Ecohealth perspectives: From Ecohealth theory to practice (case studies)

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Presentation outline

• Eco Health (EH) versus One Health (OH), history and content

• EcoHealth principles and their application

• “Learning by doing” moving from theory to practice
  Experiences from case studies within the ILRI EcoZD project
  • Yunnan Brucellosis
  • Salmonellosis, Vietnam

• Final reflections & conclusions
History of EcoHealth

• Pioneered by the IDRC: The International Development Research Centre, Canada over the last 2 decades

• Key case studies:
  – *Amazon basin and Mercury Poisoning*, 1994
    • Expected to be linked to mining; Mercury used to extract Gold
    • In depth research showed this was not the case, instead released from soil to the river due to farming practices (slash and burning)

• EH in SE Asia:
  – Initial approach through exiting informal researcher network
  – IDRC funded various projects: APAIR, EcoEID, FBLI, BECA and EcoZD
  – New initiatives emerged
Ancient times: experts often treated both animals & humans.

11th – 17th Century: Human medicine integrated into the medieval universities, whereas veterinary medicine focussed on horses handled by equerries;

18th century: The first veterinary school in Lyon (1762) followed by Berlin

19th century: Rudolf Virchow, father of cellular pathology, stated that, “Between animal and human medicine there are no dividing lines – nor should there be.”

20th century: both sciences specialised to an extent that their association was hardly visible

1976: Calvin Schwabes’ re-thinking of the concept of “one medicine” as a unified approach to human and veterinary to target zoonoses.

Mid-late 2000 onwards: Various initiatives emerged in response to HPAI
Eco Health – One Health Contrast

**Eco Health**

Originated in biological Ecology/land conversation

Complexity focus/systems

Communicable/non communicable diseases

Pioneered from IDRC

‘Bottom Up’

Vets, Medicals, epidemiologists, ecologists, social scientists, philosophers, indigenous perspectives, etc.

**One Health**

Schwabe’s One Medicine

One world/One Medicine (Zinsstag)

More quantitative/ Biometric focus (animal/human/wildlife)

Communicable diseases

Vets, medicals, some ecologist

Currently institutionalized (FAO, OIE)

*Modified after IAEA 2014*
EcoHealth Theory
Vector-borne disease Rift Valley Fever, Malaria, Dengue…
Parasites Liver flukes, Cysticercosis…
Soil associated Anthrax…
Water associated Leptospirosis…

Eco System: Temperature, humidity, rain, disasters (e.g. floods), social-cultural behaviours …

Air associated Multi-factorial respiratory diseases (pigs)
Eco System: Temperature, humidity, stress, management, socio-cultural …
Causal Schema for Zoonotic Disease Emergence

Recognize the complexity of disease emergence

Wilcox, 2011
Introduction Ecohealth Theory

> Factors affecting health and wellbeing are connected in a multi-dimensional, complex web

Societies, Behaviour, Cultures, Political situation, Crisis/Disasters, Education, Poverty, Economies, Regulations, Institutions, Governance & Policies

EH manual
Introduction: Ecohealth Theory

- IDRC’s Ecohealth Program Initiative is based on three methodological pillars (Lebel, 1994):
  - transdisciplinarity, participation, and equity.

- More recently, Charron (2012) expanded on the three pillars of Lebel, introducing six Key Principles of EcoHealth:
  - Systems thinking
  - Knowledge to action
  - Transdiciplinary
  - Participation
  - Equity
  - Sustainability

4 interacting sub-systems influence health

An approach to understand complex systems

Ecohealth Research in Practice: Innovative applications of an ecosystem approach to health
System Thinking

Understanding and examining the linkages and interactions between the elements that make up the system

• In contrast to reductism which looks more in details of each part

System perspective: **scale** is important
  e.g. time scale: daily routines, seasons, climate change

Challenges:

• Define **boundaries** of the system
• Choices between inclusiveness and feasibility based on time skills and capacity
• ILRI EcoZD: review objectives and activities (China case study)

Modified after Charon 2012
Knowledge to action

Knowledge to action refers to the idea that knowledge generated by research is then used to improve health and well-being through an improved environment.

- What different groups are interested to change

- **Knowledge moves both ways**
  - Researchers pushing new knowledge into policies
  - Policy is requesting new knowledge from researchers
  - Collaborative exchange and knowledge platforms

- Generation of unintended (positive and negative effects)
  - Study on zoonoses (China)
    - Regular consultations at community level between PH and Vet initiated
    - Village toilets

Modified after Charon 2012
Participation

Aims to achieve consensus and cooperation between all involved groups (communities, scientific and decision-making groups)

– Define on who should participate and what will be their role
– Mapping and analysis of potential actors, stakeholders or groups
– Helps to:
  • Identify boundaries
  • Identify existing barriers to change (for each actor) and provide options to move forward

Reality:
- Farmers are often the most disadvantaged group when facing rigid control measures.
- Policy against small scale slaughter slots or farms in communities, anyhow community may have often positive perception on both

Modified after Charon 2012
Transdisciplinary research

• Inclusive vision of health problems by scientists from multiple disciplines, community and policy actors
  – Evolves the integration of research methodologies and tools across disciplines including none academics perspectives and (local) knowledge
  – From the first idea until dissemination/publication
  – Wide range of skills sets are needed which are usually not part of academic training
    • Consensus building
    • Facilitation & communication …

• Challenge: Incentive for researcher, groups to participate

Modified after Charon 2012
Gender and social equity

Involves **analyzing the respective roles** of men and women, and various social groups;
- Gender and age
- Social cultural, economic class
- Ethnic minorities or marginalised groups

**Why so important?**
- Inequity in access to health care
- Woman held major responsibility for health of their families
- Anyhow, often little power on decisions how the HH income is used

**Examples for gender**
- Consumption habits, who prepares food, who sells food…

Modified after Charon 2012
Sustainability

- As research for development EH research aims to make ethical positive long lasting changes
- Sustainability implies that changes are environmentally sound and socially durable
- What will remain after the lifetime of the project
- Short term needs might be not consistent with long term process for improvement of health
- What farmers care most:
  - Household, debts, etc.
  - Animal health often less prioritised

Modified after Charon 2012
From theory to practice (ILRI EcoZD)
2008-2013++
Ecosystem Approaches to the Better Management of Zoonotic Emerging Infectious Diseases in Southeast Asia

- **Appraisal & Consultative Process**
  - Outcome Mapping: demonstrate behaviour changes of targeted groups

- Innovative **Eco Health research in** all 6 countries ("learning by doing" case studies)
  - Trans-disciplinary collaboration between institutions & teams –
  - **New for most of the team members**

- Establishment of two **Eco Health Resource Centres (EHRC) in the region** Thailand and Indonesia

- **Networking** with other OH, EH initiatives
Eco ZD - general reflections

- Project did not come with pre-determined research questions, there was plenty of room for adaptation in the proposal
- Learning by doing EcoHealth approach
- It was easier to achieve early success with partners already experienced in EH e.g. Cambodia. More difficult but perhaps more significant, was this with teams with almost no previous exposure to EH (e.g. China)
- Emphasis on capacity building - an approach where teams made key research decisions and were supported in implementation
- Multi-year process of inter-personal relationship/trust-building
- Amendments made based on own and partners reflections – 2 EHRC
Start up challenges

Identification of research teams

- Initial contacts were made with MOA & MOH due to focus on zoonoses. Most of actors, partners had doubts on the added value of EH.
- Easier for teams with previous EH experience
- More difficult for teams from countries with more top-down institutional environment (e.g. China and South Vietnam)

Approach: Repeated consultations & sufficient time allocation
Identification of a common research interest

- Often a painful and time consuming process
- *Entirely left with teams*, only focus on zoonoses was crucial
- Most critical in South Vietnam and China, classical silo thinking
- Who will lead & sharing of budgets

**Approach:** Various consultations and mentoring, sufficient time allocation

**Indonesia:** Call for proposal, submitted proposals were evaluated by an independent expert group
Challenges

Recognition of the added value of other “none medical expertise” (e.g. social science or socio economic)

– Teams were led by MD’s or Vets with mainly biometric background
– To work with social scientist was new for most of them
Easier: Indonesia and Thailand, as interdisciplinary collaboration existed already
  e.g. CMU Vet Fac (Thailand); or UGM-KKN, CIVAS (Indonesia)
More challenging: China and South Vietnam

Approach: Specific and continued mentoring by EH champions, Training (EH, research methods, participatory tools, outcome mapping)
Challenges across all teams

- Various definitions (EcoHealth and OneHealth)
- Lost in translation “equity” or “EcoHealth”
- Limited understanding of EH but also proposal writing
  - Two-dimensional capacity-building requirement
    - Technical
    - EH concept
- EH incorporation in the case studies – reality check
  - often more VPH or at most OH than EH
- Paper writing & publications (ongoing)
- Policy engagement
Ecosystem approaches to the better management of zoonotic emerging infectious diseases in the South East Asia Region
Case study: Brucellosis & Toxoplasmosis in Yunnan

Problem:
• Brucellosis is a serious concern in Northern China
• Dairy sector: animal movements from north to south
• Support of farm cooperatives (group of small holders) with limited biosecurity
• Brucellosis: Limited information on prevalence's for Yunnan
• Toxoplasma: Lack of information for animal sector and PH concern

No studies on perception/awareness of involved groups and actors

Classical vet approach (demanded by most tam members):
• Prevalence study in targeted livestock populations

PH approach
• To add public health perspective (people at risk)
Developing of an EH framework
Mapping of stakeholders, partners & groups involved

- Public health authorities (central/local officers, local hospitals)
- LS officers (central/local)
- Socio economic experts
- Animal husbandry expert
- Milk vendors, butchers
- Outpatients
- Local administration officers
- Donors, international organizations & universities
- Policy makers
- Farmers/herders
- Communities
- Butchers, meat vendors
- Associations (if any or to be established)

Brucellosis control
EH (study) framework for Yunnan study

**Public health** authorities (hospitals and local) (IDI)
- Review of existing information
- General Z knowledge
- Specific action B & T patients
- Collaboration with PH

**Vet officers/stations** (IDI)
- Review of existing information
- General Z knowledge
- Specific action B & T
  - Control
- Collaboration with PH

**The problem:** Brucellosis

**Survey:**
- Dairy farms (milk)
- People at risk (serum)

**Farmers** (QX)
- Production data
- AH and disease prevention
- Reproductive disorders
- Zoonoses and OH
- Waste management

**Villagers** (with/without livestock) (FGD)
- Animal husbandry
  - Zoonoses
  - Risk factors
  - AH services
  - PH services
  - Source of information

**Past unit, milk vendors** (FGD):
- Zoonoses knowledge
- Quality control
- Sanitation
- Inspection by authorities

**Hospital case review:**
- Clinical cases

**Literature review**

**Butchers** (IDI)
- General Z knowledge
- Specific knowledge B & Toxo
- Health check and status
- Hygiene and training
- Waste management
Challenges

1. Identification of a common research topic

Researchers from 4 different institutions with different locations, priorities and interests:

- Yunnan Agriculture University (Vet Fac)
- YAGAS, Yunnan Academy of Grasslands and An. Science
- Yunnan Endemic Disease Control and Prevention Institute (YEDCPI)
- Yunnan Animal Science and Veterinary Institute (ASVI)
## Partners Interests and Expertise

<table>
<thead>
<tr>
<th>Institute</th>
<th>Focus diseases</th>
<th>Expertise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yunnan Endemic Disease Control and Prevention Institute (YEDCPI)</td>
<td>Leptospirosis, Schistosomiasis japonica, Hantaviral diseases, Bartonellosis, Brucellosis, Toxoplasma</td>
<td>Detection, identification, and isolation of pathogens; Serological survey; DNA Sequencing, Lab tech., field epidemiology, pathogen ecology</td>
</tr>
<tr>
<td>Yunnan Animal Science and Veterinary Institute (ASVI)</td>
<td>TB, Brucellosis, E. coli, salmonellosis</td>
<td>Diagnostic and monitoring methods, epidemiology, pathogen characterization, control and prevention, economic and public health impacts</td>
</tr>
<tr>
<td>Yunnan Agricultural University (YAU)</td>
<td>Schistosomiasis japonica, toxoplasma, Hepatitis E., E. coli</td>
<td>Pathogen ecology, epidemiology, pathogenesis, prevention and control</td>
</tr>
<tr>
<td>Yunnan Academy of Grassland Animal Sciences (YAGAS)</td>
<td>Fluke, Brucellosis, TB, Tape worm</td>
<td>Epidemiological investigation, clinical diagnosis, livestock genetics, production system, livestock ecology and management</td>
</tr>
</tbody>
</table>
2. No experience with an EH approach
  • EH principles were all new for team members
  • Strong silo-thinking and biometric driven research team, resulted in an continued demand for biological sampling
    – Team went out for biological mini survey prior to the research agreement

3. Perception on qualitative research tools
  – Some team members had perception that qualitative research is less valid or scientific and therefore not useful
  – Younger researchers more open

If than used (qualitative tools) there was a perception from some researchers that “everybody can do this”…
FGD in the commercial dairy cattle farm
## Brucellosis & Toxoplasmosis in Yunnan

### 4. Synthesising qualitative and quantitative research results

<table>
<thead>
<tr>
<th></th>
<th>FGD &amp; PE</th>
<th>KII</th>
<th>QX</th>
<th>Check list</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Demographic (e.g. gender/ethnics)</strong></td>
<td>More woman participated</td>
<td>Gender, differed by actor</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Knowledge on zoonoses (brucellosis)</strong></td>
<td>Miss-classification of zoonoses</td>
<td>Lowest in butchers but low in all actors</td>
<td>Lowest in butchers</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Risk practices</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consumption habits</td>
<td>Some raw milk and meat</td>
<td>No indications of raw m/m consumption</td>
<td>No indications of raw m/m consumption</td>
<td>NA</td>
</tr>
<tr>
<td>handling of aborted fetus</td>
<td>Risky practices</td>
<td>NA</td>
<td>No indications for risky practice</td>
<td>NA</td>
</tr>
</tbody>
</table>
## Case studies – evaluation (outcome mapping)

<table>
<thead>
<tr>
<th>EH principles</th>
<th>+</th>
<th>-</th>
<th>Evaluation</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transdiciplinary research</td>
<td>Some changes within the research team</td>
<td>Still biometric, &amp; PH driven</td>
<td>**</td>
<td>Varied by team member</td>
</tr>
<tr>
<td>Participation</td>
<td>Various actors, groups &amp; tools, strategic Stakeholder analysis</td>
<td></td>
<td>***</td>
<td>EH champion, team highly motivated</td>
</tr>
<tr>
<td>Equity/gender</td>
<td>Ethnic minorities</td>
<td>Gender perspective weak</td>
<td>**</td>
<td></td>
</tr>
<tr>
<td>Knowledge to action</td>
<td>Policy brief</td>
<td>Policy meetings</td>
<td>**</td>
<td>Sometimes lost track as in Chinese</td>
</tr>
<tr>
<td>System thinking</td>
<td>EH framework</td>
<td>Not fully applied</td>
<td>*</td>
<td>Continuous challenge</td>
</tr>
<tr>
<td>Sustainability</td>
<td>Enhanced exchange at village level (Vet, PH, village heads, party committee) Networking</td>
<td></td>
<td>**</td>
<td>Positive side effects (village toilets)</td>
</tr>
</tbody>
</table>
Selected findings and effects

Brucellosis:
  Sporadic, but cases in ruminants and human demonstrated the potential risk, cooperative farms more likely to be affected

Disease prioritization (farmers)
  Brucellosis not among important diseases (1st five)

Perception on zoonoses:
  Low perception and awareness of all actors and groups
  Lowest in butchers

Risk practices:
  Consumption of raw milk/meat sporadically happen (ethnic/gender)

EcoHealth capacity building of team including outcome mapping to monitor changes of targeted groups.

Positive side effects:
  Initiatives for village toilets, co-funding, follow-up project, collaboration between community PH & Vets, PE network
Final reflections:

- Initially very biometric team (focus on sampling)
- Team initial sceptical but than exited about use of qualitative tools
- Younger team members more open for EH approach
- Finally one of the best teams
- Incentive: invited by FAO to Beijing to present results
- Extended networking (e.g. EHRC and PE)
Case study 2:
Salmonella spp. IN PIG SLAUGHTERHOUSES AND PORK MARKETS ASSOCIATED WITH HUMAN HEALTH IN HUNG YEN

Map of Vietnam

Source: http://www.trelangkienviet.com
Scase study 2: *Salmonella* spp. IN PIG SLAUGHTERHOUSES AND PORK MARKETS ASSOCIATED WITH HUMAN HEALTH IN HUNG

Quantitative research
• Assess *Salmonella* contamination
• Determine potential risk factors

Quantitative research (FGD, KII, PE)
• people’s and stakeholders perception related to *Salmonella* contamination with the potential risks in practice

- People’s living around slaughter houses (IDI)
- Pork consumers (KII)
- Community vets
- Community health workers (KII)
- SH workers (FGD)
- Pork sellers (FGD)
- Local authorities, party committee (KII)

- Biological sampling
- Semi-structure QX
- Check lists

Common used approach
VPH study in slaughterhouses focusing on *Salmonella* contamination
Case study 2: Exiting results from focus groups discussions and PE in pork sellers

1. Use of **cloth to dry pork**, clean equipment, hand or table, some consumers related “wet” looking meat to low meat quality

2. **Use of cupboard** at market stools, same reason as under 1

3. **Use of masks**: in response to buyers/consumers perception that sellers may have a health problem.

4. Knowledge of zoonoses: PRRS and FMD, CSF, leptospirosis, cysticercosis, misperception on FMD, CSF

Results of FGD & PE helped a lot to understand used practices which were not in the line with regulations
Case study 2: Challenges & approaches

- Designing of outlines
  - FGD and KII looked more like a long questionnaire

- Huge amount of collected information
  - 35-40 pages of transcript from FGD and KII
  - Analysis of such data was new for the involved MSC student

Solution: National social-scientist was taken on board
MSC student (a vet) was very proactive and open for EH
Final reflections and conclusions

• New challenges on EID require new more integrated approaches
• Eco Health as recently emerging research concept has the potential to react more effectively to these challenges
• Anyhow, synergies with One Health should be explored/used
• Classical vet studies on food safety and zoonoses can be widened/extended using a more intergraded “EH light” approach
• **Sufficient time should be allocated when planning an EH study** for change of team operations
• Easier to achieve early success with partners already experienced in EH. More difficult but perhaps more significant, with teams with no previous exposure to multi-disciplinary approaches (e.g. China)
Final reflections & conclusions

- **Flexible adaptive/consultative approach** needed
  “no card blanche”
- **Two-dimensional capacity-building** requirement
  - Technical (proposal writing/implementation/methodological)
  - EHRC concept
- **Sharing of credits** for institutions/members in a multidisciplinary team is crucial
- Develop and use an **evaluation system** (outcome mapping) to monitor “soft” change

More evidence needed:
- Policy engagement
- Sustainability (most OH/EH project in SE Asia are externally funded)
- Impact/added value of EH research
Special thanks to the former EcoZD team and its partners
In particular: Jeff Gilbert, Delia Grace, Sinh Xuan, Hung Nguyen

Eco Health Research in practice, Charon D.

better lives through livestock

ilri.org
One Health

- One Health is the collaborative effort of multiple disciplines working locally, nationally, and globally, to address critical challenges and attain optimal health for people, domestic animals, wildlife, and our environment. One Health Commission (http://www.onehealthcommission.org/)

- The One Health concept is a worldwide strategy for expanding interdisciplinary collaborations and communications in all aspects of health care for humans and animals. One Health Initiative (http://onehealthinitiative.com/)

The Ecohealth approach focuses above all on the place of human beings within their environment. It recognizes that there are inextricable links between humans and their biophysical, social, and economic environments, and that these links are reflected in a population's state of health. International Development Research Centre (IDRC)

EcoHealth is an emerging field of study researching how changes in the earth’s ecosystems affect human health. It has many prospects. EcoHealth examines changes in the biological, physical, social and economic environments and relates these changes to human health. Wikipedia.