Title:

Ecohealth Policy Brief for Indonesia: Integrated Approach to Tackle Ecohealth Challenge in Smallholder Dairy Farms

Key Policy Messages (3-5)

1. Agriculture intensification in dairy farm has potential adverse impact to health.
2. Excessive use of chemical fertilizer, and antibiotic in dairy cattle have negative effects on health.
3. Development of organic fertilizer and animal herbal medicine to substitute chemical fertilizer and antibiotics.
4. Government of Indonesia is encouraged to strengthen veterinary authority in Ministry of Agriculture.

Background and Process

Threats from infectious diseases need to be addressed at the human-animal-environmental interface and need partnership worldwide since the diseases know no boundaries. To address this challenge as well as other health threats, Global Health Security Agenda is established on 2014 with 11 action packages. South East Asia region including Indonesia play important role to achieve GHSA goals by becoming leading country for Zoonotic Disease, and contributing country for AMR.

As an initiative to support Indonesia role, a research network was establishedtogether with China, Thailand, and Vietnam to tackle health threats induced by agriculture practices using integrated approach of human-animal-environment disciplines called Ecohealth FBLI. In Indonesia, the focus is on smallholder dairy farms. Smallholder dairy farms are an important part of local economies in developing countries and contribute to milk production (OECD-FAO, 2012). Such farms are found throughout Southeast Asia, including in Indonesia. However, significant challenges remain for the development of dairy farms in Indonesia in particular and the Asia Pacific region in general (Otte et al., 2012, Schreinemachers et al., 2013, Wright and Meylinah, 2014). The challenges facing Indonesia's smallholder dairy farms have been noted by policy analysts as forming an obstacle to self-sufficiency in milk production for the country (Soedjana, 2012) and there are also concerns about the linkage of smallholder agriculture to poverty (Suzuki et al., 2006, Wiggins and Keats, 2014), as well as environmental pollution and the spread of diseases (Ahuja et al., 2012, Zilberman et al.,

2012).Ministry of Agriculture also reported antibiotic residues found on dairy farm products in several provinces (Yuningsih, 2009). Misuse and overuse of antibiotic cause antimicrobial resistance in animal and human, as well as residues in dairy farm products which harmful for health (Gould, 2013; Dinki et al, 2013).This condition caused by lack of control from government (veterinary authority) as a side effect from regional autonomy governance.

This research studied the impact of farming activity in smallholder dairy farms in the Pangalengan, West Java, Indonesia on human, animal and environmental health and identify which characteristics of the farms where associated with a health-supporting approach. The research finding was translated with several methods below:

1. **Intervention to the community at risk:**

   Developantibiotic and chemical fertilizer substitution for farming sector.

2. **Increase awareness of the community leaders:**

   Promote the use antibiotic and chemical fertilizer substation productsto farmer leaders across Indonesia in order to reduce adverse impact of agriculture intensification to health.

3. **Advocacy to Policy Maker:**

   Advocate the Government of Indonesia to improve its animal health control system by strengthening Veterinary Authority in Ministry of Agriculture.

From Ecohealth Research to Policy

A survey of 335 smallholder dairy farms wasconducted in the Pangalengan sub-district in West Java, Indonesia. Several main research findings are listed below:

a. The dairy farm waste affected water quality of Cisangkuy River near study site.
b. Poor management of dairy cattle business in Pangalengan, which significantly caused by farmer economic status.
c. The feed management and dairy cow maintenance activity had a significant relationship with human and animal health as well as environment quality around the study site.

Intervention was developed to reduce waste negative impacts on river and improve the human and animal health status. These products have been tested in 4 national laboratories with description below:

a. Chemical Fertilizer Substitution Products

- Bio-fertilizer: a product made from urine of rabbit mixed with fruits and other organic materials and has function to accelerate production of solid fertilizer and provide nutrients for soil.

- Earthworm feces: a processed earthworm feces and has function to provide high nutrients for plants.
- **Organic fertilizer:** a product made from bio-fertilizer, earthworm feces, and other materials and has function to improve soil quality and provide nutrients for plant.

b. Antibiotic Substitution Products

- Lumbricus rubellus extract: earthworm extract for animal growth and additional material and has function to produce **animal herbal medicine.**
- **Animal herbal medicine:**a product made from molasses, probiotic, curcuma, Lumbricus rubellus extract and other materials and has function to increase performance and immunity of the animal.

As research dissemination, three approaches was used to translate the evidence and influence policy decision making process by conducting promotion among farmers, business incubation, and advocating the government of Indonesia.

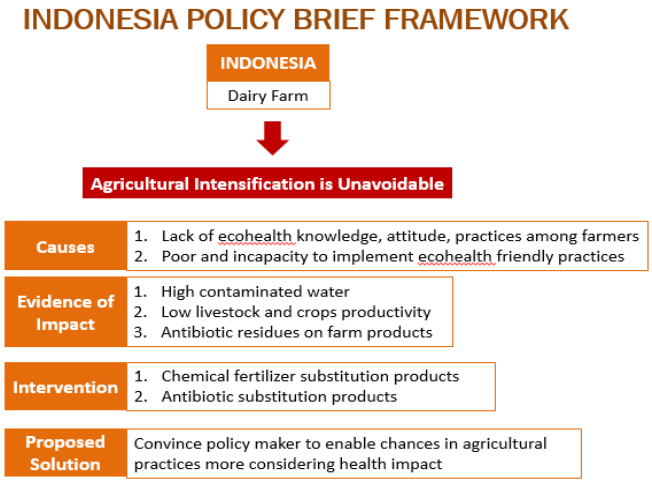

Figure 1. Indonesia Policy Brief Framework

1. Ecohealth Promotion Among Farmers

Excessive use of chemical fertilizer and pesticide found in Indonesia, where 30-40% farming budget allocated to buy these products alone (Pasetriyani, 2010). These practices lead to poisoning on community at risk (Sucahyo, 2014). On the other hand, high use of antibiotic are found on poultry (60,2%), companion animal (22,3%), livestock (18,5%), and feed additive (18,2%) (ASOHI, 2010). Poor farm management which usually found in smallholder farmers lower agriculture productions, and decrease supply for market (Soedjana, 2012).

Promotion was conducted to several farmer groups across Java to increase their awareness of good farm management practice as well as the benefit of ecohealth products. The selected locations are Pangalengan and Cipanas in West Java, Karanganyar and Solo in Central Java, also Sidoarjo and Pujon in East Java. These activities increased farmer awareness of ecohealth products and influenced their practice to utilize these on their farms.

2. Business Incubation

As economic burden becomes main burden for Pangalengan farmers to implement ecohealth approach, a business incubationwas initiated as a platform to produce and sell the ecohealth products. The Pangalengan farmers convert farm waste as ingredients for 5 ecohealth products and earn additional income which may improve their welfare.

These products give advantages for farmer since it all reduce farming cost which contributes to profit improvement. The use of animal herbal medicine reduces feed conversion ratio and save food consumption cost up to IDR 6,930,000,- on 3000 chickens with average weight is 1.5 kg. It also increases milk production on cowand income up to 56% from previous income. On the other hand, utilization of organic fertilizer increases vegetable weights and its price on market.

3. Advocacy to Government of Indonesia on Establishment of Veterinary Authority

Figure 2. Advocacy Approach to Government of Indonesia

These activities interacted researchers and policy makers to discuss research finding and further implication by involving 32 core team members from state universities, 7 representatives from government institutions, 85 team members of GHSA committee, and 130 civil servants from related ministries. The advocacy process was disseminated through online petition, 2 policy briefs, and 3 academic manuscripts.

Lead researchers and trainers

- Prof. Wiku Adisasmito, DVM, M.Sc, PhD, Dr. Allan Frank Lauder, Citra Pratiwi Sidebang, S.TP, M.Si, Sinar Cahya Wijayanti, S.Si, M.Si, Arie Aryanto, SP, M.Si, Nurul Maretia Rahmayanti, S.KM

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