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## Key Findings

- Small-holder farmers are unlikely to adopt compulsory bio-security measures given the current incentives structure.
- Consumers highly value safety as a quality of poultry products.
- The structure of the duck sector makes these producers particularly vulnerable to disease infection and propagation. These actors should be directly addressed in any comprehensive HPAI management strategy.
- We recommend that this evidence be more fully considered in formulating socially effective and sustainable HPAI strategies, particularly if avian influenza disease is endemic in Southeast Asia.

## Controlling Avian Flu and Protecting People's Livelihoods in the Mekong Region

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## Pro-Poor HPAI Risk Reduction for Small-holder Poultry Supply Chains

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Highly Pathogenic Avian Influenza (HPAI) may not have affected Cambodia to the extent it has Cambodia's neighbors, however, there have been nearly 25 confirmed poultry cases and seven human deaths from HPAI since the disease was discovered in the country in 2004. During this time, the disease has affected more than 20,000 birds. Since the disease penetrated Cambodia's borders, it has become apparent that there is a highly temporal pattern to the disease outbreaks. In the past four years, 70% of HPAI outbreaks in Cambodia have occurred between February and May while 25% have occurred between June and September, and 5% between October and January. Moreover, all 7 human cases have occurred between February and May. Outbreaks have also occurred primarily in selective geographical regions. Consequently, there is reason to believe that Cambodia may be able to target risk mitigation policies and effectively manage HPAI at a relatively low cost.

The purpose of this brief is to discuss a study that supports an approach that balances risk management with poverty alleviation. One possible strategy would be to promote pro-poor HPAI risk reduction by utilizing a demand-driven approach to disease risk mitigation, by supporting local cooperatives and/or traceable regional market chains that maintain minimum safety standards. Modelled on similar projects undertaken in other Mekong countries, this study combines an assessment of local market chains with an evaluation of household poultry purchasing preferences. Another issue is that, in light of the decreased number of outbreaks and in conjunction with the international economic downturn, resources for combating HPAI are

likely to decrease in the future. Approaches that selectively target geographic areas and temporal periods of high risk, as well as approaches that can potentially be self financed, are more likely to be sustainable in the long run.

From these studies, two general types of policy recommendations can be derived. The first relates to the consideration of farmers' market incentives with regards to risk mitigation strategies. The second category of recommendation relates to the strategic importance of small-scale poultry market chains and their pro-poor multiplier effects with regard to national development. Both types of recommendations have implications for HPAI risk management policies.

## Rationale and Motivation

The purpose of this project was to produce an assessment of poultry supply chain conditions in the Kampot and Siem Reap market catchment areas. This was done with detailed and separate surveys at four levels; producers, traders, vendors, and consumers. Modeled on the surveys already undertaken in Viet Nam and Thailand, these questionnaires aimed to elucidate production conditions, market access, contractual relationships, consumer preferences and consumer willingness to pay.

Taken together, these results can inform policy initiatives to improve incentives for higher poultry quality (including health status) and higher value added at each stage of the supply chain. Recommendations that follow from these activities can promote sustainable market participation by small-holder poultry producers. In addition, these recommendations promote improved large-scale producer safety practices. This includes, but is not limited to, programs for micro-credit and technology transfer, certified supply chains, and contract-farming programs for bio-secure production of both chickens and ducks. In addition to reducing HPAI risk and the economic vulnerability of rural poor farmers, these recommendations strive to increase product quality, safety and revenue across the traditional chicken and duck supply chains.

Another important motivation of this study was achieving a better understanding of the current market incentives facing small-holders. This is essential to predicting responses to policies such as compulsory bio-security implementation, trade regulation, and other approaches meant to mitigate disease risk. Policies that drive production and trade underground may hurt rural peoples' livelihoods and are less likely to reduce risk. On the other hand, allowing the regional poultry trade (in particular duck), in its current form, may pose risks to public health and large-scale producers, in addition to the risks posed to small-holders' poultry and their own health. It is within this context that we seek to promote pro-poor HPAI risk reduction policies.

## Project Activities

Project activities took place in two provinces with high densities of backyard chicken farms and large-scale duck farms that were affected by HPAI; Siem Reap in the north, and Kampot in the south. Consumer and market surveys were conducted in the capital districts of each

province, and farmer and aggregator surveys were conducted in districts within close proximity of the capital district market (<75 km).



Household consumer surveys aimed to better understand poultry purchasing habits of households that acquire their poultry products through markets. A detailed survey was carried out revolving around household tastes, price sensitivity, breed preference, and other aspects of shopping habits. In addition, this survey assessed interest in paying for traceable poultry. One important facet of the consumer survey was evaluating households' willingness to pay for traceable poultry products. Consequently, an experiment was developed to evaluate this issue. The respondent was presented first with a detailed description of a proposed certification system and subsequently with a hypothetical market

visit with three meat product alternatives; local chicken meat, cross-bred chicken meat, and duck meat, only one of which has been certified as traceable to the farm of origin. The respondent was then asked to choose the most appealing product. This process was repeated 5 times for each household, with prices and traceability randomized for each scenario. Prices were randomly selected from a list of seven prices ranging 25-30 Percent above and below average prices for a given product (average prices were estimated from market visits). Which product would be certified for each repetition was also randomized. A certification premium of 4,000 Riles (~1 USD) was added to the item selected for certification in each repetition.

Producer surveys were also conducted in order to better understand farmer cost structure, resource utilization, and assess the adjustment of poultry producers in response to HPAI control measures. The surveys assess these issues by focusing questions on evaluating farmer inputs and outputs, production cost structure, access to markets, trading relationships, barriers to expansion, and HPAI experience. From these data collected we are better able to estimate the cost to producers from shifts in policy or structural changes in the Cambodian poultry sector.

In addition, aggregator surveys strive to improve our understanding of the marketing network and trading relationships as well as to collect information on pricing, disease considerations, resource utilization, and operation costs. The survey included traders of all poultry products including chicken and duck eggs/meat, and chicks/ducklings for sourcing production. Finally, market vendor surveys collected information about the sources of poultry products sold in urban markets, the trading relationships that facilitate these transactions, as well as price and breed data.

## Findings and Outcomes

One of the main outcomes of the study was significantly better understanding of how existing institutions and stakeholders operate and interact within supply chains. It became evident that trust, reliability, and market information are main components of these relationships. In addition, emphasis was placed on understanding the incentives that farmers face when deciding whether or not to invest in safety precautions.

We found that most small-scale chicken and duck producers have not adopted bio-security measures on their farms. In fact, most farmers invest minimal resources into production and expect high mortality rates. Average survey participants spend less than 20 minutes per day attending to chickens and only rarely provide additional feed to supplement scavenging. For these reasons, poultry production is seen as an ancillary activity that does not warrant additional investments. In addition, farmers believe HPAI poses little risk to their own flocks. On a scale of 0 to 3, respondents ranked HPAI risk to their flocks and to their families close to 1. Risks from other livestock diseases were ranked significantly higher. Consequently, while considerable resources have been invested into HPAI public awareness campaigns, farmers are unlikely to adopt bio-security measures to combat HPAI in the future. Policies that address other livestock diseases, such as Newcastle disease, in coordination with HPAI are more likely to be adopted. Nonetheless, measures that require additional investments from farmers, whether it is in the form of time or other resources, are unlikely to be adopted unless there are additional incentives provided to do so.

Despite its low standing in the household economic hierarchy, poultry production does serve an important role in rural livelihoods. Every survey respondent uses poultry production to supplement household diets. More than half of all respondents also receive cash income from the sale of birds. Moreover, women are often in control of the income from poultry sales and tend to put the money towards essential consumption goods, school fees, and to save for use in emergencies. Consequently, policies seeking to combat HPAI should not hinder the production and sale of bird by small-holders. Moreover, as Cambodia continues to urbanize, poultry production could potentially be used as a tool for rural poverty alleviation.

The surveys also found that poultry marketing is based largely on trading relationships with friends and acquaintances. More than half of respondents in Siem Reap reported trading with people whom they interacted with regularly outside of the poultry trade. Therefore, any policies that seek to regulate poultry trade need to take into account the importance of pre-existing relationships. Moreover, attempts to create alternative trading networks, in order to improve regulation, would need to incorporate existing relationships in order to prevent a breakdown of the system.

An especially important facet of this study was the survey of large-scale duck producers. The most common form of duck production encountered in our surveys was large-scale duck egg production (>100 birds). We estimate that there are more than 100 active duck layer farms per district in the catchment area sampled in Kampot province. However, the number of duck hatcheries is very few (it requires specialized skills to identify the sex of ducklings) and most producers source eggs from the same suppliers. Consequently, the duck product

supply chain may be vulnerable to disease outbreaks that occur high up on the chain. Moreover, hatcheries in Kampot province reported significant, albeit illegal, sourcing of duck eggs from Vietnam, a country with far more serious HPAI problems than Cambodia. In fact, one hatchery reported that nearly 40 percent of eggs were sourced from Vietnam during particular seasons. This practice may pose a significant risk of introduction of livestock disease into the Cambodian poultry sector. However, there have been few studies exploring the ability of duck eggs to transmit H5N1. Consequently, it is unclear exactly how much of a risk these activities pose.

Duck eggs are also the most commonly traded and consumed poultry products. However, urban households tend to also purchase chicken meat every week. Generally, consumers are very considerate about the products they buy, but there is confusion about how disease risk can be determined. Safety is judged by appearance, either of the live bird or of the meat. Nonetheless, consumers do place a high value on safety. More than three-quarters of consumer survey respondents felt that the safety of the chicken meat they buy could be improved, and more than 85% said that they were interested in paying a premium for a proposed “safety guaranteed chicken”. Moreover, most respondents reported a willingness to pay this safety premium even when the base price of poultry products (without the premium) were priced 10-20% higher than normal cost. These findings are in line with similar findings in Vietnam and Thailand, suggesting that households value safety over price. Consequently, there is potential for farmers to market “safe chicken” at a higher price if consumers believe the safety guarantee. The potential for demand side approaches to improving production techniques, and rural livelihoods, should be further investigated.

## Guidelines for Incentive-Based Poultry Supply Chain Improvements

Our detailed investigations of the poultry supply chain in Cambodia suggest that small-scale poultry producers are unlikely to adopt bio-security measures, while large-scale producers (in particular duck farmers) prefer to implement bio-security technologies but face cost constraints that may prevent them from doing so. For these reasons, we recommend that this evidence be more fully considered in formulating socially effective and sustainable HPAI strategies, particularly if avian influenza disease is endemic in the region.

The detailed findings suggest a broad spectrum of socially constructive policy responses, initiatives that will advance HPAI risk reduction while improving economic conditions for poor farmers who are the majority population in rural Cambodia. Access to information and technology can be improved for duck farmers, particularly with respect to product quality, pricing, and other market conditions. On the financial side, micro-credit schemes can accelerate technology adoption and small enterprise modernization, improving product quality/reliability and leading eventually to established brands/reputation that confer higher long term value added at lower transaction cost. Professional training is also important, especially for product certification and enforcement of standards with veterinarians and technicians. Similarly, rudimentary education with respect to contracting, negotiation, and conflict resolution would improve the terms of market participation.

Previous outreach activities have promoted the adoption of bio-security as a mechanism to protect flocks and families from HPAI. Our findings suggest that this is

unlikely to convince farmers to adopt these technologies. Instead, we advocate for programs that promote overall 'product quality improvement' among small-holders so that there are lower mortality rates and healthier appearing birds that can potentially be sold for a higher price. Promoting market-based programs where farmers receive cash benefits in exchange for improving their bio-security is more likely to convince farmers to adopt these measures because the risk of an individual farm contracting HPAI is far lower than the many health risks that rural farmers face on a daily basis (e.g., securing clean drinking water). Furthermore, consumers appear to be willing to pay a premium for safety as a

quality of poultry products. Consequently, the potential for funding small-scale bio-security adoption through higher market prices should be further explored.



Unlike chicken production, duck egg production is a primary economic activity for most participating farmers. Therefore, most producers invest significant resources in order to protect their flock. On average, survey respondents spend more than 7 hours per day attending to their duck flocks. Consequently, duck producers are more willing (some even eager) to adopt bio-security technologies if it is feasible. The major constraints to improving production, cited by the majority of respondents, are space and cost. Commercial feed is the primary expenditure. Consequently, imposing minimum bio-security standards among large-scale duck producers might be feasible, if the program also helped ease farmers' cost constraints. Moreover, because of the potential of this sector to propagate disease, any outreach programs seeking to promote safe poultry production practices should place an emphasis on large-scale duck producers. In addition, temporary measures such as keeping birds in an enclosure, should be promoted during the high disease risk months of February – May. However, unless there is a program in place (market based or other) that alleviates cash constraints, farmers may not be able to implement these technologies despite their positive incentives to do so.

Finally, a primary source of disease concern is the duck hatchery. Relatively few hatcheries serve large catchment areas in Cambodia. Therefore, infections occurring at hatcheries are likely to spread throughout the supply chain and have potential to infect a wide region. However, like duck farmers, hatcheries tend to invest significant resources protecting the household's primary economic activity. Nonetheless, if safety inspections are going to be implemented, they should begin with duck hatcheries. Furthermore, information outreach programs should include hatchery owners and the potential for creating a certification system for hatcheries should be further investigated.

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