academia (Wageningen, LCIRAH, etc.), NGOs and implementing agencies (e.g. Save the Children, VSF, AVSF, ECP), CSIRO.

• + Collaboration on strategic topics
Group 2: Nutrition interventions and assessment

Objective: how ASF can improve gaps and excess in nutrition, particularly of urban and rural poor populations, throughout the life-cycle

Key areas requiring data:
- Geographical specificities and context
- Behaviours ~ decision making ~ drivers
- Trends and how we expect things to happen and how to address it.

Framework development and theory of change and pathways: activity can follow the biofortification structure, and include formative research, development and dissemination

Discovery phase: map what we know, discuss the models used and what is the data telling us.
Theory of change: multilevel, transdisciplinary
DELPHI method to prioritise agenda questions
Take the ASF lens across all the framework:
- Dietary behaviours analysis: what we know and what we do not know
- Develop community of change
  1. Develop needs
  2. Target groups
  3. Objectives
  4. Activities
Step 1: Establish theory of change.
Objective: Understand pathways between pro-poor ASF systems and improved health diets

Outputs:
- Community of practice (CoP) with specific ToRs, roles
- Framework dynamic/theoretical/across discipline, fitting into higher level framework

Scale?
Scope: Not reinvent wheels but adapt existing frameworks (e.g. Lancet)

Step 2:
Objective:
1) What are our nutrition problems?
2) Characterise the diet (current and potential role of ASFS): who, where, when (targeting, why or why not); 2ndary data analysis as start and identify gaps where there are missing data. Mapping of existing research evidence; gender intra household allocation (barriers and opportunities
3) Drivers and Barriers and opportunities: why, why not, what is cultural? Implicit/unreasoned motivations at 2 levels: dietary (e.g. taboos) or non-dietary (eg. Pregnant women to avoid having big babies)
4) Potential -> modelling demand-supply /compare models/cost-effectiveness
   a. Returns, positive or negative, simulation
5) Intervention Design: target groups (1000 d, adolescent girls/boys, school age 5-18, pregnant, lactating, elderly, HIV) – establish primary and secondary (the ones that influence primary groups) target groups. The framework needs to be lifecycle
   a. The context tells how to prioritise the problems related (relate back to framework), identify nutrition problems ASF related, which are dietary and which not (e.g. WASH, HIV, parasites, ASF related like zoonosis or environmental contamination)

Dietary intake -> Optifood: gaps and recommendations, limitations (FCT, bioavailab, capacity of supply, elasticity, drivers, gender)-> methodology -> interventions (proposals)

Discovery -> Development -> Operationalisation

Characterisation of ASF:

1) Food Composition tables, bioavailability comparison (tools ignore it), focus on specific micronutrient problems that we want to focus in; compare alternatives on level of ASFs being used (ASF vs non-ASF). Turn gaps into food quantity needed (DEMAND)
   a. Sensitivity analysis of the tools and methods
2) Potential: Demand vs supply capacity -> combine both sets of potential (how can we influence both demand and supply
3) Improve interventions
   a. School feeding,
   b. pregnant supplementation
   c. Maternal supplementation: breastmilk effect in composition and volume
   d. Micro-linkages (BCC) vs macro-linkages (food systems -> effect on markets and diets)

Group 3: Food systems and consumer context
Interventions into Food Systems for ASF
Goal of Activity: Reduce Malnutrition (undernutrition or overnutrition) and improve food security among the poor
Objective: To do so optimizing the contribution of animal source foods within the Food System

What is a Food System?

<table>
<thead>
<tr>
<th>Five broad components, as food system evolves</th>
<th>Production</th>
<th>Processing</th>
<th>Distribution</th>
<th>Consumption</th>
<th>Disposal</th>
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<tbody>
<tr>
<td>Governance applies throughout</td>
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</table>

Methodology developed to Consider ASF contribution. Broadly, we first suggest examining consumption, then production, to meet the goal of understanding how one could optimize the contribution of ASF within the food system

1. Examine the diet to understand gaps plus future trends, as well as potential substitutions within the diet
2. Understand the barriers to improving the diet, including the intrahousehold allocation of food, and how behaviors are changing
3. In considering the role of ASF in the diet, need to also consider (or understand) the broader role of animals in the livelihood system (insurance, etc.)
4. Examine how specific ASF are produced, processed, and distributed within the food system being studied, as well as the governance of the system
5. Consider how price/income/transaction costs/access (equity) is changing and may continue to change in the future
6. Identify points of entry to optimize the contribution of ASF to nutrition and food security

Thoughts from second session

Conceptual Framework Do we need a new one or can we borrow from old ones? How do the ideas listed above link to other ideas about how ASF value chains link to diet (e.g. Spencer Henson and LANSA have a framework). Want to effectively incentivize actors within the value chain to produce safe ASF (proper incentives throughout system are necessary)

What is the role of policy? There is a diversity of ASF production systems and policy can help or hinder that role. Definitely depends upon context – but need to continue thinking along the lines of equity/public health risk/environmental factors as policy needs to be able to trade off these points. It is probably useful to have a matrix (or a theory) that brings these categories together.

What groups need to be on board, not already at the table?
- Commodity groups
- WHO for healthy diets (?) (this one was more controversial, as they can be normative)
- Industry (also have to step carefully)
- Local Universities in target countries (when we get there)

REPORTING FROM THE WORKING GROUPS

Next steps: Further workshop to:
- Discuss key messages on ASF
- Elaborate the overarching conceptual frameworks and assess whether they are appropriate
- Prepare policy briefs on strategic topics

**Activities scope:** Dynamic iterative process, with 3 groups of activities:
- Develop framework, suggesting indicators to measure
- Discovery: Community of Practice to identify baps and nutrition problems related to diets
  - Characterise diets: spatial, temporal dynamics
  - Whys and why nots: drivers and constraints
  - Potential roles of ASFs: model different scenarios
  - Develop common analytical tools to model and measure...
  - Determine the capacity of ASFs system to meet demands
  - Work in FCT and databases
- Interventions: ongoing on potential effects

**Food systems:** rephrase the overall goal -> improve nutrition and food security among poor by contribution of ASF. Governance process throughout livestock value chains, considering the broader role of animals in livelihoods

**Partners necessary in the consortium and to create platform to build the large scale agenda:**
Policy and practice people need to be involved from the beginning and it is necessary a variety of disciplines: e.g. anthropologists, sociologists
- CGIAR centres
- UNICEF, FAO
- Private sector
- Academia: Wageningen, LCIRAH, CG, CSIRO, SOAS, LSHTM,
- NGOs and implementing partners: SC, Concern, VSF, AVSF, ECP
- Policy makers (e.g. access through FANARPAN at national level)
## ANNEX I: LIST OF PARTICIPANTS

<table>
<thead>
<tr>
<th>Names</th>
<th>Position</th>
<th>Organisation</th>
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<tbody>
<tr>
<td><strong>EXTERNAL</strong></td>
<td></td>
<td></td>
</tr>
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<td>Ulf Magnusson</td>
<td>Professor, Theme leader</td>
<td>SLU Global, Swedish University of Agricultural Sciences</td>
</tr>
<tr>
<td>Names</td>
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<tr>
<td>Carl Johan Lagerkvist</td>
<td>Professor in Business Economics; Head of Department.</td>
<td>Swedish University of Agricultural Sciences, Department of Economics</td>
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<td>Senior Researcher</td>
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<td>Karltun</td>
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<td>Nancy Johnson</td>
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<td>Paula Dominguez-Salas</td>
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<td><strong>Livestock &amp; Fish</strong></td>
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