International Livestock Research Institute: Zoonoses & Food Safety Related Activities in APHCA member states

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Outline of talk

• ILRI (ILRAD/ILCA); CGIAR; CGIAR Research Programmes (CRPs)
• DfID review
• Indonesia – HPAI
• Ecosystem Approaches to the Better Management of Zoonotic Emerging Infectious Diseases in SE Asia (EcoZD)
• GET Dairy India
• IDRC-PHFI

• Grameen Danone
• Viet Nam: ACIAR and CRP-3.7
• PENAPH
Animal bioscience
Animal science for sustainable productivity
BecA-ILRI Hub
Biosciences facilities
Feed and forages bioscience
Food Safety and Zoonoses
Livelihoods, gender and impact
Livestock systems and the environment
Policy, trade and value chains
Vaccine biosciences

ILRI’s strategy 2013-2022 was approved in December 2012. It emerged from a wide process of consultation and engagement.

ILRI envisions... a world where all people have access to enough food and livelihood options to fulfill their potential.

ILRI’s mission is... to improve food and nutritional security and to reduce poverty in developing countries through research for efficient, safe and sustainable use of livestock—ensuring better lives through livestock.

ILRI’s three strategic objectives are:

1. with partners, to develop, test, adapt and promote science-based practices that—being sustainable and scalable—achieve better lives through livestock.

2. with partners, to provide compelling scientific evidence in ways that persuade decision-makers—from farms to boardrooms and parliaments—that smarter policies and bigger livestock investments can deliver significant socio-economic, health and environmental dividends to both poor nations and households.

3. with partners, to increase capacity among ILRI’s key stakeholders to make better use of livestock science and investments for better lives through livestock.

This is ILRI’s second ten-year strategy. It incorporates a number of changes, many based on learning from the previous strategy (2000-2010, initially produced in 2000 and modified in 2002), an interim strategy (2011-2012) and an assessment of the external and internal environments in which the institute operates.
ILRI and where it works

Headquarters in Nairobi

ILRI outposts in SE Asia: Hanoi, Vientiane, ChiangMai (Bangkok)
CGIAR Research Programs

It has been recognized for more than a decade that the ever more complex issues facing agricultural research for development require an innovative approach to research. No single research institution working alone can address the critically important issues of global climate change, agriculture, and food security and rural poverty. Our ambitious new CGIAR Research Programs tackle the cross-cutting issues in agricultural development across the globe.

Tackling complex issues with collaborative research

Our new CGIAR Research Programs align the research of our 15 Research Centers and their partners into efficient, coherent, multidisciplinary programs. These realize the full potential of collaborative research for tackling complex development issues.

Our Research Programs to improve yields and profits of crops, fish, and livestock

- CGIAR Research Program on Dryland Cereals;
- CGIAR Research Program on Grain Legumes;
- CGIAR Research Program on Livestock and Fish;
- CGIAR Research Program on Maize;
- CGIAR Research Program on Rice;
- CGIAR Research Program on Roots, Tubers and Bananas; and
- CGIAR Research Program on Wheat.

Our Research Programs to improve sustainability and environmental integrity, adapt to and mitigate climate change

- CGIAR Research Program on Climate Change, Agriculture and Food Security;
- CGIAR Research Program on Forests, Trees and Agroforestry; and
- CGIAR Research Program on Water, Land and Ecosystems.
Strategic goal: CRP4 is a research and development program that will work to accelerate progress in improving the nutrition and health of poor people by exploiting and enhancing the synergies between agriculture, nutrition, and health through four research components: value chains, biofortification, control of agriculture-associated diseases, and integrated ANH development programs and policies.
Historical projects
Across a range of zoonoses burden, poverty burden, and reliance on livestock, the hotspots for poverty, emerging livestock systems and zoonoses are (in decreasing order of importance both by region and country; countries in red appear in multiple listings):

**South Asia:** India > Bangladesh > Pakistan

*Is higher than:* East and Central Africa: Ethiopia > Nigeria > Congo DR > Tanzania > Sudan

*Is higher than:* South East Asia: China > Indonesia > Myanmar > Vietnam

*Is higher than:* West Africa: Burkina Faso > Mali > Ghana

1. zoonotic gastrointestinal disease;
2. leptospirosis;
3. cysticercosis;
4. zoonotic tuberculosis;
5. rabies;
6. leishmaniasis;
7. brucellosis;
8. echinococcosis;
9. toxoplasmosis;
10. Q fever
11. zoonotic trypanosomosis
12. hepatitis E
13. anthrax.
Greatest Burden of Zoonoses Falls on One Billion Poor Livestock Keepers

An ILRI study shows that zoonotic diseases are major obstacles in pathways out of poverty for one billion poor livestock keepers. The diseases mapped cause 2.3 billion human illnesses and 1.7 million human deaths a year. In poor countries, the diseases also infect more than one in seven livestock every year.

Map by ILRI, from original published in an ILRI report to DFID: Mapping of Poverty and Likely Zoonoses Hotspots, 2012.
INDONESIA

Project title: Pro-Poor HPAI Risk Reduction
Period: 2007 - October 2010

International partners:
International Food Policy Research Institute (IFPRI)
International Livestock Research Institute (ILRI)
Royal Veterinary College, University of London (UK)

National partners:
DGLS/DAH
Local Dinas (Bogor Kota and Kabupaten)
Universities (UGM and IPB) & NGO´s
DFID-Funded Collaborative HPAI Research Project for Asia and Africa

Objectives:

1. Provide scientific basis for improving HPAI control strategies
   – More cost-effective
   – More ‘equitable’
2. Inject insights into policy processes
   – national
   – regional and global
3. Build capacity for evidence-based formulation of pro-poor disease control policy
DFID-Funded Collaborative HPAI Research Project for Asia and Africa

Outputs:
1. Background: Review of national poultry sectors & experience with HPAI
2. Disease risk: risk maps, Qualitative & quantitative risk assessments
3. Institutional analysis: poultry value chain study, alignment of poultry sector actors with HPAI control; HPAI institutional response analysis
4. Livelihood analysis: qualitative information on the impact of HPAI on people’s livelihoods; quantitative livelihood analysis
5. Evaluation of Risk management options (synthesis analysis) including KAP
6. Communication and advocacy
Avian influenza control (Indonesia)

- Operational research (OR) to control AI in backyards
  Feasibility and effectiveness of different treatment options compared (BY chicken and semi-intensified farms)
- Partners & Donors: FAO, MoA, USAID, WB
- Period and location: 08/2007 – 12/2009, 16 Districts of Java

Objective - evaluate intervention strategies against HPAI in backyard and semi-intensive farms in Indonesia by:

- Assessing the feasibility of implementing the interventions
- Assessing the impact the interventions on HPAI incidence
Ecosystem Approaches to the Better Management of Zoonotic Emerging Infectious Diseases in SE Asia

- Leptospirosis in community and abattoirs
- Rabies control and prevention
- Hygiene in small-scale poultry slaughterhouses (2 countries)
- Zoonotic causes of acute diarrhoea
- Increased risk of brucellosis and toxoplasmosis
- Prevalence of priority pig zoonoses
- Leptospirosis in community and abattoirs

EcoHealth Resource Centre at Gadjah Mada University
EcoHealth Resource Centre at Chiang Mai University
EcoZD (multi-country)
• Definitions open to debate: range from quite rigid to very flexible; issues of branding

• **One-Health** – biomedical focus: human + animal + wildlife;

• **One-Health**: focus on communicable diseases

• **One-Health**: operational / strategy

• **EcoHealth**: environment & socio-economic aspects – pioneered outside ‘traditional’ health

• **EcoHealth**: communicable & non-communicable diseases (dioxin; heavy metal toxicity)

• **Eco-Health**: academic / research / complexity
Rabies in Bali

- Ecological focus:
  - Behaviour
  - Demography
  - Fecundity
  - Socio-cultural
Priority Pig zoonoses

• 7 zoonoses
  • Taenia/cysticercosis
  • Trichinella
  • Erysipelas
  • Japanese B encephalitis
  • Hepatitis E
  • Brucella
  • Coxiella

• 3 non-zoonoses
  • PRRS
  • CSF
  • FMD
2011 EcoZD (ILRI/ACIARI) Human Cysticercosis Prevalence 4.7% (some hot-spots)
Results: Crude Sero-prevalence

<table>
<thead>
<tr>
<th>Disease</th>
<th>Humans</th>
<th>Pigs</th>
</tr>
</thead>
<tbody>
<tr>
<td>JEV IgM</td>
<td>4.4%</td>
<td>8.5%</td>
</tr>
<tr>
<td>JEV IgG</td>
<td></td>
<td>75.2%</td>
</tr>
<tr>
<td>Hep E IgG</td>
<td>64%</td>
<td>61.4%</td>
</tr>
<tr>
<td>Trichinella</td>
<td>47.3%</td>
<td>13.7%</td>
</tr>
<tr>
<td>Taenia solium IgG</td>
<td>2.9%</td>
<td></td>
</tr>
<tr>
<td>Cysticercosis IgG</td>
<td>4.7%</td>
<td></td>
</tr>
<tr>
<td>Erysipelas</td>
<td></td>
<td>47.5%</td>
</tr>
<tr>
<td>CSF</td>
<td></td>
<td>10.3%</td>
</tr>
<tr>
<td>PRRS</td>
<td></td>
<td>8.2%</td>
</tr>
<tr>
<td>FMD (ABC non-structural ELISA)</td>
<td></td>
<td>2.1%</td>
</tr>
</tbody>
</table>

* Prevalence data reported above has not been adjusted for population weighting factors
EcoHealth Resource Centres

Chiang Mai & Gadjah Mada Universities

- Academic environment
- Multi-faculty training
- Multi-faculty research
  - Food safety
  - Hill-tribe health
  - Leptospirosis
  - Toxoplasmosis
- Future OH/EH resource for the SE Asia region
Joint Thai-Vietnamese team

Poultry slaughterhouse hygiene

• Engage community
• Discuss cost-benefits
• Policy engagement at central level (DLD)
Cambodia: Zoonotic causes of acute human diarrhoea

Yunnan province, China: brucellosis

VietNam: leptospirosis
### Challenges

- Accepting novel ‘EcoHealth’ paradigm and fostering trans-disciplinary collaboration (some countries rigid mechanism including financial mechanisms)
- Limited capacity within disciplines eg proposal writing, epidemiology, dissemination (journal articles, policy, IEC)
- Competition with other projects/initiatives/‘paradigm (One Health)
- Sustainability of EcoHealth (One Health) approach

### Solutions

5 year project cycle assisted, *learning by doing* approach gives first-hand experience using country priorities not donor ones

Plans for all countries to disseminate approach and findings to research community, policy makers and communities

Mentoring by ILRI researchers & technical experts provided real-time support according to needs; EcoHealth (One Health) Resource Centres for regional training and advocacy

Teams/members were encouraged to be part of other initiatives; some team members drafted & submitted multi-country proposal to APEIR

Ownership by teams: they chose the priority and conducted the research

Further funding cycle(s) essential: 10+ years to institutionalise
Background: the traditional dairy sector in Assam
- About 95% of milk in Assam is marketed through the informal dairy sector.
- The hygiene and quality of milk marketed by informal sector players is perceived to be poor by consumers but the distribution system facilitates farmers access to markets and consumers access to milk.
- Government support to informal sector players has been limited and the policy environment has been mostly unfavourable.

An initiative to improve the quality of milk and livelihoods for value chain actors in the traditional dairy sector was undertaken by ILRI and supported by various donors. Its objectives were:
1. To improve the hygiene and quality of milk produced and marketed by informal dairy market actors.
2. To reduce the risk of zoonoses (e.g. brucellosis, tuberculosis etc.) and milk borne diseases.
3. To ensure the informal dairy actors were competitive in the emerging retail market where bigger business has a larger role.
4. To bring the informal sector dairy market actors under the ambit of more effective regulation.
Funding provided by OFID were used to evaluate the initiative, in a project called “Generating Evidence to Improve the Traditional Dairy Sector in Assam” or GETDairy. The main research questions were:

- How does training and certification of informal dairy chain actors change knowledge, behaviour and milk quality/safety outcomes?
- How does participation in the training and certification scheme translate into livelihood benefits for milk value chain actors and reduced health risks for dairy consumers?
- What are the economy-wide impacts of these programmes? What are the overall costs and benefits of the initiatives? Who gets the benefits and who pays the costs?
- How can research outputs be translated to development outcomes? Which policy processes enabled and hindered adoption?

All the data needed to answer these questions has been collected and analysed. The findings are:

- Improved practices resulted in reduced levels of hazards and increased productivity.
- The average quantity of milk procured and sold by trained traders increased significantly compared to untrained traders.
- The average cost of production and selling increased marginally but profitability increased.
- The traditional dairy sector development became an important focus of Dairy Development Department.
Pipeline projects
‘Promoting Health, Livelihood, and Sustainable Livestock Systems’ A proposal jointly prepared by ILRI and the Public Health Foundation of India has just been funded by IDRC Canada. It will generate evidence and improved understanding of interactions between disease risk, livestock and human health, and sustainable development in different types of peri-urban settings of the country and influence the coordination of policy and practice that supports safe food production, healthy livestock and improved public health.
Related projects
ACIAR – Pigs

- Assessing the human and economic costs of pork-borne diseases in smallholder pig value chains
- The adoption of ‘risk-based’ approaches to food safety and pork-borne diseases as opposed to the currently applied ‘hazard-based’ approaches
- Incentive-based innovation as a means of improving the management of human and animal health risks in smallholder pig value chains

The main research for development issues confronting Vietnam’s pig sector in the current context include productivity and associated NRM implications of intensification, market access for inputs and outputs, food safety, value chain performance, and the appropriate institutional and policy adjustments required to jumpstart the change process in order achieve development goals.
‘Building a Framework for Assessing the Impacts of Efforts to Enhance Access to Nutritious Foods Through In-Depth Analysis of the Grameen Danone Foods Ltd Case’ (in partnership with BRAC and IDS UK) is value chain focussed; part of the nutrition component of the CRP Agriculture for Improved Health and Nutrition. It will develop capacity and an analytical approach for the analysis of value chains-based initiatives aimed at enhancing access and consumption of nutritious foods by the poor and to use this learning to develop research proposals on leveraging value chains for nutrition. A better understanding of value chains could assist with risk assessment of zoonoses.
Participatory Epidemiology - PENAPH

Partners:
- FAO
- OIE
- RVC
- ILRI
- US-CDC
- VSF-Canada
- VSF-Belgium
- AU-IBAR
- AFENET
- CIRAD

Asia Pacific Participatory Epidemiology Network Holds First Training Workshop

The Asia Pacific Participatory Epidemiology Network (APPEN) based at Chiang Mai University is holding its first introductory training for PE Practitioners. The course is divided into two 5-day sessions. The first session was held at Khon Kaen University from June 8 to 12. The course included 22 veterinary and public health participants from Thailand, Vietnam, Cambodia, Laos, Indonesia and China. Participants were sponsored by the RESPOND Project and by CIRAD through the SEA-PREID Network. The first session included 2 days of field work on the epidemiology and control of Opisthorchis liver fluke disease in man associated with the consumption of raw fish. The second session will be held at Chiang Mai University from July 8 to 12, 2013. PENAPH and ILRI are providing trainers to lead the program.
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Southeast Asia Representative: Dr Steve Staal (Manila), s.staal@cgiar.org

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