

EcoZD



Ecosystem Approaches to the Better Management of Zoonotic Emerging Infectious Diseases in the Southeast Asia Region



Two health workers read over notes at the Vietnam EcoZD training session held in Binh Phuoc Province, Vietnam (photo: ILRI/Andrew Nguyen).

With growing concern about emerging infectious disease, there is a need to better understand disease emergence, and the most effective actions to detect and control emerging pathogens.

Using the *EcoHealth* approach to human health, with support from Canada's International Development Research Centre (IDRC), the International Livestock Research Institute (ILRI) is spearheading implementation of an Ecohealth project in Southeast Asia.

The project titled *Ecosystem approaches to the better management of zoonotic emerging infectious diseases in the Southeast Asia Region* (EcoZD), is linking, working with, and building capacity in multi-disciplinary research groups in six pilot countries: Cambodia, Indonesia, Lao PDR, Thailand, Vietnam and China (Yunnan Province). ILRI is coordinating the research projects in these countries, facilitating learning across the projects, mentoring national partners, and helping translate the knowledge gained into feasible policies and actions.

Goals

The overall goal of the project is 'To increase the knowledge, skills and capacity of research and infectious disease control personnel in Southeast Asia in utilising an EcoHealth approach to augment prevention and control of priority and emerging infectious diseases'.

Outcomes

1. Have policy makers formulate evidence-based policy incorporating an EcoHealth approach.
2. Engage local bodies and community leaders actively within the project to address the concerns of zoonotic emerging infectious diseases (ZEIDs).

3. Develop a clear understanding within the national teams of the comparative advantage offered by EcoHealth.
4. Have the two university-based EcoHealth Resource Centres (EHRCs) in Thailand and Indonesia focused on curriculum development and outreach in addition to research, to better provide EcoHealth advocacy training and mentoring for the Southeast Asia region.

Where we work



Cambodia

Focus: Prevention and Control of Zoonotic Causes of Acute Diarrhoea in Rural Cambodia through an Ecohealth approach

With Diarrhoea being the third most important health issue – in terms of both deaths and Disability Adjusted Live Years (DALYs), the Cambodian team has opted to investigate the prevention, and control of zoonotic causes of acute diarrhoea.

Research has focused on the rural areas of Cambodia where a large proportion of the populace remain dependent on livestock and farming for their livelihoods, thus heightening their risk of exposure to zoonotic diseases.

Together with partner organisations, the Veterinary Public Health Unit of the Ministry of Agriculture, and the Department of Centre of Disease Control within the Ministry of Health, lead organisation – the Centre for Livestock Development (CelAgrid) has led a team which has actively engaged ‘knowledge-to-action’ in their research through streamlining their EcoHealth findings on diarrhoea into local policies and practice conventions on ZEID management.



Research Approach and Preliminary Findings

Using a combination of Participatory Rural Appraisals (PRA) and household questionnaires, the team was able to compile a preliminary report discussing findings and potential associations – such as food and water consumption habits, presence and illness of certain livestock species, and socio-economic status.

Dissemination meetings held in February 2012, provided villagers and other stakeholders with feedback. These interactive sessions demonstrated that whilst participants acknowledged the risk factors, there was still insufficient motivation to alter their behaviour.

Moving forward, the team is now conducting a cross-sectional survey – in different pilot villages (within the same operating districts), and complementary biological sampling to determine the risk factors for specific pathogens.

China (Yunnan Province)

Focus: Establishment of Technology System for Prevention and Control of Zoonoses in Ethnic Minority Living in Different Systems in the Upper Reaches of the Mekong Sub-Region Environment.

Led by the Yunnan Academy of Grassland and Animal Science, the project team includes the Yunnan Institute of Endemic Disease Control and Prevention, Yunnan Agricultural University and the Yunnan Academy of Animal Husbandry and Veterinary Science.

With evidence suggesting that the prevalence of Brucellosis in domestic animals has been increasing, the disease was chosen as one of the two ZEIDs to be focused upon. The second was Toxoplasmosis.

The team in China focuses on transdisciplinary by examining local knowledge on ZEIDs and by finding ways to use social science to synthesize the different EcoHealth studies they have conducted under EcoZD.

Research Approach and Preliminary Findings

Initially, a literature review regarding each ZEID was undertaken by the team. Building upon that, the team conducted training workshops with local veterinarians, and livestock technicians where training materials pertaining to identification and prevention techniques for the ZEIDs of concern were shared in interactive sessions.

Animal disease surveys to ascertain baseline prevalence for each disease were also undertaken in each pilot village.

Indonesia (Bali)

Focus: Optimising Rabies Control in Bali: an EcoHealth Approach

Since late 2008, most of Bali has been faced with a rabies epidemic, leading the local government to undertake two island-wide vaccination campaigns, with a third underway. Maintaining high coverage is critical to successful rabies control, however mass dog vaccination is difficult, especially in light of high population turnover, which erodes coverage.

Led by the Centre for Indonesian Veterinary Analytical Studies (CIVAS), the team in Bali includes partners from the Diseases Investigation Centre (Denpasar, Bali), the Indonesian Centre for Agriculture Socio-Economic and Policy Studies, and additional individual veterinarian public health experts.

Research Approach and Preliminary Findings

The team fundamentally aims to identify vaccination gaps in the local dog population in an effort to assist Bali maintain high vaccination coverage.

Between March 2011 – 2012, 37 urban, suburban and rural villages across 3 Bali districts were surveyed to collect data on 17,376 owned dogs, with village transects used to gather information on 1,972 free-roaming dogs. Based upon said

data, the team was able to identify that:

- High vaccination coverage was achieved in owned dogs, with 10% higher coverage in restrained than in un-restrained dogs
- Significantly higher coverage in adults (91%) than juveniles (<1yr, 44%) – likely due to births and insufficient puppy targeting
- Fecundity studies suggest those interviewed do not report the birth of puppies – possible obstacle for vaccinators

The team also investigated the use of culling and its effect upon coverage rates. They found that despite a 20% higher coverage being observed for free-roaming dogs, culling only stimulates population turnover, with culled dogs likely to be replaced with unvaccinated adults.

Beyond a dog demographics study, the team also completed studies into dog behaviour, socio-cultural impacts, dog fecundity, dog registration piloting. They are also actively tackling the EcoHealth principle of sustainable intervention by engaging local communities and policy makers in research reporting and feedback workshops, including a planned awareness program in more than 100 schools in two pilot villages.

Lao PDR



(Photo: ILRI/Kate Blaszk)

Focus: A participatory EcoHealth study of smallholder pig systems in lowland and upland Lao PDR

With little previous history in Lao PDR of zoonotic epidemiological prevalence surveys having been conducted, the Lao EcoZD team elected to focus upon identifying key pig-related zoonoses, whilst also evaluating associated public health risks in pig raising and pork consumption.

The multidisciplinary team comprises of members from the Department of Livestock and Fisheries, National Agriculture and Forestry Research, Department of Hygiene and Prevention and Savannakhet University.

Research Approach and Preliminary Findings

Pivotal to the team's research was a cross-sectional seroprevalence survey of key pig-related zoonoses and an accompanying household questionnaire addressing potential risk factors.

Based on the questionnaire, and the biological sampling of

882 humans, and 675 pigs, the team concluded that there was a significant level of exposure to the tested diseases.

Moving forward, the team plans to:

- pilot communication materials based upon their findings with villagers and stakeholders;
- host a stakeholder meeting with key policy makers where concerns and experiences can be shared firsthand.

Thailand - Vietnam joint team

Focus: The Model of Hygienic Small Scale Poultry Slaughter House for Asian Partnership Countries

With Thailand and Vietnam having both experienced such strong economic development in the past two decades, public awareness of food-borne disease risk has increased. Despite this, the true impact of such diseases still goes underreported, and thus – underestimated. Large scale industrial approaches to food safety are ineffective here given the socio-economic complexities of each country. Instead, expertise from multiple disciplines is needed to truly understand the drivers of risk here.

With this in mind, the joint team, under coordination from both Chiang Mai University (Thailand) and the National Institute of Veterinary Research (Vietnam), with additional project support provided by the Department of Livestock Development (Thailand) and the Sub-department of Animal Health in Hanoi (Vietnam), look to capitalize on a transdisciplinary approach to ZEID research.

With existing research suggesting that the dominant small-scale poultry slaughterhouses are a possibly strong source of spreading *Salmonella* spp., the team has elected to focus upon developing a systematic EcoHealth approach to instigating sustainable improvements in slaughterhouse hygiene.

Research Approach and Preliminary Findings

The research takes place in two different countries and a comparative study of the collected data is underway. As such, it was important that the team harmonized research methodology between research sites – including data collection tools, laboratory methods and statistical analysis.

The team adopted a combination of data collection at slaughterhouses through questionnaires and bacteriological sample collection, with consumer data collection accounted for through household questionnaires.

Vietnam

Focus: Studies on Ecosystems for Prevention of ZEIDs in Provinces of Southern Vietnam

Despite the notable prevalence of multiple other zoonoses in Vietnam, the team decided upon solely targeting Leptospirosis due in part to the lack of existing research into human interaction with ZEIDs in Vietnam.

Focusing their research upon two provinces in southern Vietnam, the team designed their research to address risk factors with specific regard to pigs, and pig slaughterhouses in an effort to better understand the prevalence and risk factors of pathogen transmission.

In keeping with the EcoHealth tenant of greater transdisciplinary collaboration, the team was comprised of members from the Department of Animal Health, Nong Lam University and the Pasteur Institute of Ho Chi Minh City. Together, these agencies combined animal and human health expertise.

Research Approach and Preliminary Findings

Research activities were preceded by an extensive retrospective study. However since data collection for the study was almost entirely based on case reports, incidence of zoonotic diseases was likely to be underestimated. Thus, using an EcoHealth approach of analysing ecological and socio-economic variables in correlation with zoonosis transmission surveillance data, the team was able to identify hotspot communes in an effort to better understand the risk factors of selected zoonoses.

With Leptospirosis chosen as the pathogen of focus, cross-sectional questionnaires aimed at gauging exposure to risk were designed by the team, and undertaken by slaughterhouse workers and households.

To support these questionnaires, with support provided by local health workers and paraveterinarians, seroprevalence samples have been taken from both pigs and humans, with results forthcoming.

EcoHealth Resource Centres



(Photo: ILRI/Korapin Tohtubtiang)

In addition to the six country teams, the project has also overseen the establishment of two resource centres. Supported by Chiang Mai University in Thailand, and the University of Gadjah-Mada in Indonesia.

Each centre has developed a strong transdisciplinary core group of academics within their respective institutions.

Fundamentally, the centres are expected to provide the region with EcoHealth-centric:

- information platforms;
- curriculum development and research;
- and policy advocacy and outreach.

Chiang Mai University (CMU)

The resource centre at CMU has been focused on providing action research on health among hill tribes near Chiang Rai in the north of Thailand. Research into 'highly pathogenic avian influenza' policy, and the planned synthesis of research in the risks of food borne pathogens in Thai beef, in line with the 'Kitchen of the World' research area have also been central to the resource centres activities.

The centre has also been active in developing curricula for integrating EcoHealth concepts into undergraduate, and in time – postgraduate studies.

University of Gadjah Mada (UGM)

Beyond providing research support for the specific pathogens of Leptospirosis and Toxoplasmosis, the resource centre at UGM has also been building upon their 'student services' (KKN) programme. The programme promotes the practical application of final year students training for community development through multidisciplinary student groups.

Based on a provided locally identified problem, the students spend two months in the field, living in the community, developing and implementing methods of addressing the problem with local stakeholders. Crucially, students groups for the programme are designed to contain a minimum of three distinct disciplines, promoting diversity, collaboration. and participatory approaches to problem and solution identification.

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