

# Navigating upstream-downstream animal health research: reflections from the Livestock and Fish Program

Barbara Wieland (ILRI), Mohan Chadag (WorldFish), Vish Nene, Phil Toye (ILRI)

## Key messages

1. Laboratory- and field-based research benefit from strong cross-linkages.
2. Using a value chain approach enables evaluation of the impact of the work, stimulates integration of cross-cutting issues such as gender and capacity development, and facilitates collaboration with other CGIAR Research Programs (CRPs).
3. Communications strategies need to enhance and sustain the flows of information between field and laboratory researchers, and to support development actors help smallholder farmers cope with this key livestock production constraint.

Research conducted under the Animal Health flagship of the CGIAR Research Program on Livestock and Fish sought to alleviate animal health and disease challenges facing smallholder farmers in low-income countries. The flagship comprised four interdependent activity clusters:

1. **Animal health assessment and prioritization** of the disease-related productivity constraints within each value chain, particularly infectious diseases;
2. **Animal population health and food safety** to develop and test solutions in the field for identified disease constraints and risks;
3. **Vaccine and diagnostic assay development** to support control efforts in the field; and
4. **Equitable animal health services delivery** to ensure that tools and improved management protocols reach the intended beneficiaries.

Given the nature of the work, an immediate challenge was to align upstream research on vaccine and diagnostic development with field-oriented research taking place in the other clusters. The development of novel vaccines is a long-term endeavour of 15–20 years, often continuing long after the end of a project or a CGIAR research program. On the other hand, there are obvious links between upstream and downstream research.

The success of upstream research depends on effective linkages into local understanding of disease priorities and downstream findings examining access to and uptake of tools and products developed upstream. Without the downstream findings and knowledge, upstream research would make little impact.

This brief examines the experiences of scientists conducting a range of field and laboratory-based research. It was facilitated through the value chain approach of the Livestock and Fish program which focused on a specific chain in each target country: Pigs in Uganda and Vietnam, small ruminants in Ethiopia, aquaculture in Bangladesh and Egypt, and dairy in Tanzania and India.

It draws on a synthesis workshop in late 2016 where a group of flagship scientists organized to reflect on three issues:

- The benefits of a value chain approach;
- Success in bridging upstream and downstream research; and
- Lessons learned from the flagship research.

Further insights and lessons from this synthesis exercise are summarized in the following four briefs:

- Dione, M. et al. 2016. Pig diseases in Uganda: Impacts on pig production, human health and nutrition. [hdl.handle.net/10568/80137](https://hdl.handle.net/10568/80137)
- Gameda, B. et al. 2016. Interventions and tools to improve small ruminant health in Ethiopia. [hdl.handle.net/10568/80138](https://hdl.handle.net/10568/80138)
- Steinaa, L. 2016. Pig vaccines and diagnostics for African swine fever: the case of Uganda. [hdl.handle.net/10568/80597](https://hdl.handle.net/10568/80597)
- Kiara, H. et al. 2016. Access to livestock health interventions and products in dairy and cattle value chains in Tanzania. [hdl.handle.net/10568/80633](https://hdl.handle.net/10568/80633)

## Benefits of a value chain approach

Clear benefits and limitations to the value chain approached were highlighted during the workshop. Scientists appreciated the inclusive nature of the approach in how it caters for participation of key stakeholders in setting research priorities at different stages of the process. It helped foster scientists' understanding of challenges along the value chain and how their particular research leads to impact.

The inclusion of market considerations into the research framework facilitated the undertaking of impact evaluations. Addressing the complete value chain stimulated the integration of the cross-cutting issues, such as gender and capacity development, in the research, and facilitated collaboration with other CRPs, especially with the CRP on Agriculture for Nutrition and Health.

Further, focusing the work of all the flagships on one value chain helped develop a critical mass in Tanzania, for instance with regards to Infection and Treatment Method to prevent East Coast fever, and facilitated interactions between the flagships. However, there were constraints associated with this approach. Some scientists described the lack of a standard framework and the large number of value chains as a drawback. Others felt the value chain approach was too restrictive at times, and it would have been better to focus on production systems (i.e. pastoralism) and on more than one species.

Scientists in the fish value chains underlined the benefits stemming from the partnerships built among WorldFish, ILRI and others organisations which fostered new approaches and the undertaking of comparative studies, such as the review of infectious disease impact and its role in informing decisions on disease management in aquaculture systems in Bangladesh.

## Bridging upstream and downstream research

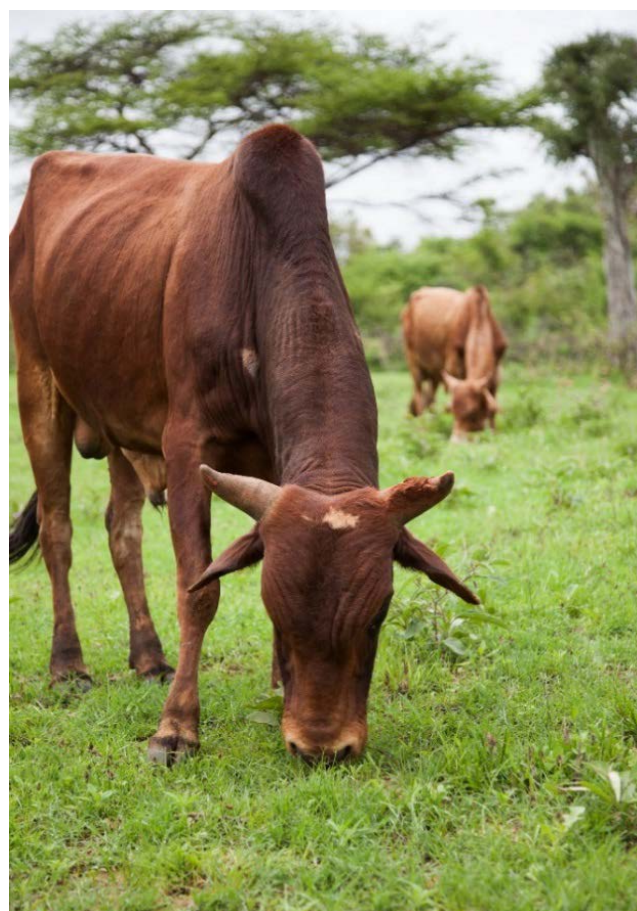
Small group discussions concluded that bridges between upstream and downstream, even though at times wobbly, had been built. Compared to the beginning of the CRP, there was much more mutual appreciation of the importance of the different research priorities of the flagship clusters. In the fish value chains, for instance, the linking of laboratory- and field-based research led to significant advances in understanding health problems.

In Egypt, studies conducted by WorldFish, ILRI and partners identified Tilapia Lake virus in Nile tilapia and other pathogens in ponds affected by the 'summer mortality' syndrome. This has helped to plan next steps to resolve a key problem. In Bangladesh, the Program' work provided evidence for the presence of diseases listed by the World Organisation for Animal Health, such as acute hepatopancreatic necrosis disease in shrimp, and confirmed *Streptococcus agalactiae* (serotype 1b and 1a) infections as the underlying causes behind observed mortalities and associated losses of farmed tilapia in ponds and cages. Both fish value chains examples highlighted the need to collaborate with national authorities to address issues of relevance and facilitated stronger partnerships that will continue beyond the duration of the CRP.

Similar experiences were highlighted in the livestock value chains in Ethiopia, Tanzania and Uganda, where collaboration with the national authorities was essential in identifying key priorities. As in the case of the fish value chains, a strong foundation was built, enabling the undertaking of upstream research on rapid diagnostics and vaccines. However, scientists, especially in the livestock value chains, perceived some misalignment of time frames of upstream and downstream research as a serious constraint. Vaccine research was viewed as a long-term commitment, whereas field research needs quick solutions.

While these differences are inherent to the different research types, scientists suggested how the different research priorities could be better linked. The development of a communications strategy designed to enhance and sustain the flow of information was recommended as key to improving mutual understanding between field and upstream researchers. This strategy should include the organization of joint meetings and participation in joint working groups, for instance, to discuss specific diseases or livestock health problems, and offer laboratory-based staff an opportunity to spend more time with field researchers to better gauge problems faced by livestock producers.

The flagship theory of change is also a good way to facilitate such discussions as it outlines how upstream research outputs ultimately lead to impact and what role field-based research plays in this. In response to the question how far should flagship scientists go in the process of discovery to delivery and for how long, it was felt that this should depend on specific situations, but that this should be clearly thought through, a process in which again the flagship theory of change is an important tool.



## Lessons learned

Scientists highlighted the need for increased focus on prioritization and impact assessment early on in the program, as it informs and guides the flagship research priorities. This would also promote multi-pathogen thinking, rather than a single disease approach which, given the findings of phase I in the different value chains, seems appropriate. However, it is important that resources are not spread too thinly. Getting things done requires a critical mass of resources. The flagship needs to be realistic in how much can be achieved in several value chains and resources need to be aligned to CRP outcomes.

Experience from phase I also highlighted that such prioritization exercises are of little value if undertaken superficially. Capturing the complexity of production systems and reliably measuring the impact of diseases require the investment of substantial human and financial resources, and will ideally lead to the development of predictive models for change in production systems; ones which can be adjusted as new data emerges in dynamic livestock systems. Such an approach would give important pointers as to which diseases are likely to become more important in the future, thereby informing upstream research priorities.

More emphasis was also recommended on the generation of short-term products which could act as proof-of-concept of the value chain approach for technology flagships. There is a lot of scope for collaboration with other flagships, such as bundling technologies for service delivery from the three technology flagships health, genetics and feeds and forages. This has been taken up in the development of the phase II proposals of the new LIVESTOCK CGIAR Research Program, where more emphasis has been placed on undertaking research related to access to products and services. In the new Fish CRP, the health and fish feeds and aquaculture systems clusters will support the genetics cluster to produce best practice packages for genetically improved fish strains.

## Conclusions

Animal health research is not a one-way stream from laboratory to field. Feedback loops from the field to inform laboratory-based research are absolutely mandatory. Similarly, advanced molecular diagnostic tools support epidemiological research since they increase the resolution of case definitions, by replacing a yes/no diagnostic test with molecular tools that allow differentiation of various genotypes and making epidemiology surveys more precise. The way the work is conducted in vaccine and diagnostic research emphasizes the development of 'generic' research platforms within the context of research on a specific disease, so that the required expertise and equipment may be applied to other disease priorities uncovered through field-based research

As long as there are visible benefits for those involved—scientists or livestock producers—opportunities for collaborations will be sought. While CRP scientists may have been slow to engage with a new group of researchers, this clearly has changed over the last five years. There is, however, a need to continue fostering these links to prevent them from being overlooked as scientists get caught up in their daily routines. A recent internal restructuring in ILRI brings together upstream and downstream research into one program, mirroring the research agenda of the CRP in phase II, and supports fostering of existing links.

The structure of the flagship in phases I and II generates a thorough understanding of health priorities and provides tested solutions or evidence-based approaches to solve problems. This distinct strength should be better communicated to development actors to support smallholders in coping with a key livestock production constraint, particularly donors to ensure appropriate financial support in the future. Thus for phase II ways need to be sought to interact more closely with donors to highlight the relevance of the animal health research.





## Acknowledgements

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*Patron: Professor Peter C Doherty AC, FAA, FRS*

*Animal scientist, Nobel Prize Laureate for Physiology or Medicine—1996*

Box 30709, Nairobi 00100 Kenya  
 Phone +254 20 422 3000  
 Fax +254 20 422 3001  
 Email [ilri-kenya@cgiar.org](mailto:ilri-kenya@cgiar.org)

[ilri.org](http://ilri.org)  
 better lives through livestock

ILRI is a CGIAR research centre

Box 5689, Addis Ababa, Ethiopia  
 Phone +251 11 617 2000  
 Fax +251 11 667 6923  
 Email [ilri-ethiopia@cgiar.org](mailto:ilri-ethiopia@cgiar.org)

*ILRI has offices in East Africa • South Asia • Southeast and East Asia • Southern Africa • West Africa*