

# Engaging with complexity for improved veterinary antimicrobial stewardship in Thai Nguyen, Vietnam

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## Introduction

In countries characterised by industrialised livestock systems, veterinary antimicrobial stewardship (AMS) success is largely attributed to greater regulation. Countries dominated by smallholder systems are likely to be less responsive to such 'top-down' approaches. Towards finding context-appropriate solutions for AMS in Vietnam, this research aimed:

- To identify the ways in which livelihood capitals influence AMS in smallholder livestock systems in Vietnam.
- Using a participatory approach, to identify leverage points for intervention for improved AMS.



**Figure 1:** Participatory group interviews proportionally mapped cases of 'sick pigs' from the point of case recognition to treatment, identifying key stakeholders and themes for further investigation

## Methods

Firstly, participatory group interviews identified stakeholders involved in AMS in cases of smallholder pig disease and themes for further study. These findings were used to develop and implement a cross-sectional census survey of 82 animal healthcare workers and randomised survey of 210 smallholder farmers in Phu Binh District, where smallholders comprise approximately 86% of households.

The cross-sectional survey aimed to describe how livelihood capitals influence AMS behaviours related to examination, diagnosis, treatment, prophylaxis and animal husbandry. Subsequently, a longitudinal survey followed pig and chicken disease case management on 110 farms for five months.

Finally, in September 2018 these data were presented in a series of participatory stakeholder workshops aiming to, first as individual groups and then in a multi-stakeholder workshop, identify leverage points for intervention.



**Figure 2:** Following individual stakeholder workshops with farmers, private veterinarians and veterinarians with a government role, this final workshop brought stakeholders together to discuss points of synergy and divergence before presenting their ideas to external stakeholders. Together, they mapped stakeholders who would need to be involved in particular interventions.

## Results

### Smallholder farmers play a significant role in all aspects of veterinary case management

Throughout the research farmers and animal healthcare workers (AHWs) emphasised the significant roles smallholders played in disease management, largely attributed to their human capital and variably, to barriers in engaging with veterinary services. Barriers included financial and institutional factors.

Farmer motivations for using antimicrobials in healthy animals overwhelmingly pertained to disease prevention. Knowledge of stewardship principles was lacking in all stakeholder groups.



**Figure 3:** Spatially randomised sampling of farms in Phu Binh, Thai Nguyen was achieved using QGIS and Google Earth. Inset: Project researcher Nguyen Thanh Binh explains sampling strategy to commune leaders using a smartphone, seeking approval to approach sampled households.

### Agreement on leverage points for intervention was found

Over 5 months, 66 cases of chicken disease and 50 pig cases were recorded (individual cases included single or multiple animals with the same signs). Animals were examined by an AHW in fewer than one percent of cases. In cases where antimicrobials were sought, most commonly, farmers' descriptions of clinical signs were used by an AHW to make a presumptive diagnosis and recommend treatment.

From the final workshops, suggested leverage points spanned disease prevention, diagnosis and treatment and involved different scales and stakeholders. Participants in the workshops were encouraged and surprised at some suggestions of other stakeholder groups for improving AMS, due to their synergy and at times, replication. A list of recommendations from farmers and AHWs were presented to District and Provincial leaders and livestock researchers.

## Conclusions

This iterative approach aided a more nuanced, multi-perspective understanding of local constraints and opportunities for AMS.

While the ultimate goal may be for all animal healthcare systems to adhere to global AMS standards, our research provides tentative recommendations for further testing, which aim to support animal healthcare workers to make better stewardship decisions within their current livelihoods context.

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