

Health and environmental impact of agricultural intensification: Translating Ecohealth program-derived knowledge into practice

This regional policy brief is based on the outcomes from the Ecohealth research, capacity building and knowledge translation work conducted under the Field Building Leadership Initiative (FBLI), a five-year program (2011-2016) funded by Canada's International Development Research Centre (IDRC) and implemented by partner institutions in China, Indonesia, Thailand and Vietnam (for more details, please visit www.ecohealthasia.net).

Key Policy Messages and Lessons Learned

- Agricultural intensification increases risks to human, animal, and environmental health; and the application of Ecohealth approaches can mitigate some of the negative effects of agricultural intensification.
- Increasing the capacity and involvement of farmers and other relevant stakeholders in applying Ecohealth approaches can contribute to improved agricultural practices and health.
- Capacity building activities – such as training for future leaders and integrating Ecohealth approach in existing official training programs – improve the leadership skills and capabilities of current and future Ecohealth practitioners.
- Building up and sustaining the Ecohealth field in the region requires concerted efforts in research, capacity building and knowledge translation, underpinned by appropriate support from policy makers.

From Ecohealth Research to Policy

Global and regional context of agriculture, health and environment

The framework of the Sustainable Development Goals (SDGs) is universal; considers the economic, social and environmental determinants of sustainability; and includes 7 out of 17 goals dedicated to health, agriculture and the environment (goals 1-3 on health and hunger; and 12-15 on the environment). Global Health Security Agenda (GHSA) addresses the threats from infectious diseases at the human-animal-environmental interface. With a growing partnership of nearly 50 countries, GHSA aims to help: build countries' capacity; create a world safe and secure from infectious disease threats; and elevate global health security as a national and global priority.

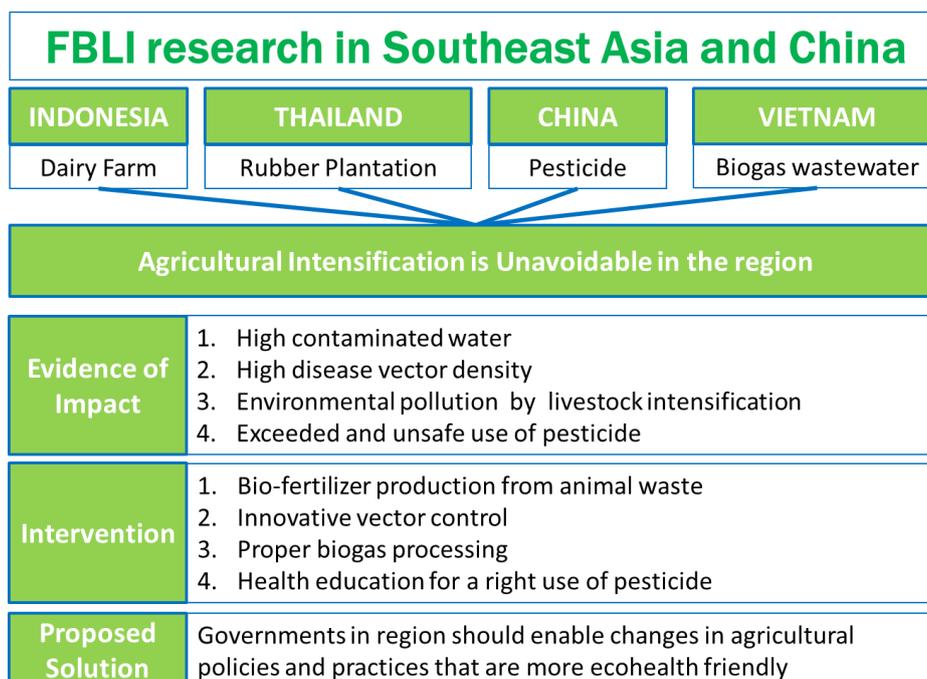
Ecohealth – short for Ecosystem Approaches to Health – is a transdisciplinary field that addresses the interface and links among humans, animals and the environment. Ecohealth may be applied to some action programs of SDGs to contribute to the improvement of health and environment related to agriculture.

Agricultural intensification increases risks for human, animal and environmental health

In Southeast Asia and China, rapid population and economic growth has fueled agricultural intensification – defined as the increase in the productivity of crops and livestock per unit of input. While agricultural intensification can be beneficial for human health – in terms of increased food security and socioeconomic development – there are also negative impacts on people and environmental health.

Ecohealth process and key results

The diagram below depicts the process of how FBLI piloted research in four countries led to improved understanding of agricultural intensification's impact on health and the environment, as well interventions to mitigate the impacts.



FBLI Ecohealth research.

The FBLI pilot research work has produced evidence of the health risks associated with agricultural intensification. Pilot research sites and entry points are as follows:

	CHINA	INDONESIA	THAILAND	VIETNAM
Site	<i>Yuanmou County, Yunnan Province</i>	<i>Pangalengen, Bandung, West Java</i>	<i>Chachoengsao Province</i>	<i>Hanam Province</i>
Research	Control pesticide use, and improve water management practices	Address excessive use of pesticides, fertilizers and antibiotics in dairy farms by developing alternative Ecohealth products	Reduce risk of vector-borne diseases among communities living in and nearby rubber plantations	Promote correct treatment of biogas waste water to reduce risks to humans, animals and environment
Results	Farmers are highly dependent on pesticides for commercial vegetable production, but most do not know how to properly choose and use pesticides. Out of 120 urine samples collected from farmers, pesticide residues were detected in 52 samples.	Excessive use of chemical fertilizers and antibiotics on dairy farms negatively affects human health and water quality. Overuse of antibiotics can cause antimicrobial resistance in animals and humans, as well as leave harmful residues in dairy farm products.	Expansion of rubber plantations creates favorable conditions for vector-borne diseases and their transmissions by mosquito vectors. The risks for dengue and chikungunya among local communities are higher in areas with rubber plantations.	The use of livestock waste for biogas generation is extremely common at smallholder farms but biogas waste water still contains many harmful substances and pathogens. The risk of diarrheal diseases among people who were exposed to biogas wastewater was extremely high compared to the WHO reference level.

Ecohealth interventions to address agricultural intensification

To address the health risks caused by agricultural intensification, FBLI country teams developed and tested several Ecohealth interventions, all of which were community-led and involved the use of educational and communication materials. Innovative interventions included the following:

- In China, the team employed “street theater” to facilitate health education on pesticides; laboratory testing of pesticide residues in vegetable and urine samples; and health campaign to share information on pesticide use, including designing, production and distribution of calendars and posters that contain health information.
- In Indonesia, Ecohealth products were tested in four national laboratories, including: replacing chemical fertilizers with bio-fertilizer, vermiculture and organic fertilizer; and substituting antibiotics with earthworm extract and herbal feed supplement. The team also conducted policy advocacy to government to strengthen animal health system and disease control that caused by agriculture intensifications.
- In Thailand, the research team worked with local partners to: educate affected communities on the risks of vector-borne diseases and chemicals used in rubber plantations; promote safe handling practices of chemicals; test the efficacy of mosquito repellent jackets; and test an innovative vector birth control approach.
- In Vietnam, an education campaign was launched with posters, calendars and booklets, as well as a visit by biogas technical experts to share ideas for effective biogas management; training for core group of local residents who later on training and supporting their neighbors; rules for improving sanitation were added to traditional village documents and disseminated widely.

Increasing capacity and involvement of farmers and other relevant stakeholders

One major lesson learned from the FBFI interventions described above is that increasing the capacity and involvement of farmers and other concerned stakeholders to understand and apply Ecohealth approaches holds the key for improving agricultural practices and health at the community level. The pilot research experiences in four countries have confirmed that:

- Partnerships with the community and other stakeholders are essential in gaining their trust, participation, and development and adoption of new interventions
- Community engagement enabled better identification of specific issues and interventions
- Inputs from community members can help improve communication tools
- Information, education and communication campaigns are essential to change farmers’ unsafe behavior and practices, and to promote better hygiene and practices by farmers.
- Research activities (e.g. urine sampling test) can be an incentive for community engagement.

Capacity building improves leadership skills of Ecohealth practitioners

While Ecohealth has been promoted for a relatively long time in many parts of the world, it has only been recently introduced in SEA and China. Therefore, FBFI puts great emphasis on capacity building and honing the skills of current and future leaders in the Ecohealth field. Specific capacity building achievements include the following:

- ***Future leaders program.*** Led by FBFI Indonesia, a series of trainings for future leaders was successfully conducted in Indonesia, Thailand, Vietnam and China for nearly 400 participants across professions and disciplines, and is expected to continue post-FBFI.
- ***Ecohealth training manual.*** Produced by FBFI and Veterinarians without Borders, this resource was used during the future leaders training activities and very well-received throughout the region.
- ***Ecohealth courses and degree programs.*** Ecohealth content and courses are offered by Mahidol University, Thailand, Hanoi School of Public Health, and Kunming Medical University. Moreover, Mahidol University has developed Ecohealth degree programs, the first in Asia, involving nine faculties. The proposals to develop these degree programs were approved by Mahidol University Council, and the final degree programs are expected to launch after obtaining an approval from the Ministry of Education.
- ***Seed funding grants.*** Funding was provided for 24 small Ecohealth projects proposed by Global Health True Leaders participants. The small grants enabled awardees to organize workshops, conduct research, and facilitate community empowerment to address local health challenges and benefited 300 beneficiaries.

Policy Implications and Recommendations for Action

Based on the evidence and lessons emerging from five years of FBI research, capacity building and knowledge translation work, there needs to be concerted efforts to convince governments and global/regional bodies in South East Asia – such as GHSA, ASEAN, FAO, WHO and USAID – to enable changes in agricultural policies and practices that are more Ecohealth friendly.

Specific implications for policy and recommendations for action may be summarized as follows:

1. Increased investment in agricultural intensification research is warranted to further demonstrate the impacts of agricultural intensification on human, animal and environmental health, and to show that Ecohealth can be an appropriate approach to address agriculture intensification problems and solutions.
2. Health risks can be managed through improving the knowledge, attitudes and practices of farmers and other concerned stakeholders, and involving them throughout the project/activity cycle.
3. There is a strong need to continue training and education activities to groom future leaders and the next generation to better understand and apply Ecohealth principles and approach.
4. Policy makers should support the institutionalization of the Ecohealth field – including mainstreaming these approaches in regional and national agricultural plans – and commit to scale-up bestpractices throughout the region.

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Further reading

- Charron.2012. EcoHealth research in practice: innovative applications of an ecosystem approach to health. Springer.
- Lam S, Pham THG, Dinh XT, Adisasmito W, Pham-Duc P, Jing F, Kittayapong P, Nguyen-Viet H. 2016. Advancing Ecohealth in Southeast Asia and China: Lessons from the Field Building Leadership Initiative. Field Building Leadership Initiative, Hanoi, Vietnam.
- Nguyen-Viet H, Doria S, Tung DX, Mallee H, Wilcox BA, Grace D: Ecohealth research in Southeast Asia: past, present and the way forward. *Infect Dis Poverty* 2015, 4:5.

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