

PROJECT PERFORMANCE ASSESSMENT REPORT

VIETNAM

Livestock Competitiveness and Food Safety Project

Report No. 182306
AUGUST 31, 2023



IEG
INDEPENDENT
EVALUATION GROUP

WORLD BANK GROUP
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**Livestock Competitiveness and Food Safety Project
(IDA-46490; IDA-56920)**

August 31, 2023

Finance, Private Sector, Infrastructure, and Sustainable Development

Independent Evaluation Group

Abbreviations

ASF	African swine fever
GAHP	good animal husbandry practice
ICR	Implementation Completion and Results Report
IEG	Independent Evaluation Group
LIFSAP	Livestock Competitiveness and Food Safety Project
LPZ	livestock production zone
MARD	Ministry of Agriculture and Rural Development
PDO	project development objective
PPAR	Project Performance Assessment Report

All dollar amounts are US dollars unless otherwise indicated.

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Note: IEG = Independent Evaluation Group; PPAR = Project Performance Assessment Report.

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Data

This is a Project Performance Assessment Report by the Independent Evaluation Group of the World Bank Group on the Vietnam Livestock Competitiveness and Food Safety Project (P090723). This instrument and the methodology for this evaluation are discussed in appendix C. Following standard Independent Evaluation Group procedures, copies of the draft Project Performance Assessment Report were shared with relevant government officials for their review and comment.

Livestock Competitiveness and Food Safety Project (P090723)

Basic Data

Country	Vietnam	World Bank financing commitment	US\$109,940,000
Global Practice	Agriculture and Food	Actual project cost	US\$105,885,515
Project name	Livestock Competitiveness and Food Safety Project	Expected project total cost	US\$107,450,116
Project ID	P090723	Actual amount disbursed	US\$105,430,000
Financing instrument	Investment project financing	Environmental assessment category	Partial Assessment B
Financing source	International Development Association		

Dates

Event	Original Date	Actual Date
Approval	January 25, 2007	September 22, 2009
Effectiveness	March 10, 2010	March 10, 2010
Restructuring	November 29, 2018	January 16, 2019
Mid-Term Review	March 25, 2013	March 25, 2013
Closing	December 31, 2015	June 30, 2019

Key Staff Responsible

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Summary

Background and Description

The agriculture sector, particularly smallholder livestock production, has played a crucial role in Vietnam's economy. In 2009, agriculture accounted for 22 percent of GDP and over 60 percent of employment, whereas the livestock subsector contributed 6 percent of GDP. Small-scale pig and poultry production dominated the livestock subsector, with household-based producers accounting for 70 percent of production (8.3 million households produce poultry and 7 million pigs; World Bank 2009b).

Household-based livestock producers in Vietnam have faced challenges to increasing their sustained competitiveness and profitability. They had limited access to innovations as a result of weak extension services, inadequate disease control, and limited biosecurity measures resulting from weak decentralized animal health services. In addition, the lack of waste treatment technologies on small-scale livestock farms contributed to groundwater and surface water pollution. These challenges were particularly acute for small-scale producers, whose livestock were especially vulnerable to diseases such as avian influenza that in the past devastated the livelihoods of millions of poultry producers. Efficient and high-quality meat production by small-scale producers, along with access to safe and hygienic meat markets, was crucial in Vietnam. These markets were supplied by small-scale unhygienic slaughterhouses with no formal meat inspections. Upgrading these slaughterhouses and markets would not only improve food safety but also enhance disease surveillance and control in high-risk areas. Addressing these constraints would also provide household producers with the opportunity to compete effectively in the rapidly expanding meat market.

The project development objective of the Vietnam Livestock Competitiveness and Food Safety Project—as stated in the financing agreement dated December 10, 2009—included the following three elements: “increase production efficiency of household-based livestock producers, reduce environmental impact of livestock production, processing and marketing, and improve food safety in livestock product supply chains (mainly meat) in the Project Provinces” (World Bank 2009a, 5).

The project was implemented in 12 provinces covering less than 1 percent of small-scale livestock producers in the country (about 23,000 households out of 7 million small-scale livestock farmers at appraisal). The project was intended to serve as a pilot to demonstrate new concepts, technologies, and improvements along the smallholder livestock value chain. At the farm level (households), the project aimed to improve livestock production while reducing the environmental impact of livestock production by investing in good animal husbandry practices (GAHPs), improving biosecurity and

waste management, and increasing vaccination coverage for common animal diseases. It also aimed to pilot livestock production zones (LPZs) and to promote the establishment of cooperatives and partnerships with the private sector.

At the processing level, the project aimed to finance upgrades and improvements of meat slaughterhouses and wet markets, adoption of food safety standards, and implementation of waste treatment and management. It also included training on food safety for veterinary staff, butchers, and middlemen.

Project Results

What Worked and Why?

The project provided a framework for GAHP and improved biosecurity and livestock waste management for small-scale livestock farmers in Vietnam. The project developed and updated GAHP standards, guidelines, and regulations for biosecurity, livestock waste management and quality of livestock feeds, hygiene standards, and meat inspection.

Avian influenza was well controlled. Although avian influenza cases were detected in Vietnam during project implementation, the impact of avian influenza was minimal because project farmers already had their birds vaccinated—the most crucial element in preventing avian influenza.

Improving food safety worked well for wet markets that the project supported. This aspect was considered by the interviewed stakeholders as the most outstanding contribution of the project. The upgraded wet markets are, in general, still operating effectively, which helps ensure food safety for consumers. The wet market management boards reported better control over meat sold in the Livestock Competitiveness and Food Safety Project–supported markets. According to the Ministry of Agriculture and Rural Development, at the end of the project, microbial contamination in pork and chicken in these markets had declined. The successful operation and maintenance of wet markets depended on the performance of the market management boards; however, some of the management boards struggled to collect sufficient fees to adequately finance the maintenance of markets.

Waste treatment and management were enhanced along the livestock value chain. The project-supported biogas technology presented several shortcomings, although the manure composting practices were sustained. The project also supported wastewater treatment at slaughterhouses and wet markets by updating their wastewater treatment systems (which reduced environmental pollution). These systems continued to work

well after the project closed; however, in some cases, financing the systems' operation created problems.

What Didn't Work and Why?

African swine fever (ASF) swept through Vietnam and the project area soon after this project closed, devastating the livelihoods of most pig producers. The project beneficiaries had achieved reduced livestock mortality rates, increased herd size, and shortened fattening periods, meeting the project development objective indicator targets at project closing, but the Independent Evaluation Group (IEG) mission for this Project Performance Assessment Report in late 2022 found that the ASF outbreak since 2019 had a negative impact on the pig-producing households in Vietnam, including the project-supported households. According to the General Statistics Office, in 2019 alone, 21 percent of the total pig population in the country died or was culled due to the disease. In some provinces, such as Thai Binh and Hai Phong, which were visited by the IEG mission, more than 50 percent of the pig population was lost in 2019.

The authorities in the Ministry of Agriculture and Rural Development revealed during IEG's field mission that the project-supported households and those not supported by the project were equally impacted by ASF (but with some delay). This suggests that biosecurity adoption by pig producers in project areas was limited, and the measures supported by the project were not sufficient to avoid ASF transmission to small-scale farms when there is no vaccination available against ASF. However, the Ministry of Agriculture and Rural Development subsequently reported that the project-supported households overall were impacted less by ASF than were the nonproject households; due to epidemic control regulations, however, many households had to destroy their animals if they were in epidemic areas, even when the animals were not sick.

GAHP collaborative groups and cooperatives had weaknesses, and GAHP adoption was barely sustained after the project closed. The Livestock Competitiveness and Food Safety Project established and supported GAHP collaborative groups and cooperatives by providing extension services and small grants. The formation of these groups was intended to encourage harmonized, collaborative implementation of upgrades and improved practices—which also required a behavioral change for small-scale livestock farmers. The efficacy of this extension method could not be evaluated due to the ASF pandemic at about the same time as the project closed and caused many households to stop keeping pigs. In addition, local officials indicated that very few GAHP collaborative groups were still operating. Stakeholder interviews concluded that the benefits of collective activities may have been lacking or provided insufficient incentives for farmer participation. In addition, the Ministry of Agriculture and Rural Development did not expand the project-supported GAHP group formation in its extension programs, citing

budgetary and time constraints. In addition, the Ministry of Agriculture and Rural Development subsequently informed IEG that due to the removal of extension centers in the localities and their transformation into agricultural service centers, the continued support for livestock households to apply Vietnamese Good Agricultural Practices, or VietGAP, and the expansion of the method to other localities have been discontinued.

GAHP certifications were not renewed. The households supported by the project to receive GAHP certification (officially called VietGAP) did not request certificate renewal after the project was closed because smallholder farms primarily raise pigs and chickens for local markets in the commune, and it is likely that farmers had not recognized any immediate benefits from GAHP certification, as such certification is not required to meet buyer demand. In addition, the Ministry of Agriculture and Rural Development informed IEG that the removal of district veterinary stations and district extension centers has also made it more difficult to issue VietGAP certification for farmer organizations.

The LPZ pilot showed that the concept had many weaknesses. The purpose of the LPZ was to ensure that livestock production would be concentrated only in designated areas so that animal diseases and waste could be managed more efficiently and effectively. The project implemented and tested only one LPZ in the Dong Nai province, and the ASF outbreak impact was even worse in the LPZ area. The recent ASF has demonstrated that it is difficult epidemiologically (and environmentally) to prevent the spread of infections when small farms are close to one another. In addition, the LPZ model did not include the concept of biosecurity compartmentalization, according to the World Organisation for Animal Health, although this concept is essential for such zones.

Activities to form market linkages and product brands through productive partnerships had mixed results. At project closing, some formal marketing connections had been established, and 30 product brands were developed by the cooperatives and collective groups, but there was no indication that new linkages or brands were formed after the project closed; rather, many that had been formed were lost, in parallel with the dissolution of GAHP groups and cooperatives. However, the Ministry of Agriculture and Rural Development noted that the best strategy for household farms to establish market linkages in the future would be to organize as cooperative groups so they would be able to sustain their businesses.

Biogas technology did not work well for smallholders after the project closed. Overall, the technology was largely not of interest to farmers anymore because of a range of factors: (i) wide availability of electricity supplies and, therefore, use of biogas-generated energy for cooking only (except in remote areas where there is limited access to electricity); (ii) difficulty in maintaining the biodigesters; (iii) the technology's low

economic efficiency; and (iv) the farmers' growing preference for composting available manure as a result of increasing demand for organic fertilizer that provided a better income source.

Small slaughterhouses that the project supported still faced issues. At the end of the project, slaughterhouses located in the project communes served as the primary point of contact for purchasing pigs and chickens from GAHP households. However, these slaughterhouses supplied meat to the local market without cooling systems and hence were selling "hot meat," which is subject to rapid deterioration and loss of value. In addition, the number of GAHP farmers participating in the project was small, and slaughterhouses in general have been using all types of farmer inputs (safer and better-quality GAHP livestock and non-GAHP livestock); thus, differentiating GAHP products is impossible. The IEG mission discovered that some slaughterhouses have reduced their capacity or closed their operations, partially because of COVID-19, but mainly as a result of ASF. However, the exact number of closed small slaughterhouses could not be obtained because these small establishments are not monitored by the Ministry of Agriculture and Rural Development. The project also provided training on hygiene and food safety practices to slaughterhouses; however, these trainings needed to be repeated because the level of application of these practices varies among slaughterhouses.

Project Design

What Worked and Why?

The project's value chain approach—which addressed the three interlinked objectives of improved production efficiency and animal health, environmental sustainability, and food safety along the chain—was sound. This helped the project benefit from the complementarities among the three objectives. It also ensured that the food safety challenges for the livestock sector value chain were addressed from farm to fork.

What Didn't Work and Why?

GAHP collaborative groups lacked sustained economic gains to continue functioning as a group. The establishment of GAHP groups to sustain the adoption of good livestock management and to facilitate linkages to input providers and output markets was an innovative idea for Vietnam; however, the majority of the GAHP groups (collective groups and cooperatives) disbanded, and ASF played a significant role in groups breaking apart. Another factor—the reluctance of farmers to form new groups because of trust issues—was initially mitigated via the provision of subsidies to these groups, but when the project was closed, the groups no longer gained benefits from collective action.

Formal market linkages (productive partnerships) for smallholders were not part of the original project design but are extremely important. This fact was also highlighted by IEG's recent evaluation on agrifood economies (World Bank 2022), which stated that productivity-enhancing interventions should be complemented by interventions linking farmers to markets. Market linkages provide better and sustainable income opportunities and deliver better-quality products from organized groups of smallholder farmers to commercial buyers; these chains also ensure that contracted smallholder farmers follow adequate GAHP techniques. The market linkage aspect was included later in the project but in an ad hoc fashion, without formal indicators monitoring these linkages. The assumption was that once core organizational and management skills were developed, collective farmer groups would establish market linkages themselves. However, specific activities targeting various stakeholders to form linkages along the value chain were necessary. For example, raising awareness for commercial buyers to establish linkages to smallholders could have helped them form more productive partnerships.

A communication strategy to raise consumers' awareness of food safety and food traceability for effective food safety monitoring is needed for a more sustainable small livestock value chain. Projects related to food safety should have a communication component targeting consumers and interventions to build a food safety traceability system. This element is crucial because changes in consumer perceptions of food safety have an impact on food demand and, hence, on the behavior of the other actors in the food supply chain—namely, producers for the adoption of GAHP and biosecurity practices, slaughterhouses, and markets for sustained implementation of food safety and hygienic practices. The lack of such explicit consumer demand led to reduced incentives for the producers and processors to sustain GAHP and biosecurity practices. Food traceability is also key to effective monitoring of the value chain back to the production stage, and the lack of traceability systems reduced the ability of the government to monitor and adequately address food safety risks along the food supply chain.

Biosecurity practices developed and implemented by the project were not sufficient to protect against a disease such as ASF; therefore, stronger biosecurity practices and effective compensation mechanisms are necessary for animal disease control. More simplified biosecurity regulations were applied to farmers producing pigs, but project experience showed that these regulations were not sufficient and that more strict regulations on biosecurity that are used for large commercial farms need to apply to small-scale farmers and processors as well. Sustainable disease-control capacity also requires the establishment of a compensation mechanism to adequately reimburse farmers if they lose their livestock because of diseases. As mentioned earlier, as a result of the recent ASF, many farmers lost their livelihoods. The IEG mission was informed

that the government provided some compensation for ASF (only part of the value of loss), yet the compensation was provided solely to the farmers who had registered their livestock; thus, many farmers missed this opportunity.

Lessons

This assessment offers the following lessons:

- Collective group formation by small-scale livestock producers to sustain GAHP adoption is not likely to work unless long-term external support is provided through training and strong economic incentives via formal market linkages for farmer products. The project supported collective groups and cooperatives' formation via provision of training and subsidies. Nevertheless, the project did not establish any specific activity providing market linkages and left formation of market linkages to collective groups' initiation. However, many GAHP groups split up after the project closed, mainly because of the ASF outbreak but also because of the lack of economic benefits derived from working as a group. Thus, it is essential for productivity-enhancing interventions to be complemented by interventions that link farmers to markets.
- Sustainable livestock disease control requires the enforcement of strict biosecurity measures and permanent availability of resources for compensation. The ASF outbreak led to many project-supported farmers (including small-scale pig farmers who were not part of the project) losing pigs and, therefore, their livelihoods. However, large-scale pig farms were relatively immune from the ASF outbreak. Because project interventions included biosecurity measures for small-scale farmers, they were clearly not sufficient to protect against a disease such as ASF, for which there is no vaccine. The lesson from the project was that small-scale pig farms need more stringent biosecurity measures. Adequate compensation mechanisms to support farmers during such outbreaks may also be necessary.
- The LPZ model has a lower chance of keeping the areas disease free if small-scale farms exist in proximity without both control of animal density and strict biosecurity measures or the possibility of vaccination against major diseases. The project piloted one LPZ, but the experience was not positive. Project support on infrastructure in the zone led to many farmers moving to the area, resulting in an increase in livestock density. The impact of ASF in the LPZ was very damaging to farmers' livelihoods, as most of the farmers (74 percent) in the zone lost their animals to the disease despite biosecurity measures. Conversely, there was an insignificant death rate of chickens in the LPZ because they had been vaccinated

against avian influenza. The lesson is that the LPZ model is more likely to work if animal density is controlled, strict biosecurity rules are implemented according to international standards, and vaccines against major livestock diseases are available.

- The use of biodigester technology by small-scale livestock farmers is beneficial for improving livestock waste management, but its economic viability depends on the extent of connectivity with the public grid and the price of grid electricity. Under the project, the biogas produced by farmers was used for cooking only because state-supplied electricity was more affordable. In addition, the amount of biogas produced was far greater than what was needed for cooking because the farms supported by the project were larger than subsistence farms (with an average herd size of 25–40 pigs). IEG interviews showed that most of the gas produced by farms was burned off and released into the environment, with only a small percentage used for cooking. Thus, when grid electricity is affordable and accessible, using electricity from the national grid—combined with environmentally viable livestock waste composting—is likely to be more economically viable than establishing biodigesters.

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1. Background, Context, and Design

Background and Context

1.1 The agriculture sector, particularly smallholder livestock production, has played a crucial role in Vietnam's economy. In 2009, agriculture accounted for 22 percent of GDP and over 60 percent of employment, whereas the livestock subsector contributed 6 percent of GDP. Small-scale pig and poultry production dominated the livestock subsector, with household-based producers accounting for 70 percent of production (8.3 million households produce poultry and 7 million pigs; World Bank 2009b). Although small in scale, pig and poultry production significantly increased household incomes and reduced rural poverty, providing a source of food and capital accumulation for poor households (World Bank 2009b).

1.2 The growth of the middle class and increasing incomes in Vietnam have resulted in rising demand for meat products. In 2009, the average annual meat consumption per capita was approximately 40 kilograms, and this amount was projected to increase to 57 kilograms by 2020. Pork and poultry accounted for 76 percent and 13 percent of the total meat market, respectively, in the late 2000s (World Bank 2009b). According to the Vietnam Household Living Standards Survey, among Vietnam's urban population, animal products (for example, meat, eggs, and fish) accounted for the largest share of food expenditures, reaching over 38 percent of expenditures in 2016. These shifts have not been limited to the middle- or upper-income segments of the urban population. In 2002, households in the lowest income quartile spent 27 percent of their budget for meat and fish; by 2016, meat and fish accounted for 39 percent of these households' budgets (World Bank 2019a, 2019b).

1.3 The context for this project was that the important household-based livestock producers in Vietnam faced significant challenges to increasing their sustained competitiveness and profitability. These challenges included limited access to innovations due to weak extension services, inadequate disease control, and limited biosecurity resulting from weak decentralized animal health services. In addition, the lack of waste treatment technologies on livestock farms contributed to groundwater and surface water pollution. These challenges were particularly acute for small-scale producers whose livestock were especially vulnerable to diseases such as avian influenza, which in the past has devastated the livelihoods of millions of poultry producers.

1.4 Achieving efficient and high-quality meat production by small-scale producers, along with improving consumers' access to safe and hygienic meat markets, was crucial in Vietnam. In 2009, over 90 percent of consumers were served by local meat markets

that lacked proper hygienic conditions and waste treatment. These markets were supplied by small-scale unhygienic slaughterhouses with no formal meat inspections. Upgrading these slaughterhouses and markets would not only improve food safety but also enhance disease surveillance and control in high-risk areas. Addressing these constraints would provide small-scale producers with the opportunity to compete effectively in the rapidly expanding meat market.

1.5 The Livestock Competitiveness and Food Safety Project (LIFSAP) was initiated at a time when major structural changes were beginning to occur within the agriculture sector in terms of land use, labor allocations, and the organization of food production. Vietnam exhibited a hybrid food system that combined a relatively small but rapidly growing formal or “modern” sector with a much larger informal sector, featuring large numbers of small players at the farm, intermediation, processing, and retail stages (World Bank 2016a). The potential exposure of Vietnam’s population to food safety risks was considerable, yet the capacity to manage such risks was limited in both the public and private sectors. Despite some broader structural changes in the economy, the supply and distribution channels for perishable foods have undergone remarkably little change. Primary production, aggregation, and subsequent distribution remained highly fragmented, and only a small proportion of marketed output could be traced to its origins. Legacy patterns of agricultural and food market organization and practices, together with the persistence of traditional food preferences (for example, to purchase “warm” meat or live animals), generate major challenges for food value chain modernization and governance. As a result, much of the delivery system servicing Vietnam’s major cities for fresh perishable foods has been experiencing very high levels of physical and product quality losses, frequently exposing consumers to produce contaminated by chemical or microbiological hazards and generating negative environmental impacts. Although the number of modern outlets such as supermarkets has increased, traditional outlets (for example, wet markets and street vendors) still account for the majority of retail grocery sales (95 percent in 2017; World Bank 2019a).

Objective, Design, and Financing

Project Development Objective

1.6 The project development objective (PDO) for the LIFSAP—as stated in the financing agreement dated December 10, 2009—included the following three elements: “increase production efficiency of household-based livestock producers, reduce environmental impact of livestock production, processing and marketing, and improve food safety in livestock product supply chains (mainly meat) in the Project Provinces” (World Bank 2009a, 5).

1.7 The project supported 12 provinces located in four geographical production clusters: Thanh Hoa and Nghe An (central north); Hanoi, Hai Phong, Thai Binh, Hung Yen, and Hai Duong (north); Cao Bang (northern border); and Ho Chi Minh City, Long An, Dong Nai, and Lam Dong (south), which supply the greater Hanoi and Ho Chi Minh City metropolitan markets. These four clusters correspond to the four “at risk” production regions, as per the risk assessment performed during project preparation.

Project Design

1.8 The project included three major components:

- **Component 1:** Upgrading household-based livestock production and market integration (appraisal: \$66 million; additional financing: \$43.69 million; actual total cost at the Implementation Completion and Results Report [ICR]: \$110.89 million). This component aimed to increase the efficiency of household-based livestock production, enhance food safety and hygiene along the meat supply chain, and enhance the environmental management of livestock waste (World Bank 2009b). Key activities were as follows: (i) promoting good animal husbandry practices (GAHPs) among farmers, extension officers, and veterinary staff to increase vaccination coverage for common animal diseases, improve biosecurity and waste management, and enhance data collection and compliance monitoring on GAHP standards and certification; (ii) piloting livestock production zones (LPZs)—an existing or proposed land area that local authorities designate for intensive livestock production—to improve disease monitoring capacity and promote the establishment of farmer cooperatives and partnerships with the private sector for better knowledge exchange and harmonized application of improved waste management practices and biosecurity investments; and (iii) upgrading slaughterhouses and meat markets to improve their hygienic conditions and waste treatment and management.
- **Component 2:** Strengthening central-level livestock and veterinary services (appraisal: \$4.3 million; additional financing: \$4.36 million; actual total cost at ICR: \$7.17 million). This component aimed to strengthen the Department of Livestock Production and the Department of Animal Health under the Ministry of Agriculture and Rural Development (MARD) in developing and monitoring the implementation of animal health practices, including an update of the GAHP guidelines and strategic studies; training of trainers in GAHP; piloting of innovative approaches; the provision of equipment and incremental costs to monitor livestock breed and feed quality, waste management and environmental compliance, disease surveillance and prevention, and meat inspection at the

provincial level; and collection and monitoring of zoo sanitary and food safety data.

- **Component 3:** Project management and monitoring and evaluation (appraisal: \$8.7 million; additional financing: \$4.83 million; actual total cost at ICR: \$13.53 million). This component entailed project implementation and coordination of various government agencies (at the central, provincial, and district levels), as well as monitoring and evaluation of project activities and impact.

1.9 The ICR prepared a theory of change (figure 1.1) for the project. Implemented in 12 selected provinces, the project covered less than 1 percent of small-scale livestock producers in the country (about 23,000 households out of 7 million small-scale livestock farmers at appraisal in 2009 and 3 million at closing in 2019). Thus, the project overall served as a pilot to demonstrate new concepts, technologies, and improvements along the smallholder livestock value chain. At the farm level (households), the project aimed to improve livestock production by investing in GAHP,¹ improving biosecurity and waste management, and increasing vaccination coverage for common animal diseases. It also aimed to pilot LPZs to promote the establishment of cooperatives and partnerships with the private sector.² Farmers would receive training on GAHP, including demonstration models in communes, and matching grants would be provided to support the construction of biodigesters, composting facilities, slurry treatment, and implementation of biosecurity measures. These interventions would increase the efficiency of household-based livestock producers while reducing the environmental impact of livestock production. The project also aimed to enhance the quality of services and support for farmers by monitoring and inspecting farms for GAHP implementation.

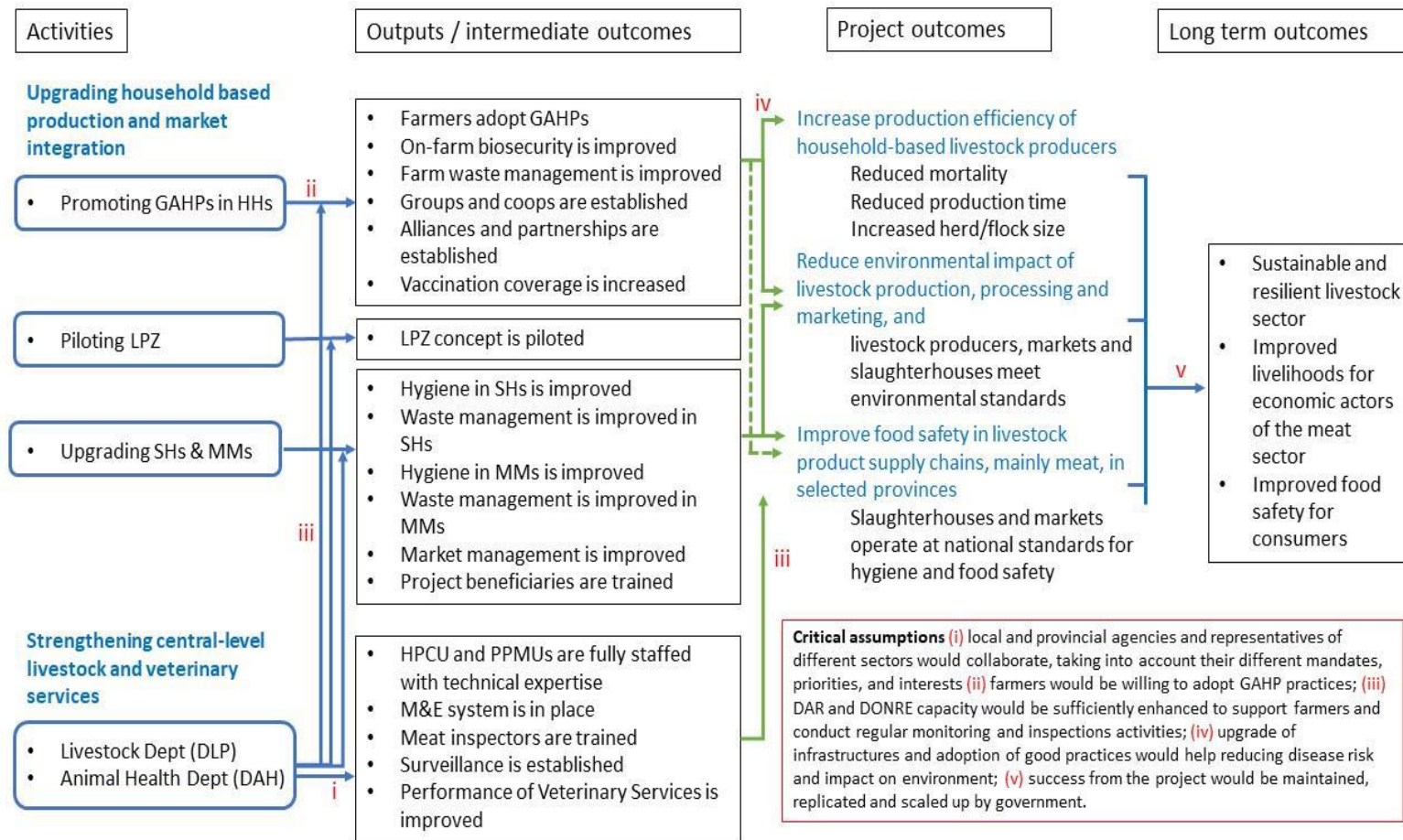
1.10 At the processing level, the project aimed to finance upgrades and improvements of meat slaughterhouses and wet markets, adoption of food and safety standards, and implementation of waste treatment and management. The project proposed these activities throughout the meat processing and marketing value chain. It also included training on food safety for veterinary staff, butchers, and middlemen, as well as meat inspectors. In addition, the provincial Sub-Department of Animal Health was to be equipped for proper meat inspection. These measures aimed to enhance the quality of services, monitoring, and inspection of markets and slaughterhouses while reducing the environmental impact of the sector during processing and marketing. The project also aimed to improve food safety in livestock product supply chains in selected provinces.

1.11 At the institutional level, the project aimed to strengthen the capacity of the livestock production department in MARD by developing and updating GAHP standards, procedures, and certification methods. The development of guidelines and

regulations for livestock waste management, quality of livestock feeds, and the sale and use of feed additives was also proposed. To ensure the successful implementation of these standards and guidelines, training, awareness-raising activities, and technical assistance would be provided to implementing agencies, MARD technical departments (such as the Department of Livestock Production and the Department of Animal Health), representatives of local governments, and stakeholder groups. This approach aimed to familiarize all of these groups with new approaches and promote better livestock production practices, biosecurity, and food safety in the sector.

1.12 The key outcomes included a variety of activities and measures designed to respond to the identified development gaps. An overview of these activities and measures can be found in the results framework achievements outlined in the project ICR (World Bank 2019b).

Figure 1.1. Simplified Theory of Change (Constructed by the Implementation Completion and Results Report)



Source: World Bank 2019b.

Note: DARD = Department of Agriculture and Rural Development; DONRE = Department of Natural Resources and Environment; GAHP = good animal husbandry practice; HH = household; PCU = Project Coordination Unit; LPZ = livestock production zone; MM = meat market; M&E = monitoring and evaluation; PPMU = Provincial Project Management Unit; SH = slaughterhouse.

Financing and Dates

1.13 The total project cost estimated at appraisal was \$133.7 million, and the total cost at ICR was \$132.4 million (99 percent of the total estimate at appraisal). The project was financed by two International Development Association credits totaling \$109 million and \$23.8 million by the borrower (government and private sector). Total World Bank financing at closing was \$105.43 million, and the borrower contribution at closing was \$26.97 million.

1.14 The project was approved on September 22, 2009, and became effective on March 10, 2010. It closed on June 30, 2019. The original closing date was December 31, 2015, which was extended through the additional financing approved in October 2015 and a restructuring for a closing date extension of six months in January 2019. The additional financing of \$44.68 million funded by the International Development Association in October 2015 was mainly intended to increase GAHP capacity-building activities.

2. What Worked, What Didn't Work, and Why?

Results

2.1 In line with the three elements of the project's objectives, the project's results are analyzed in this Project Performance Assessment Report (PPAR) for three groups of issues—namely, increasing household-based livestock production; reducing environmental impacts of livestock production, processing, and marketing; and improving food safety in livestock product supply chains and markets (mainly meat) in the project provinces.

More details on the project's outcomes and ratings of performance on a number of issues can be found in appendix A.

Increasing Household-Based Livestock Production

What Worked and Why?

2.2 The project provided a framework for GAHP, biosecurity, and livestock waste management for small-scale livestock farmers in Vietnam. The project developed and updated GAHP standards, guidelines, and regulations for biosecurity, livestock waste management, and quality of livestock feeds, hygiene standards, and meat inspection. Training and awareness-raising activities on the new approaches were provided to the technical departments of MARD, local governments, and stakeholder groups.

2.3 Avian influenza was well controlled. The results at the household-based livestock production level were sustained for poultry production. The project supported

638 poultry farmers, and almost all of them are still in business. Although avian influenza cases were detected in Vietnam during project implementation (see appendix D), the impact of avian influenza was minimal because project farmers had their birds vaccinated—the most crucial element in the prevention of avian influenza.

What Didn't Work and Why?

2.4 Household-based livestock producers. The project focused on transitioning household-based livestock producers with, on average, 25 pigs and 900 birds for poultry to small-scale commercial livestock producers. This transition was to be achieved by improving technical skills, animal health services, and processing practices at slaughterhouses and meat markets. The Vietnamese Good Agricultural Practices standards for large-scale livestock farms were adapted for household livestock producers (see box 2.1), and the institutional capacity of the Department of Livestock Production and the Department of Animal Health under MARD was strengthened.

2.5 The project's achievements at the household producer level were reduced after the project's close due to a widespread African swine fever (ASF) outbreak. The project beneficiaries had achieved reduced livestock mortality rates and shortened fattening periods, meeting the PDO indicator targets at project closing in mid-2019, but the Independent Evaluation Group (IEG) mission for this PPAR found that the ASF outbreak since 2019 had a serious negative impact on the pig-producing households in Vietnam, including the project-supported households.

2.6 Official statistics show that the livestock sector in Vietnam has been facing challenges since 2019 and that pig rearing by smallholder farmers was reduced dramatically mainly due to ASF. Although the number of small-scale livestock farmers has been declining in Vietnam over the past decades (because of the overall structural changes in the agrifood sector), the reduction since 2019 was mainly due to the negative impact of ASF. According to the General Statistics Office, pig farming decreased from about 3 million households in 2019 to a little over 2 million households in 2021—a decrease of about 1 million households, equivalent to almost 33 percent in two years (Ngan 2021). In 2019, about 21 percent of the total pig population in the country died or was culled due to the disease. In some provinces, such as Thai Binh and Hai Phong, which were visited by the IEG mission, more than 50 percent of the pig population was lost in 2019 (see appendix D for additional data). Although ASF can cause up to 100 percent mortality in pig herds and is difficult to control in the absence of an effective vaccine (Torres 2020), the main reason for the reduction in pig rearing by smallholder farmers was the lack of capacity and biosecurity resources to prevent the disease. In contrast, ASF did not have any negative impact on the herd size or meat production levels of large-scale commercial farms.³

2.7 Although the ICR stated that LIFSAP data showed a lower incidence of mortality because of ASF compared with the national rate of infection and mortality in 2019,⁴ two previous supervision reports emphasized that the epidemic is likely to negatively affect (or reverse) some of the outcomes achieved through the LIFSAP's interventions, not only at the household farm level but for the entire livestock value chain.⁵ The last supervision report from September through October 2019 stated that given the lack of an independent impact assessment, a methodology to help separate the pig herd size and mortality rates before and after the onset of the ASF was agreed to be used (World Bank 2019c, 2019d).

2.8 During the IEG mission in late 2022, authorities in MARD revealed that the nonproject-supported households were equally impacted by ASF (but with some delay), as previously warned by the World Bank in its supervision reports. Although no impact assessment was conducted by MARD, this information was monitored and provided by the provincial and district-level offices of MARD. MARD subsequently noted that according to the epidemic prevention and control regulations, if an area is declared epidemic zone, pigs are destroyed in households with infected pigs as well as in surrounding households, even when there are no infected pigs. This regulation thus obliged some project-supported households to destroy their pigs as well. However, MARD has not provided any recent figures on the ASF impact comparison between project- and nonproject-supported farmers.

Box 2.1. Good Animal Husbandry Practices for Smallholder Farms

The aim of good animal husbandry practices was to provide a standard for the production of pigs and poultry in the Vietnam Livestock Competitiveness and Food Safety Project areas. Good animal husbandry practices included all actions involved in the primary production and distribution of food products of agricultural origin and livestock to ensure animal health and welfare, food safety, and protection for the environment and the people who work on farms. The Livestock Competitiveness and Food Safety Project promoted the adoption of good animal husbandry practices in the project provinces by training livestock producers, extension workers, and livestock and veterinary staff.

There were 13 areas for implementation of good animal husbandry practices by household farms: (i) farm location (distance from the farm to schools, hospitals, residential areas, and so on) and water sources for animal husbandry and environmental treatment; (ii) layout of livestock area (design of farms, boundaries or fencing, entrance gates, and disinfection pits); (iii) housing and livestock equipment (housing design, feeding, and drinking systems); (iv) breed and livestock management (buying animals of known origins); (v) animal hygiene (equipment, people entering and leaving, and vehicles entering and leaving); (vi) management of feed and water in livestock (feed of traceable origin and water source); (vii) disease management (disease prevention plan and detection of an epidemic); (viii) waste management and environmental protection (location of waste concentration for collection and treatment of solid waste and liquid waste); (ix) animal and insect control (plan to control animals, rodents, and pests); (x) human resource management

(training of employees and emergency handling procedures); (xi) recordkeeping, traceability, and product recalls (keeping track of and storing information); (xii) self-check (organizing an internal inspection once per year); and (xiii) complaints and complaint handling.

Sources: World Bank 2014a, 2014b, 2019b.

2.9 GAHP adoption. Data collected by the project on GAHP adoption are not available because this indicator was not monitored.⁶ Therefore, to assess GAHP and biosecurity adoption levels, IEG prepared checklists and interviewed selected farms. However, because of the ongoing ASF pandemic, the IEG team was not allowed to visit most areas where pigs were kept (with two exceptions). Although the interviews revealed that farmers continued to apply GAHP practices after the project closed, the households visited (mostly leaders of the GAHP group) were generally the most technologically advanced in the project area. Thus, as a proxy for GAHP adoption, IEG used the sustainability of GAHP collective groups and cooperatives and the extent of GAHP certification renewal. This narrow information base suggested that sustained GAHP implementation in the project area was limited.

2.10 GAHP collaborative groups and cooperatives. LIFSAP established and supported GAHP collaborative groups and cooperatives (232 collaborative groups and 19 cooperatives)⁷ by providing small grants for monthly meetings. These groups and cooperatives were formed to sustain adoption of GAHP methods and develop productive partnerships with input providers and product buyers for better transactions. However, because of the ASF pandemic, many households had stopped keeping livestock, and the majority of respondents whom IEG visited reported that regular group meetings were no longer held. Local officials indicated that very few GAHP collaborative groups (mostly those established during the first phase) were still operating, and only 10 of the cooperatives were still working. MARD subsequently noted that as of the end of 2021, 40 percent of farmers working under the collaborative groups and cooperatives were not able re-herd.

2.11 IEG's discussions with stakeholders led to the conclusion that the inability of GAHP collaborative groups to function was primarily due to many farmers leaving the business because of ASF. In addition, IEG learned from stakeholder interviews that the benefits of collective activities may have been lacking or that they provided insufficient incentives for farmer participation. The degree of coordination, planning, and consumption of goods among GAHP members or cooperative groups was (according to information provided to IEG's mission by stakeholders) also influenced by the organizational capacity, managerial style, and financial potential of key participants (namely, leaders in the groups).

2.12 IEG also learned from MARD that it did not scale up the project-supported GAHP groups or productive partnerships in its extension programs, citing budgetary

and time constraints based on experience during implementation. It takes long lead time to create and nurture effective groups and cooperatives, and trust needs to be built among members. These groups also need to see benefits from collective action, and IEG observations show that the benefits are very much impacted by the capacity of the leaders in the group. Therefore, the development of such groups is a hard process, and gradual development is necessary. Although providing continued or additional support to GAHP groups could have helped economize on MARD outreach and extension costs, MARD did not favor this approach.

2.13 GAHP certification information. A total of 715 households received GAHP certification (officially called Vietnamese Good Agricultural Practices, or VietGAP) from the provincial Sub-Department of Animal Health by the end of the project. However, the number of households requesting certificate renewal since then was almost nil because smallholder farms primarily raise pigs and chickens for local markets in the commune, and it is likely that farmers had not recognized any immediate benefits from GAHP certification; as such, certification is not requested by the farmers' customers and buyers (that is, community slaughterhouses, wet markets, and consumers) in the local markets. Recertification is relatively expensive, and if it does not yield a somewhat better market price or more favorable market outlets for farmers, then incurring that cost cannot be justified by them. IEG learned that the only GAHP groups that recertify are those connected to modern outlets (such as supermarkets) because these actors require certification for food safety reasons. Currently, farm households must employ a private independent party and pay between 40 and 70 million dong (approximately \$170 and \$298, respectively) for a GAHP certificate, which is very expensive for small-scale farmers.

2.14 The LPZ is a geographical area in which pig and poultry farms are located. The purpose of the LPZ is to ensure that livestock production is concentrated only in these designated areas so that the animal diseases and animal waste can be managed more efficiently and effectively. The project planned to establish three pilot LPZs, but the project achieved only one. The LPZ supported by the project has been operating in Dong Nai since 2015. The project provided funding for infrastructure investments totaling more than \$788,000, including 3.7 kilometers of internal roads and a power line system with electrical substations. The project also delivered training sessions for livestock farmers in the LPZ on GAHP processes, group management techniques, disease reporting, livestock waste management, food safety, and pollution prevention. Two GAHP groups were established in the LPZ by the end of 2018, with a combined membership of 65 livestock farmers. A total of 20 farmers under one GAHP group received GAHP certification.

2.15 IEG was informed by local authorities that after the ASF outbreak (the impact of which was mainly experienced after the project closed), only 17 pig farms out of the 65 in the LPZ in Dong Nai (just 26 percent) were still in operation. According to the stakeholder interviews, many of the farms lacked the funds to re-herd after the ASF outbreak; thus, these households in the LPZ stopped raising animals. One livestock farmer in the zone who lost his pigs stated that he had no money left to continue his business and was thinking of leaving farming altogether. IEG observed that all the structures financed by the project (barn and biodigester) on this farm were left idle.

2.16 IEG discussed with many stakeholders the characteristics of the LPZ model; the following common issues were raised in these discussions:

- The recent ASF outbreak demonstrated that such a situation is difficult to withstand epidemiologically and prevent the spread of infections when small farms are close to one another. When establishing an LPZ, one key concern is how to monitor and regulate animal density in the area given the presence of numerous farms that raise various animal species. The 2018 Law on Animal Husbandry states that only the locations where animal production is forbidden are subject to control. There are no rules on animal density for regions where keeping livestock is encouraged. Access to better roads, power, and water supply in the LPZ led to increased demand for land, higher land values, and consequently a greater intensity of land use in these areas, as well as to increased population density (including animals). This shift made disease control even more difficult.
- The LPZ model did not include the concept of biosecurity compartmentalization, according to the World Organisation for Animal Health, although this type of biosecurity is essential for such zones. IEG learned that the concept of an epidemic-free animal husbandry zone was recently developed by the government, which will apply strict biosecurity rules according to international standards for export-oriented production by larger livestock farms, mainly arranged by or funded by the foreign direct investment corporations.⁸
- Another challenge for LPZ is waste management, as waste has the potential to be a major source of pollution. Animal concentration increases the risk to air, land, and groundwater pollution. The likelihood of bacteria and other organisms entering surface water rises with the density of animals in these areas, therefore increasing the likelihood of disease outbreaks. Although the project supported common waste management facilities, in addition to farm-level waste management methods (for example, central lagoon and pipe systems), no

evidence was generated by the project with which to evaluate the effectiveness of these systems.

2.17 Despite the previously mentioned challenges and technical risks of the LPZ concept, the government is planning to implement a similar model by moving livestock households in residential areas to zones similar to LPZs.⁹

2.18 **Market linkages and product brands.** The market linkages of pig and poultry production in Vietnam are still poorly structured, there are no formal independent market forecasts, and the majority of farmers still rely on dealers and intermediary clients. Strong and sustainable market linkages are mainly associated with large farms.

2.19 The IEG mission found that the results for market linkages were mixed. At project closing, some formal marketing connections had been established, but there was no indication that new linkages or brands were formed after the project closed; rather, many that had been formed were lost, in parallel with the dissolution of GAHP groups and cooperatives. According to the LIFSAP Project Coordination Unit, at project closing in June 2019, the project had supported 30 product brands throughout 12 project provinces.¹⁰ However, no current evidence could be obtained on how many brands were sustained after project closure.

2.20 The IEG mission's site visits revealed some remaining market connections:

- In Dong Nai, the MM Mega Market connected with small household farms as a result of the personal efforts of staff in the provincial Department of Agriculture and Rural Development to inform the company about LIFSAP support for small-scale livestock farmers in the area. The market has technical workers to assist and monitor GAHP groups in Dong Nai.
- In Thai Binh province, contracts were signed with supermarkets, thermal power plants, and schools, but none of these contracts have been implemented since the ASF outbreak in 2019. Currently, only one GAHP group in Dong Kinh commune supplies meat to schools.
- Several cooperatives in Hai Phong province (including Chieu Vien Livestock Cooperative and Bao Quan Cooperative) have good connections to Co.opmart and Big C supermarkets. The Department of Agriculture and Rural Development reported that during the project's implementation phase, four branded value chains were established for market connections in Hai Phong, and three of them are still operating.
- Two slaughterhouses visited by IEG worked with GAHP households to provide meat to businesses in industrial zones or educational institutions.

2.21 **Institutional support for animal health and veterinary services.** The project provided institutional support for animal health and veterinary services, with a focus on improving disease surveillance and prevention, meat inspection, and monitoring of zoo sanitary and food safety data. In addition, the project trained over 4,600 agricultural and veterinary extension workers in GAHP standards and certification, livestock waste management, and food safety. This support was coupled with the modernization of equipment, financing of livestock breed and feed monitoring, and disease surveillance capacity, contributing to enhanced veterinary and extension services.

2.22 Although stakeholders expressed satisfaction with the institutional support provided by the World Bank, no specific indicators were monitored to assess the World Bank's impact. In addition, it is challenging to isolate the effect of the World Bank's support from that of other donors that provided similar support or from the earlier avian influenza projects financed by the World Bank.¹¹

2.23 In response to the growing threat of ASF outbreaks in the swine industry, MARD's Department of Livestock Production enacted Decision No. 205 in November 2021 to establish rules for biosecurity farming processes to prevent ASF in small- and medium-size swine farms and households. However, according to experts, these measures are unlikely to be sufficient to prevent the spread of the disease without a vaccine.

Reducing Environmental Impacts of Livestock Production, Processing, and Marketing

What Worked and Why?

2.24 **Slaughterhouses.** The project helped improve the quality of wastewater from supported slaughterhouses by treating it before discharging it into the environment, thereby reducing environmental pollution. The volume of wastewater processed at these slaughterhouses was estimated to be 2,171 cubic meters per day (with 373 slaughterhouses receiving funding to update their wastewater treatment systems). Following the upgrade, the wastewater situation at the slaughterhouses greatly improved. About 77 percent of the measured indicators for pollution in a random sample of slaughterhouses satisfied the environmental sustainability standard (QCVN 40) of the government at project closing.

2.25 **Wet markets.** The project also supported 572 wet markets and improved their waste and wastewater treatment, leading to a 100 percent improvement in water quality after the upgrade, as reported by the ICR. However, IEG learned that in some cases, markets struggle to maintain water treatment systems, leading to difficulties in maintaining pollution-reduction levels.

What Didn't Work and Why?

2.26 **Biogas technology at the farm level.** The management of animal manure in Vietnam is a critical issue due to the estimated annual volume of 85–90 million tons. Various methods are used to manage animal waste, including composting, biogas production, and the sale of solid manure as organic fertilizer. The use of these methods has helped reduce environmental pollution and provided additional benefits,¹² such as the production of gas for cooking and fish feed. Biogas technology has been widely adopted by small-scale livestock farmers in Vietnam, with approximately 700,000 biodigesters in use.¹³ The project supported the establishment of 17,493 biodigesters and 1,608 composting facilities on 18,030 farms, some of which had both tools. In addition to providing a source of daily gas for cooking, the biogas digesters have contributed to the reduction of environmental pollution caused by animal waste. Monitoring of five pollution indicators revealed that all biogas digesters reduced the pollution level of livestock wastewater after implementation, although no data were available on pollution-level improvements at project closing or during IEG's mission to Vietnam for this PPAR.

2.27 The results of the application of biogas technology for the household farmers is mixed. Although biogas technology is a proven method for treating pig waste, its current relevance for smallholders is limited due to various shortcomings. Most systems produce an excess amount of gas that is not needed for cooking and is often burned off or released into the environment. With rising incomes, farmers are less inclined to use biodigester gas for cooking due to its hazardous compounds. In addition, gas purification technology is insufficient, leading to higher levels of harmful compounds, and equipment maintenance is often neglected, resulting in a short life span and low economic efficiency. High-quality generators are also costly and must be imported, making it less appealing to install biogas generators for electricity production.

2.28 In addition, because of increasing demand for organic fertilizers in Vietnam, many farmers have shifted away from biogas technology and embraced composting as the main manure management solution, including the use of biological padding, such as a biological mattress and a floor barn. IEG's mission learned that some larger farms generate gas only from liquid waste and sell the manure to businesses that produce organic fertilizer (which provides a good source of income).¹⁴ Overall, the technology is not of interest to farmers anymore, except in remote areas with no access to electricity, due to the gas being used for cooking only and a growing demand for organic fertilizer as a better income source for farmers.

Improving Food Safety in Livestock Product Supply Chains and Markets

What Worked and Why?

2.29 **Farm level.** At project closing on farms, the results of food safety monitoring in project GAHP areas of seven provinces (based on 204 pork samples from GAHP households) showed that 100 percent of meat samples were negative in tests for chemical contamination; the samples contained neither hormones nor any banned substances. The same held true for animal feeds when they were tested for hormones and banned substances. However, no current data were available during IEG's mission.

2.30 **Wet markets.** LIFSAP supported improving food safety in 572 wet markets by financing upgrading of buildings, providing sales tables with access to water and electricity systems, and offering guidance to vendors and market boards on periodic disinfection. Market management boards from all 5 wet markets visited by the IEG mission expressed satisfaction with the project's support for upgrading the facilities and improving hygienic conditions.

2.31 The successful operation and maintenance of wet markets depend on the performance of the market management board. The market has a charter that mandates the management board to operate it efficiently and supervise hygiene, but the IEG mission learned that the effectiveness of fee collection from vendors and using them for market maintenance varies. In some cases, markets struggle to maintain water treatment systems, leading to difficulties in maintaining pollution-reduction levels.

2.32 During the mission, IEG visited five meat markets in four project provinces: Binh Dien Wholesale Market in Ho Chi Minh City; Viet Hung market, Viet Hung commune, Vũ Thu district, Thai Binh; Vũ Quý market, Kien Xuong, Thai Binh; Dau Giay market, Dau Giay Town, Thong Nhat District, Dong Nai; and Ben Pha Market, Bac Son commune, Kien An, Hai Phong. Except for wholesale markets, local slaughterhouses supply the meat sold in these traditional markets, which have newly built steel-framed, corrugated iron roof meat stalls.

2.33 The upgraded food markets supported by the project are still operating effectively, contributing to ensuring food safety for consumers, except for the Dau Giay market, where vendors complained about deteriorating conditions and some traders sold pork and poultry outside the market. The wet market management boards reported better control over meat sold in LIFSAP-supported markets. The provinces visited by the IEG mission appreciated the project's contribution to improving hygiene and food safety and reducing environmental pollution. Especially, Hai Phong and Dong Nai consider these aspects the most outstanding contributions of the project. The Ministry of Industry

and Trade followed a similar approach in upgrading 62 large wet markets under its monitoring.

2.34 Food safety data for wet markets. According to MARD, at the end of the project, food safety monitoring found that approximately 90 percent of pork samples met the requirements for microbial contamination (E. coli and salmonella) at the upgraded markets, whereas for chicken, about 75 percent of samples met the requirements on E. coli criteria and 92 percent met the salmonella criteria. However, there were still some issues with appropriate equipment and potential risk of microbiological contamination of meat traded in upgraded markets. To address these concerns, recommendations, guidance, and monitoring are being provided to implement mandatory operating procedures and improve food safety in coordination with minimum standards established by local authorities, market management boards, and the subdepartments of animal health.

2.35 In Thai Binh, the Sub-Department of Agro-Forestry Product Quality Management conducted 324 samples to test for food safety monitoring at the retail wet markets supported by the LIFSAP project between 2019 and 2021. All monitoring indicators were negative.

2.36 Food safety and hygiene sample tests by MARD at markets in Hai Phong between 2019 and 2021 showed that the percentage of samples meeting standards was higher at wet markets supported by LIFSAP than at those outside the program. For example, the carcass samples at LIFSAP markets met the standard for total aerobic bacteria count at 35.5 percent, whereas non-LIFSAP markets had a count of 12.9 percent.

2.37 Slaughterhouses. Although food safety figures were not reported for slaughterhouses by LIFSAP, the ICR mentioned that at the end of the project, slaughterhouses had shown a reduced and low microbial contamination on carcass samples and slaughter tools. A total of 30 slaughterhouses supported by LIFSAP received the highest rating available on the veterinary industry's evaluation scale: grade A from the project provinces' subdepartments of livestock and animal health. More detailed evidence on food safety improvements for similarly upgraded slaughterhouses can be found in the literature on this topic. A study by Dang-Xuan et al. (2019) found that the prevalence of salmonella on pig carcasses in slaughterhouses was 38.9 percent. The study identified that the risk factor for carcass contamination was the slaughter area being close to lairage without hygienic procedures. According to the study, before the slaughterhouse upgrades, only between 3.6 and 7.3 percent of samples of tools at the facility and during transportation met the standards for microbial contamination. The indicators on infection improved significantly after the improvement of the operation,

and the percentage of samples that met the standards for all indicators increased to 67.7 percent after the upgrade.

What Didn't Work and Why?

2.38 **Slaughterhouses.**¹⁵ The project aimed to enhance the operations of 373 slaughterhouses in 12 project provinces, including 70 medium- and large-scale facilities that processed over 30 pigs per day and 303 small-scale facilities that processed between 10 and 30 pigs per day. The project provided these slaughterhouses with upgrades, equipment for safe and hygienic slaughtering, and training. At the end of the project, 257 slaughterhouses located in the project communes served as the primary point of contact for purchasing pigs and chickens from GAHP households. However, these slaughterhouses supply meat to the local market without cooling systems and hence sell "hot meat," which is subject to rapid deterioration and loss of value.

2.39 Although the project has upgraded 303 small-scale slaughterhouses, there are still issues with them. The number of GAHP farmers participating in the project is small; therefore, there are not enough inputs from GAHP farmers to supply the small slaughterhouses upgraded by LIFSAP. Slaughterhouses in general have been mixing all types of farmer inputs (GAHP and non-GAHP); thus, differentiating GAHP products is impossible. In addition, some slaughterhouses mix various types of livestock as a result of low supply from certain types of animals. These slaughterhouses are not monitored by MARD. Moving toward larger central slaughterhouses is planned by MARD, but a traceability mechanism is also required to achieve food safety monitoring along the value chain.

2.40 The IEG mission for this PPAR discovered that some slaughterhouses had reduced their capacity or closed their operations, partially because of COVID-19, but mainly as a result of ASF (for example, 2 slaughterhouses visited by IEG were working only at 25 percent capacity). However, the exact number of closed small slaughterhouses could not be obtained because these small establishments are not monitored by MARD. This information could be obtained for Dong Nai only, and there, out of 30 small slaughterhouses supported by the project, 3 establishments were closed due to a lack of supply from the communities. The project provided training on hygiene and food safety practices to slaughterhouses, but these trainings need to be repeated several times because the level of application of these practices varies among slaughterhouses.

Project Design and Preparation

What Worked and Why?

2.41 **Bundling of three objectives for complementarity and thorough coverage of issues along the value chain.** The project included three core objectives of improving productivity, food safety, and environmental mitigation. This anticipated the emphasis that would be given in the government's 2013 Agricultural Restructuring Plan to move beyond output targets to simultaneously pursue economic, environmental, and social goals at the sectoral and subsectoral levels. This bundling of objectives helped the project cover the interfaces and realize complementarities among them. Furthermore, this approach was associated with or actualized through the project's value chain approach.

2.42 **Value chain approach.** The project design included a value chain approach by targeting the entire chain; this was innovative in a sense because it was the first project that covered farmers, processors, and wet markets associated with smallholder livestock production. The design relied on the understanding that safely raised animals can still result in contaminated meat if there are suboptimal slaughter or hygiene practices at later stages of the supply chain and that renovating market stalls will not result in safe meat if farmers are abusing the use of antibiotics when raising the animals. Given the scarcity of modern retail markets in Vietnam, value chain approaches seldom tackled domestic food safety problems in the country. One initiative may have targeted vendors while another targeted slaughterhouses, perhaps with different institutional sponsors. Thus, the project's approach of addressing the issues of various actors along the chain was sound.

2.43 **Market linkages.** Although the project did not include market linkages in the PDO, marketing aspects were included in design during the additional financing phase, with the introduction of the group and cooperative approach as the medium for livestock production and marketing for small households. The assumption was that collective farmer groups would establish market linkages because small livestock holders are typically part of informal chains that supply products to local middlemen or small local processing facilities. Formal value chains can deliver better-quality products from larger farms or organized groups of smallholder farmers to commercial wholesalers or supermarkets. These formal chains ensure that contracted smallholder farmers follow adequate GAHP techniques, providing extension services and inputs and ensuring product safety and a consistent level of quality.

What Didn't Work and Why?

2.44 **Market linkages.** The market linkages aspect was not incorporated as part of the results framework with PDO and intermediate outcome-level indicators and specific activities targeting various stakeholders to form linkages along the value chain. For example, awareness-raising activities for commercial buyers to establish linkages to smallholders could have helped form sustainable and formal linkages. In Dong Nai, the MM Mega Market established linkages with smallholders with the encouragement of MARD's provincial directorate. However, such an activity could have been included as part of project design to expand formal connections.

2.45 **GAHP collaborative groups.** Establishment of GAHP groups to sustain adoption and form linkages to input providers and markets was an innovative idea for Vietnam; however, the majority of the GAHP groups (collective and cooperatives) disbanded, and ASF played a significant role in groups breaking apart. Another factor—the reluctance of farmers to form new groups because of trust issues and other challenges—was initially mitigated via the provision of subsidies to these groups; however, when the project was closed, the groups did not see increased benefits from collective action. To address this issue, the project design could have devoted more attention to establishing formal market linkages or started with proven, existing groups formed for water management or crop sales, so that the group members would see benefits to sustain their collective action.

2.46 **Communication strategy and food traceability mechanism.** It is important that the projects related to food safety have a communication component and interventions to build food safety traceability systems. This is crucial because changes in consumer perceptions of food safety have an impact on food demand and, hence, on the behavior of the other actors in the food supply chain—namely, producers, slaughterhouses, and markets. Thus, the desire for safe meat is certainly driven by customers in the retail market who play a significant role in determining the outcomes of meat value chains. Evidence-based food safety risk communication through collaboration with key players, especially consumers, is important because consumers' choice of food can be affected by communication and information. The lack of such a consumer pull mechanism led to reduced incentives for the producers and processors to sustain GAHP and biosecurity practices. Food traceability is also key to effective monitoring of the value chain down to the production stage, and the lack of traceability systems reduced the ability to monitor and adequately address food safety risks along the food supply chain.

2.47 **Stringent biosecurity regulations and compensation mechanisms.** More simplified biosecurity regulations were developed and applied to small-scale livestock farmers, but the project experience showed that these were not sufficient, and more strict

regulations on biosecurity that apply to large commercial farms need to be applied to small-scale farmers and processors. In addition, sustainable disease control capacity requires the establishment of a compensation mechanism to adequately reimburse farmers if they lose their livestock because of diseases. Lessons from avian influenza projects show that compensation mechanisms for culled animals have proven to be a critical element in encouraging farmers to report outbreaks and allow their animals to be culled, rather than trying to sell their sick livestock and spreading the disease (World Bank 2014c). Compensation is also extremely important to small-scale livestock farmers because livestock is often their main source of income. As a result of the recent ASF, many farmers lost their livelihoods (about 1 million small-scale famers stopped rearing pigs). The IEG mission was informed that the government provided some compensation for ASF (only part of the value of loss), but solely to the farmers who had registered their livestock; therefore, many farmers missed this opportunity (actual numbers, however, could not be obtained). Providing capacity building by the project on a sustainable compensation system could have been helpful.

3. Lessons

3.1 This assessment offers several lessons.

3.2 Collective group formation by small-scale livestock producers to sustain GAHP adoption is not likely to work unless long-term external support is provided through training and strong economic incentives via formal market linkages for farmers' products. The project supported collective group and cooperative formation via the provision of training and subsidies. Nevertheless, the project did not establish any specific activity providing market linkages and left formation of market linkages to collective groups' initiation. However, many GAHP groups split up after the project closed, mainly because of the ASF outbreak but also because of a lack of economic benefits derived from working as a group. Thus, it is essential for productivity-enhancing interventions to be complemented by interventions that link farmers to markets.

3.3 Sustainable livestock disease control requires the enforcement of strict biosecurity measures and a permanent availability of resources for compensation. The ASF outbreak led to many project-supported farmers (including small-scale pig farmers who were not part of the project) losing pigs and, therefore, their livelihoods. However, large-scale pig farms were relatively immune from the ASF outbreak. Because project interventions included biosecurity measures for small-scale farmers, they were clearly insufficient for protecting against a disease such as ASF, for which there is no vaccine. The lesson from the project is that there is a need for more stringent biosecurity

measures on small-scale pig farms. Adequate compensation mechanisms to support farmers during such outbreaks may also be necessary.

3.4 The LPZ model has a lower chance of keeping the areas disease free if small-scale farms exist in proximity without control of animal density and strict biosecurity measures or the possibility of vaccination against major diseases. The project piloted one LPZ, but the experience was not positive. Project support on infrastructure in the zone led to many farmers moving to the area, resulting in an increase in livestock density. The impact of ASF in the LPZ was very damaging to farmers' livelihoods, as most of the farmers (74 percent) in the zone lost their animals to the disease despite biosecurity measures. Conversely, there was an insignificant death rate of chickens in the LPZ because they had been vaccinated against avian influenza. The lesson is that the LPZ model is more likely to work if animal density is controlled, strict biosecurity rules are implemented according to international standards, and vaccines against major livestock diseases are available.

3.5 The use of biodigester technology by small-scale livestock farmers is beneficial for improving livestock waste management, but its economic viability depends on the extent of connectivity with the public grid and the price of grid electricity. Under the project, the biogas produced by farmers was used for cooking only because state-supplied electricity was more affordable. In addition, the amount of biogas produced was far greater than what was needed for cooking because the farms supported by the project were larger than subsistence farms (with an average herd size of 25–40 pigs). IEG interviews showed that most of the gas produced by farms was burned off and released into the environment, with only a small percentage used for cooking. Thus, when grid electricity is affordable and accessible, using electricity from the national grid—combined with environmentally viable livestock waste composting—is likely to be more economically viable than establishing biodigesters.

¹ According to the Project Appraisal Document (World Bank 2009b), good animal husbandry practices would introduce more effective disease control, improved feed quality through truth of labeling, household recordkeeping, farmer organizations, better extension, contract veterinary services, animal traceback to track disease, capacity building in livestock production, veterinary services, small-scale farmer skills, regulatory reviews and enforcement of feed and meat quality, and improved slaughter and meat marketing facilities. All of these elements would combine to create a sustainable infrastructure that would increase household incomes and competitiveness.

² The project supported a pilot program to test the effectiveness of the livestock production zone approach by providing incentives to livestock producers to relocate from urban to rural areas to reduce pollution and human health risks. The pilot livestock production zones would also test

the effectiveness of improved biosecurity measures and increased veterinary services as a mechanism to increase the productivity and competitiveness of the household livestock production system. In addition, the livestock production zones would pilot improved livestock waste management and environmental protection procedures. According to the Project Appraisal Document (World Bank 2009b), in Thailand, the production of pigs and poultry has shifted to areas away from densely populated Bangkok to the northeastern region. Similarly, through the strategic location of slaughterhouses in production areas, the government of Brazil has reduced livestock pressure around the major urban centers. Key challenges for these zones include the sustained enforcement of strict biosecurity standards and adequate spatial distribution to areas with a low livestock density.

³ Essentially, large companies have increased the size of sows and fattening pigs. Counting only 16 large-scale companies, in the first month of 2021, the number of breeding sows increased by over 30 percent, and the population of fattening pigs increased by 71 percent, compared with the time before the African swine fever epidemic (that is, January 1, 2019). These farms have more stringent biosecurity levels even above the requirements of the Vietnamese good animal husbandry practices certification.

⁴ The Implementation Completion and Results Report stated that “[Livestock Competitiveness and Food Safety Project] data showed lower incidence of [African swine fever] infections in pigs that have been reared by the [good animal husbandry practice] farmers compared with the average national rate of infection and mortality of pigs due to [African swine fever] infection. For example, data collected in Hanoi, in early October 2019, indicated that the percentage of [African swine fever]-affected households applying [good animal husbandry practices] was lower (21.3 percent) compared with the overall percentage (38.9 percent). Also, the livestock planning zone developed by the [Livestock Competitiveness and Food Safety Project] remained free from the infection at the time of project closing” (World Bank 2019b, 24).

⁵ The aide-mémoire from April 2019 stated that “since its entry to Vietnam in February 2019, [African swine fever] has spread rapidly with nearly 100 [percent] fatality. Moreover, [African swine fever] virus is one of the highly resistant viruses that can live in pig, in cooked (< 70 degree [Celsius], < 30 [minutes]) or uncooked pork products, wastes (blood, feces, tissues) and in the contaminated environment between 11 days and more than 33 months. Thus, in the absence of any vaccine to induce immunity in pigs against [African swine fever], increased biosecurity combined with stamping out infected pigs and those pigs that have been exposed to the virus ([for example,] came in contact with the infected ones, suspected) remain[s] the main means to control the outbreaks. Such measures, on top of morbidity and mortality, have a tremendous impact not only on farmers’ livelihood but also on the pig value chain as a whole. The impact is likely to last. Failing to contain the disease soon is likely to have a strong negative impact on the country’s economy and jeopardizes the achievements of the [Livestock Competitiveness and Food Safety Project project development objective]. Vietnam’s livestock industry is in the hand of householders; about 70 [percent] of total livestock products come from smallholders. For poor households, livestock is a major source of food and a means to save and accumulate capital” (World Bank 2019c, 9).

⁶ The project monitored farmers adopting improved agriculture technology that included good animal husbandry practices, biosecurity, and manure management techniques. No specific indicator was designed specifically for each type of technology. In addition, it was not clear how adoption was defined and measured.

⁷ The following criteria were used to decide which households would be allowed to take part in the project: households whose primary source of income was from livestock, with willingness to join and adherence to project guidelines, and households that have a background in raising animals. In the first and second phases, some 9,000 and 11,000 households, respectively, were chosen. Among the project provinces, there are also significant differences in the volume and pattern of livestock production and management. As an illustration, the scale of household pig production in Dong Nai was 40 to 200 heads per household; in Thai Binh or Hai Phong, it is 10 to 40 heads, and in the mountainous province of Cao Bang, it is 6 to 15 pigs.

⁸ The Independent Evaluation Group was informed that the International Finance Corporation currently supports three groups to set up an epidemic-free zone and disease safety zone. According to Article 8 of the 2018 Law on Animal Husbandry, epidemic-free animal husbandry zones must satisfy the requirements on animal epidemic-free zones prescribed by Vietnam's Law on Animal Health and relevant provisions of international law. They must also be suitable to conditions of different ecoregions and regional advantages associated with product preservation, processing, and sale. The building of epidemic-free animal husbandry zones is particularly important for the negotiation and conclusion of agreements on the export of animal husbandry products. These zones must be built in conformity with socioeconomic development primary plans, as well as plans and schemes for the development of epidemic-free animal husbandry zones approved by provincial-level people's committees. The Ministry of Agriculture and Rural Development will set out criteria for and recognize epidemic-free animal husbandry zones.

⁹ The Law on Animal Husbandry that took effect on January 1, 2020, bans livestock production in residential areas. Thus, to ensure livelihoods for livestock households, many provinces—including Hanoi, Vinh Phuc, Thanh Hoa, Nghe An, Thai Binh, Binh Duong, Tay Ninh—have been planning a model similar to the livestock production zone.

¹⁰ Examples include the brand Soc Son Hill Chicken of the US-Hanoi food processing joint stock company, A-Z Clean Pork of the Hoang Long Cooperative in Hanoi, herbal pork of the Sieu Viet Cooperative in the province of Hung Yen, or the An Ha clean food chain in Ho Chi Minh City, among others. In addition, major retail chains such as MM Mega Market, Co.opmart, Vingroup, and Rossy have also signed long-term purchasing agreements for good animal husbandry practice cooperatives, particularly in the southern provinces, acknowledging the quality of the Livestock Competitiveness and Food Safety Project's products; these brands are still being maintained today.

¹¹ Some other donors working on institutional support include the Food and Agriculture Organization, the International Livestock Research Institute, the Japan International Cooperation Agency, and the Australian Centre for International Agricultural Research.

¹² Five indicators that reflect the pollution level of animal wastewater are biochemical oxygen demand, total suspended solids, total nitrogen, total phosphorus, and coliform.

¹³ About 500,000 biogas digesters for smallholder farms were supported by various projects and agencies, such as SNV, sponsored by the Netherlands Development Organisation; the Quality and Safety Enhancement of Agricultural Products and Biogas Development Project, sponsored by the Asian Development Bank; and the National Biogas Programme.

¹⁴ Organic manure is sold by farmers for 15,000–20,000 dong per bag on average (\$0.65–0.85).

¹⁵ According to Article 76 of the Law on Animal Health, people's committees at the district level shall be responsible for (i) coordinating with relevant divisions for the development of planning on centralized animal slaughtering; and (ii) managing activities of centralized slaughtering, preprocessing, processing, transportation, trading of animals, animal products, and veterinary hygiene in the local area. Regarding management of smallholder-based slaughterhouses, according to Point b, Clause 3, Article 76 of the Law on Animal Health, commune-level people's committees are responsible for (i) coordinating with competent agencies to manage centralized animal slaughtering, preprocessing, processing, transportation, trade of animals, animal products, and veterinary hygiene on the local area; and (ii) managing scattered smallholder-based slaughtering activities.

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Appendix A. Ratings

Vietnam Livestock Competitiveness and Food Safety Project (P090723)

Table A.1. ICR, ICR Review, and PPAR Ratings

Indicator	ICR	ICR Review	PPAR
Outcome	Satisfactory	Satisfactory	Moderately unsatisfactory
Bank performance	Satisfactory	Satisfactory	Moderately satisfactory
Quality of monitoring and evaluation	Modest	Modest	Modest

Sources: World Bank 2019, 2020.

Note: The ICR is a self-evaluation by the responsible Global Practice. The ICR Review is an intermediate Independent Evaluation Group product that seeks to independently validate the findings of the ICR. ICR = Implementation Completion and Results Report; PPAR = Project Performance Assessment Report.

1. Relevance of the Objectives

Objectives

The project development objective (PDO) was “to increase production efficiency of household-based livestock producers, reduce environmental impact of livestock production, processing and marketing, and improve food safety in livestock product supply chains (mainly meat) in the Project Provinces” (World Bank 2009a, 5). This objective was not revised during implementation.

Relevance of the Objectives

When the project was prepared, the project objective was well aligned with the government’s 2008 strategy for the development of the livestock sector and 2003 Ordinance on Food Hygiene and Safety that had the objectives to meet the increasing demand for safe, quality meat and improve the conditions for household livestock producers to expand from more small-scale “backyard” production to a more intensive, commercial production. The objectives were also directly linked to the 2008 strategy’s key components of livestock disease control, food safety, and enhanced livestock waste treatment. At project completion, the project objectives remained highly relevant to the government’s development priorities of a sustainable and competitive agriculture and livestock sector. These objectives were supported by the 2011–20 Socio-Economic Development Strategy and the 2016–20 Socio-Economic Development Plan, which aimed to develop “a new environmentally sustainable growth model based on improved productivity and competitiveness, and investments in infrastructure development” (World Bank 2019, 16). The project objectives continue to be aligned with the

government's food safety concerns, outlined in the 2011–20 Food Safety National Strategy and Vision 2030 approved by the prime minister in 2012.

At appraisal, the project objectives were also strongly linked to the World Bank's Vietnam Country Partnership Strategy for fiscal years 2007–11, particularly to pillar 1 (improved business environment) by strengthening the competitiveness for household livestock producers and slaughterhouses; pillar 2 (strengthening social inclusion) by making basic services accessible to rural smallholder livestock producers; and pillar 3 (strengthening natural resource and environmental management) by introducing livestock producers, slaughterhouses, and meat markets to waste treatment technologies to reduce environmental pollution. At completion, the PDO remained aligned with the current Country Partnership Framework for fiscal years 2018–22 and its three focus areas of (i) enabling inclusive growth and private sector participation (which includes the promotion of private sector participation and agribusiness development and enhancement of trade competitiveness for the agriculture sector); (ii) investing in people and knowledge (which includes the reduction in malnutrition and improved access to health services); and (iii) ensuring environmental sustainability and resilience (which includes the reduction in greenhouse gas emissions and strengthened natural resource management).

The Implementation Completion and Results Report (ICR) and the Implementation Completion and Results Report Review both rate relevance as **high**—a judgment with which the present assessment concurs.

2. Efficacy

Objective 1: Increase the production efficiency of household-based livestock producers.

The project established the following indicators to measure the extent to which the objective was achieved:

1. Livestock mortality rates reduced (percent of pigs and chickens): achievement was as follows: for pigs, 10 percent against the target of 10 percent and for chickens, 13.9 percent against the target of 29 percent.
2. Livestock fattening times shortened (days for pigs and poultry): achievement was as follows: for pigs, 116 against the target of 116 days, and for chickens, 56 against the target of 56 days.
3. The number of pigs and birds per herd and per flock, respectively, increased (number of pigs and chickens): achievement was as follows: for pigs, 40 against the target of 40, and for chickens, 1,826 against the target of 1,800.

Although the project met or exceeded these indicator targets at project closing, the Independent Evaluation Group (IEG) Project Performance Assessment Report mission found that the livestock sector in Vietnam had been going through challenging times since 2019 (when the project closed) and that the households engaged in pig rearing declined dramatically due to African swine fever (ASF), which was most virulent during 2019 and 2020. According to the General Statistics Office, pig-farming households decreased from about 3 million in 2019 to over 2 million in 2021—a decrease of about 33 percent. In 2019 alone, about 21 percent of the total pig population was dead and culled due to the disease. In some provinces, such as Thai Binh and Hai Phong, which were visited by the IEG mission, more than 50 percent of the pig population was lost in 2019 (see appendix D for additional data). The IEG team was informed that small-scale livestock farmers not supported by the project were equally impacted by the disease. The reason for the reduction in the pig population by smallholder farmers was a lack of capacity and biosecurity resources and services to prevent the disease.

Regarding the poultry sector, the project supported 638 poultry farmers, and the IEG mission was informed that almost all of them are still in business. Although avian influenza cases have been detected in Vietnam (see appendix D), the impact of avian influenza was minimal for these farmers because the birds were vaccinated (which is the most crucial element in avian influenza prevention).

Good animal husbandry practices implementation and certification. The ICR did not provide information on the adoption of good animal husbandry practices (GAHPs) but stated that 715 livestock producers were GAHP certified (and 232 collective GAHP groups and 19 cooperatives were established). The IEG team found that most of the GAHP groups formed were not working anymore (the number of collective groups is not known, but for cooperatives, only 53 percent of the established cooperatives are currently operating). In addition, renewal of GAHP certification is limited to those farmers with linkages to supermarket chains. However, even with supermarket connection, this did not prevent farmers from being impacted by ASF. Farms that had adopted GAHPs could not protect themselves against a disease such as ASF when no vaccine is available.

Livestock production zone (LPZ) pilot. The project implemented one pilot (designed as an enhanced GAHP zone) to demonstrate that geographical concentration of the livestock activities enables higher efficiency (for example, ease of extension and veterinary services, common waste management approaches, GAHP on a deeper basis in all participating farms, animal health activities across the livestock population). However, the IEG team was advised that due to the ASF outbreak, only 17 farms out of 65 farms remained in business. The impact of the disease was even more severe in the

pilot LPZ due to the intense concentration of animals, and biosecurity procedures were not designed according to international standards for such zones.

Although the project improved household-based livestock production at project closing by reducing mortality rates, shortening fattening periods, and increasing herd and flock sizes, after the project closed, the GAHP and biosecurity arrangements that the project had developed and diffused did not provide small-scale pig producers with adequate protection against ASF. This resulted in a significant loss of pigs and a negative impact on the livelihoods of small-scale farmers and the processing sector.

Considering these shortcomings, and the point of view in IEG evaluations that the expected outcomes beyond a project's close and the actual outcomes are taken into account, the achievement of objective 1 is rated as **negligible**.

Objective 2: Reduce the environmental impact of livestock production, processing, and marketing.

The project established the following indicators to measure the extent to which the objective was achieved:

1. Households supported by the project with lessened adverse environmental impact from their production (achievement was 25,172 households against the target of 25,000)
2. Small slaughterhouses supported by the project with lessened adverse environmental impact from slaughtering (achievement was 303 slaughterhouses against the target of 310)
3. Medium- and large-scale slaughterhouses supported by the project meeting national environmental standards (achievement was 70 slaughterhouses against the target of 40)
4. Wet markets supported by the project meeting national environmental standards (achievement was 572 against the target of 500 markets)

5. Manure management at the farm level: To reduce negative impact of livestock production, the project supported 17,493 households on construction of biodigesters and 1,608 households on composting pits. IEG found that, with the impact of ASF and many farms not re-herding, most of the biodigesters are not being used; this is also the case because the biogas produced is not used for electricity but just for cooking, and many farmers do not like to use it for that because the gas includes some hazardous chemicals. In addition, the required maintenance of these systems after about five years often does not happen, reducing their economic efficiency. Thus, many livestock farmers now prefer composting pits and the sale of organic fertilizer because it is a good source of income.

Slaughterhouses. The project has contributed to improving the quality of wastewater of the supported slaughterhouses after it moves from treatment to the environment, thereby reducing environmental pollution. The volume of wastewater processed at these slaughterhouses is estimated to be 2,171 cubic meters per day, with 373 slaughterhouses receiving funding to update the wastewater treatment system. Following the upgrade, the wastewater situation at the slaughterhouses greatly improved. About 77 percent of the measured indicators in some slaughterhouses, according to sampling results, satisfy national technical regulations (QCVN 40) on industrial wastewater.

Regarding medium- to large-scale slaughterhouses that are monitored by the Ministry of Agriculture and Rural Development, 30 slaughterhouses received the highest rating. Pertaining to the small-size slaughterhouses, IEG learned that due to lack of supply, some slaughterhouses either reduced capacity or closed down operations, or some slaughterhouses mixed their inputs from non-GAHP households or mixed types of animals. IEG also learned that while the project provided training to slaughterhouse staff on hygiene and food safety practices, these trainings needed to be repeated several times because the level of application of these practices varied among slaughterhouses.

The IEG mission visited a smallholder-based slaughterhouse in Thai Binh province. The facility was upgraded by the Livestock Competitiveness and Food Safety Project in 2016; the project financed some equipment along with training. The project supports a stainless-steel table instead of dissecting on the floor as before, and pigs are slaughtered on this table. There are physical separations between clean and dirty operations. Product flow is from dirty to progressively cleaner areas. The capacity before upgrading was about 8–10 pigs per day; currently, it is 15 pigs per day, which provides meat for schools.

The mission also visited Nguyen Quang Tho's slaughterhouse, with a hanging slaughter line and the capacity of 100 pigs per day. According to the owner of the slaughterhouse,

the total investment was 4 billion dong (\$170,000). The Livestock Competitiveness and Food Safety Project provided financial support of \$30,000, which was not enough to invest in wastewater treatment construction. This slaughterhouse, like others in the province, is running at only 25 percent of its total capacity. IEG learned that many project-supported slaughterhouses reduced capacity, closed down operations, or mixed GAHP animals with non-GAHP animals as a result of low level of supply from GAHP households.

Wet markets. A total of 572 wet market upgrades supported by the project made significant improvements in hygienic conditions and the reduction of environmental pollution in project areas because of wastewater treatment investments. IEG verified the positive improvements during visits to 5 wet markets (with the exception of one where vendors complained about deteriorating conditions). Successful operation and maintenance of the wet market depends on the performance of the market management board. Collection of fees from vendors and the use of these fees to maintain the markets do not occur equally everywhere. Although IEG could not obtain any information on the percentage of wet markets successfully continuing operations with adequate maintenance, the wet market improvements by the project were the most appreciated component, according to the interviews with stakeholders.

On the basis of this information, the achievement of objective 2 is rated as **substantial** but with moderate shortcomings because of the lack of data to confirm achievements in some areas.

Objective 3: Improve food safety in livestock product supply chains in selected provinces.

1. Small slaughterhouses upgraded by the project, producing meat of improving quality and safety (achievement was 373 slaughterhouses against the target of 350)
2. Supported wet markets meeting national meat quality and safety standards (achievement was 572 markets against the target of 500 markets)

Food safety monitoring results at the slaughterhouses and wet markets at the end of the project and more recent figures obtained by IEG showed substantial improvements; thus, achievement of this objective is rated as **substantial**.

Overall Efficacy

Although the project achieved some aspects of the broad objectives, they were outweighed by the shortcomings in the achievement of the first and partially the second objective. The sustainability of the project outcomes for the first objective after the

project closed was negatively impacted due to the failure of the project-supported technologies and practices to protect the smallholders against shocks such as ASF. Thus, on balance, this assessment rates the efficacy with which the PDO was achieved as **modest**.

3. Efficiency

The economic analysis of the project in the ICR was based on the net benefits of livestock production and biogas digesters. The potential economic benefits from project support to improved food safety at the levels of livestock producers, slaughterhouses, and meat markets were not included in the project economic analysis due to the limited data to support a credible analysis. In addition, income increases of slaughterhouse and meat market operators were not estimated.

The ICR's economic analysis resulted in a net present value for the project of \$189 million, with a 9 percent discount rate and an economic rate of return of 22.5 percent. Simulations with a 40 percent reduction in pig and poultry benefits also showed positive values (\$71 million net present value and 9.3 percent economic rate of return). However, considering the significant reductions in pig numbers and the substantial reductions in the number of households producing pigs and the decreases in the sale price of pigs would have inevitably reduced both the net present value and the economic rate of return for this project to a much lower level than that calculated by the ICR.¹

Thus, this assessment rates the eventual efficiency of this project as **modest**.

4. Outcome

This assessment rates the overall eventual outcome of the project as **moderately unsatisfactory**, lower than the outcome ratings in both the ICR and the ICR Review, because of the significant shortcomings in the project's efficacy and efficiency and despite the high relevance of its objectives.

5. Risk to Development Outcome

Two risk areas stand out:

- **Maintaining GAHP levels and food safety standards.** Maintaining the application of GAHPs among project beneficiaries and ensuring scale-up to the national level of food safety improvements are at risk without adequate monitoring and inspection capacity (both technical and financial) by the relevant sector agencies. Hence, there is a need for continued mitigation budget to support activities established by the Livestock Competitiveness and Food Safety

Project, especially for district- and provincial-level monitoring capacity. IEG found that the monitoring capacity for small households and processing facilities at the provincial and district levels was limited. The monitoring of small establishments was left to the responsibility of the communes (which was not sufficient). Continued support from the Ministry of Agriculture and Rural Development on this issue is needed.

- **Unexpected virulent and infectious animal diseases.** The unpredictability of animal diseases and their detrimental impact on the livestock sector and animal (and sometimes also human) health can have a tragic effect on the economic condition of producers and related supply chain actors. IEG observed that smallholder pig producers incurred substantial economic losses, and many households (close to 1 million) exited the livestock production business. The GAHPs and increased biosecurity measures at the farm level supported by the project were not sufficient to withstand an outbreak of ASF; therefore, stricter sanitary and isolation efforts will be needed in the future. As mentioned by the ICR (World Bank 2019), public awareness campaigns are needed to provide education (complemented by technical support) to farmers to better combat ASF outbreaks.

6. Bank Performance

Quality at Entry

The quality at entry of the project is rated as **moderately satisfactory**.

The project's objectives were fully aligned with the government's agriculture sector priorities and the World Bank's strategies in Vietnam at the time of project preparation. The team built the project design on the World Bank's long-term involvement in Vietnam's agriculture sector and incorporated lessons from previous World Bank-assisted agricultural projects and relevant analytical studies on Vietnam's livestock sector to address key constraints to livestock competitiveness and food safety. The project design incorporated lessons from previous sector projects in Vietnam, such as the importance of supporting the adoption of improved livestock production technologies and the need for forming private-public partnerships in veterinary services delivery to ensure effective veterinary coverage and taking a decentralized approach to ensure ownership and capacity building at provincial levels. In addition, the World Bank task team placed an emphasis on designing an effective coordination mechanism using existing systems to generate institutional capacity building for the time after project completion and to ensure ownership by the government.

Some of the mitigation measures to anticipate risks described in the Project Appraisal Document were not adequate. For example, the risk of disease outbreaks was to be mitigated by enhanced disease-control reporting and procedural measures; however, the ASF outbreak showed that these measures were not sufficient because project-supported households were equally impacted by the disease. Moreover, the risk of producer reluctance to adopt GAHP was planned to be mitigated by intensive awareness raising and demonstrations (World Bank 2009b), which were also insufficient because many farmers—as IEG found out—are not part of the GAHP groups or do not renew their GAHP certifications. Small-scale farmers need repeated and continuous trainings and extension services to adopt GAHP requirements.

Furthermore, the project's design had two main weaknesses. The project relied on collective groups to form linkages with actors along the input supply and market value chains and did not have a specific framework to build these market linkages. Thus, the project would have benefited from a value chain approach to build those linkages (for example, by developing mechanisms to involve commercial buyers to help build the markets for farmers). In addition, the project could have included a consumer awareness-raising campaign to educate consumers on food safety aspects so that consumers require improved practices from all actors along the value chain.

Finally, the project did not accurately anticipate the time needed to build capacity of technical staff given the introduction of new concepts such as LPZ, which was implemented in only one instead of three pilots during implementation (World Bank 2019).

Quality of Supervision

The project's quality of supervision is rated as **satisfactory**.

The project faced initial capacity constraints and delays caused by the new approaches introduced by the project, such as GAHPs, LPZs, biosecurity measures, food safety practices, and livestock waste management. To address the significant delays in the first years of project implementation, the Mid-Term Review recommendations were taken seriously and led to adjustments in the results framework, and the team did not shy away from restructuring when necessary. For example, the World Bank team adapted the plans for the LPZ pilot to one instead of three to deeply examine the related environmental, economic, and technical risks (World Bank 2019). Other factors were outside the control of the World Bank task team, such as the livestock market fluctuations due to food shortage concerns, restrictions placed by the government on International Development Association budget allocations, or the ASF outbreak affecting pig mortality and production (World Bank 2019).

Supervision missions took place on a regular basis with adequate expertise in staffing and included site visits and interactions with various project stakeholders. In addition, especially at early implementation, the World Bank task team provided technical advice to the Project Coordination Unit when needed and brought international expertise on specific issues requested by the government (in collaboration with the Food and Agriculture Organization). Task team leadership was continuous, with only one change in task team leadership at additional financing, which ensured continuity and a responsiveness to the client implementing agencies (World Bank 2019). During the IEG mission to Vietnam for this Project Performance Assessment Report, the implementing agency expressed appreciation for the World Bank's support.

Overall Bank performance is rated as **moderately satisfactory**.

7. Quality of Monitoring and Evaluation

Design

The results framework indicators could have been better designed to capture outcomes. Although the PDO indicators were adequate to measure the production efficiency objective (reducing livestock mortality rates and increasing herd and flock sizes), environmental outcomes could have been better captured by measuring direct reductions in water pollution levels measured from effluents or greenhouse gas emissions. The food safety objective could have been better measured by directly measuring reductions in contamination levels in meat samples, rather than just monitoring the number of slaughterhouses and meat markets meeting national food safety standards.

As the ICR also mentioned, the outcome indicators would have benefited from being designed in a clearer manner (World Bank 2019). For example, the indicator of the number of beneficiaries adopting GAHPs is very broad because it includes some indirect and partial beneficiaries of the project. It is also not clear how *adoption* was defined and measured. In addition, there was no detailed definition of a *functional* GAHP cooperative so that the indicator could be clearly monitored with a checklist based on the definition.

The monitoring and evaluation (M&E) system was designed for most of the project data to be collected through the government system, with no external evaluations conducted except for the end evaluation. However, as the ICR also discussed (World Bank 2019), the M&E system would have benefited from diversification of data sources (outside of government system) and tools (for example, qualitative evaluations, case studies, thematic evaluation [gender and ethnic minorities]). The diversification of data sources would have enhanced triangulation of data and helped the team explore and

understand some issues and success in depth to further develop lessons learned, better address the needs of women and ethnic minorities, and ensure potential scale-up. An end line impact assessment would have provided for a proper assessment of the attribution of project results to the project's investments.

Implementation

There were some weaknesses regarding the results monitoring capacity of the project implementation agencies, especially at the provincial-level Project Management Units. To address this, the project team conducted various training sessions for provincial-level Project Management Units (which increased the quality of data collection and reporting over time). The project's M&E rating improved from moderately satisfactory to satisfactory in the last two years of implementation. A simple web-based management information system for key results indicators would have allowed for the collection of and access to real-time information and would have resulted in time savings.

Furthermore, a review of the results framework at project completion revealed the lack of baseline values for the majority of results indicators (except the PDO indicators on production efficiency). Similarly, no (independent) impact assessment was conducted, despite financing plans for technical assistance for "necessary surveys and...independent evaluation reports" (World Bank 2009b, 46). The ICR contended that these shortcomings were addressed by the generation of "end line to baseline comparative data" using the project M&E system to also collect data on control groups to assess project impacts (World Bank 2019, 32). However, it also explained that its overall M&E quality rating is modest "due to the lack of the independent impact evaluation" (World Bank 2019, 33).

Use

According to the ICR, the M&E information was used to inform government decision-making on disease outbreak preparedness, rate of slaughterhouse and meat market upgrading, and the financing impact of project-supported biodigesters, among other issues.

Overall, M&E quality is rated as **modest**, reflecting issues with the adequacy of some of the PDO indicators, a lack of baselines, and the lack of final assessment of project outcomes.

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¹ According to the United States Agency for International Development Vietnam Livestock Update (December 2021), prices declined by about 50 percent between 2020 and 2021 because of an increase in the supply of hogs and an increase in imported pig meat. Accordingly, in the first three months of 2021, pig prices were very high, ranging from 75,000 dong per kilogram to 95,000 dong per kilogram. In the first half of October 2021, the average price hovered around 32,000–46,000 dong per kilogram, hitting the lowest level in two years.

Appendix B. Fiduciary, Environmental, and Social Aspects

Financial Management

The Project Coordination Unit capacity for financial management was adequate and provided timely interim unqualified financial reports, and all annual financial audit reports were unqualified. Financial management supervision missions regularly confirmed the adequacy in financial management staffing, accounting, and internal control systems that consolidated financial management reporting from 12 participating provinces and checked that disbursements were in line with the disbursement plan and guidelines. During project implementation, the financial management rating improved from mainly moderately satisfactory to satisfactory in the last 18 months of implementation, demonstrating capacity enhancements.

Procurement

The Project Coordination Unit capacity for procurement was largely adequate after the implementation of actions agreed on in the procurement capacity assessment conducted during project preparation. Good procurement planning and frequent technical support by the World Bank procurement specialist led to a largely timely completion of planned procurement activities during implementation. By the closing date, the project had successfully implemented 867 various kinds of packages. There were a few cases of rebidding, but there were no major complaints during procurement processes or misprocurement during project implementation.

However, the Independent Evaluation Group learned that the implementation of procurement was quite challenging due to the complexity of the project and the high number of procurement packages and bids. Shortcomings were found mainly in procurement planning at the provincial level, and there were some delays due to inadequate bid evaluation and approval processes. Procurement capacity and reporting at the central and provincial levels improved over time, leading to satisfactory performance in the last 18 months of implementation.

Environmental and Social Safeguards

Environmental safeguards. The project was classified as environmental category B, triggering Environmental Assessment 4.01 and Pest Management 4.09 operational safeguard policies. During project preparation, an Environmental and Social Management Framework was prepared and found satisfactory by the World Bank. The Environmental and Social Management Framework included mechanisms for screening

and excluding activities that might cause significant adverse impacts on the environment and measures for mitigating other possible environmental impacts.

The introduction of good animal husbandry practices and construction of biogas digesters and post-biogas effluent treatment schemes reduced pollution levels generated by farms, slaughterhouses, and wet markets. The Implementation Completion and Results Report highlights that the project built capacity at the responsible central and provincial institutions to better monitor and manage environmental compliance and livestock waste, using a comprehensive environmental quality monitoring database generated by the project. In addition, over 80,000 farmers received training to enhance awareness on good animal husbandry practices, waste management, and biosecurity. The project was proactive in updating the Environmental and Social Management Framework during implementation to comply with the Code chapters of the World Organisation for Animal Health and to react to environmental pollution resulting from the use of cleaning chemicals. According to the Implementation Completion and Results Report and a review of the Implementation Status and Results Reports, over time, the environmental compliance improved from mostly moderately satisfactory to satisfactory throughout the last two years of project implementation (World Bank 2019).

Social safeguards. The project triggered the Indigenous Peoples 4.10 and the Involuntary Resettlement 4.12 operational safeguard policies. In response, the Resettlement Policy Framework and the Ethnic Minority Policy Framework, including the Resettlement Plan and Ethnic Minority Development Plan, were updated and disclosed before appraisal. The Implementation Completion and Results Report states that the project led to no displacements and only minor land acquisitions with appropriate compensation and no complaints. It established a database of beneficiaries, with disaggregated information on ethnicity, gender, and economic status, allowing the team to demonstrate that ethnic minority people benefited more than expected from the project. Overall, no major complaints or grievances on environmental or social management were filed during project implementation (World Bank 2019).

Reference

World Bank. 2019. "Vietnam—Livestock Competitiveness and Food Safety Project." Implementation Completion and Results Report ICR00005020, World Bank, Washington, DC.

Appendix C. Methods and Evidence

The Project Performance Assessment Report team followed a mixed-methods approach to address the evaluation questions—composed of desk-based document reviews, field-based semistructured group and individual interviews, and discussions with local-level institutions (for example, farmer groups, seed groups, and water user groups)—and conducted site visits to districts covering both the northern and southern regions of the country. In addition, the Project Performance Assessment Report team assessed the availability of updated or new data related to the project development objective from a variety of sources (government or international sources).

The premission desk phase included the following activities:

- **Desk review** of available key documents and data from the World Bank, the Vietnam government, relevant donors and development partners, and academic literature. This led to the preparation of a gap map, which helped identify remaining gaps in information and questions.
- **Premission interviews** were held with the World Bank task team leader, Binh Thang Cao, a senior agricultural specialist, and Dina Umali-Deiningner, a practice manager based in the Singapore country office.
- **Stakeholder mapping** was undertaken by identifying key stakeholders based on advice from Agriculture and Food Global Practice colleagues and with the help of a senior local consultant.
- **Stakeholder questionnaires**, which were concise but descriptive enough to adequately convey the questions and seek the needed information and data, were developed.
- There was no impact assessment carried out by the project team. There were no updated monitoring and evaluation indicator data from the Ministry of Agriculture and Rural Development for current results.

The Project Performance Assessment Report mission included the following elements:

- Semistructured interviews with key stakeholders: World Bank staff in Hanoi and Ho Chi Minh City (task team leader and local sector specialists)
- Government agencies involved in implementation at the central and local levels (various departments of the Ministry of Agriculture and Rural Development)
- Key staff from other institutions, donors, and development partners

- Semistructured interviews with project beneficiaries (livestock farmer households, collective groups, slaughterhouses, wet markets supported by the project, extension services, and veterinary services staff) and local markets (buyers of meat products)
- Site visits to verify the application of good animal husbandry practices (GAHPs), manure management infrastructure, improved processing, and marketing infrastructure
- Site checklist for visited farms and slaughterhouses and markets to assess their GAHPs, biosecurity measures, good manufacturing practices, and hygiene practices
- Site selection criteria was developed to select three sites (within 12 provinces) for fieldwork.

Interview Protocol

Data Needs and Evaluation Questions with Various Stakeholders

The Independent Evaluation Group used guiding questions for the semistructured, open-ended interviews with relevant ministries, project implementers, beneficiaries, donors, and other stakeholders of the Livestock Competitiveness and Food Safety Project. The Independent Evaluation Group asked additional questions depending on the interviewee and the response context.

The purpose of the site visits was to (i) assess project impact related to the project objectives; (ii) verify the current conditions of the infrastructure financed by the project; (iii) assess the GAHPs, biosecurity management, waste management, and hygiene practices; and (iv) assess the effectiveness of institutional strengthening and capacity building on sector institutions, livestock producers, slaughterhouses, and wet markets. Checklists for better practices and infrastructure condition were also developed. The mission visited 4 out of 12 districts of the Livestock Competitiveness and Food Safety Project that received support from the project—namely, Thai Binh, Dong Nai, Ho Chi Minh City, and Hai Phong.

Data Needs

1. Updated project indicators, if available
2. Soil and water pollution levels at project areas (at project closing and currently)
3. Number (if available) or estimated proportion of functioning collective groups established (at project closing and currently)

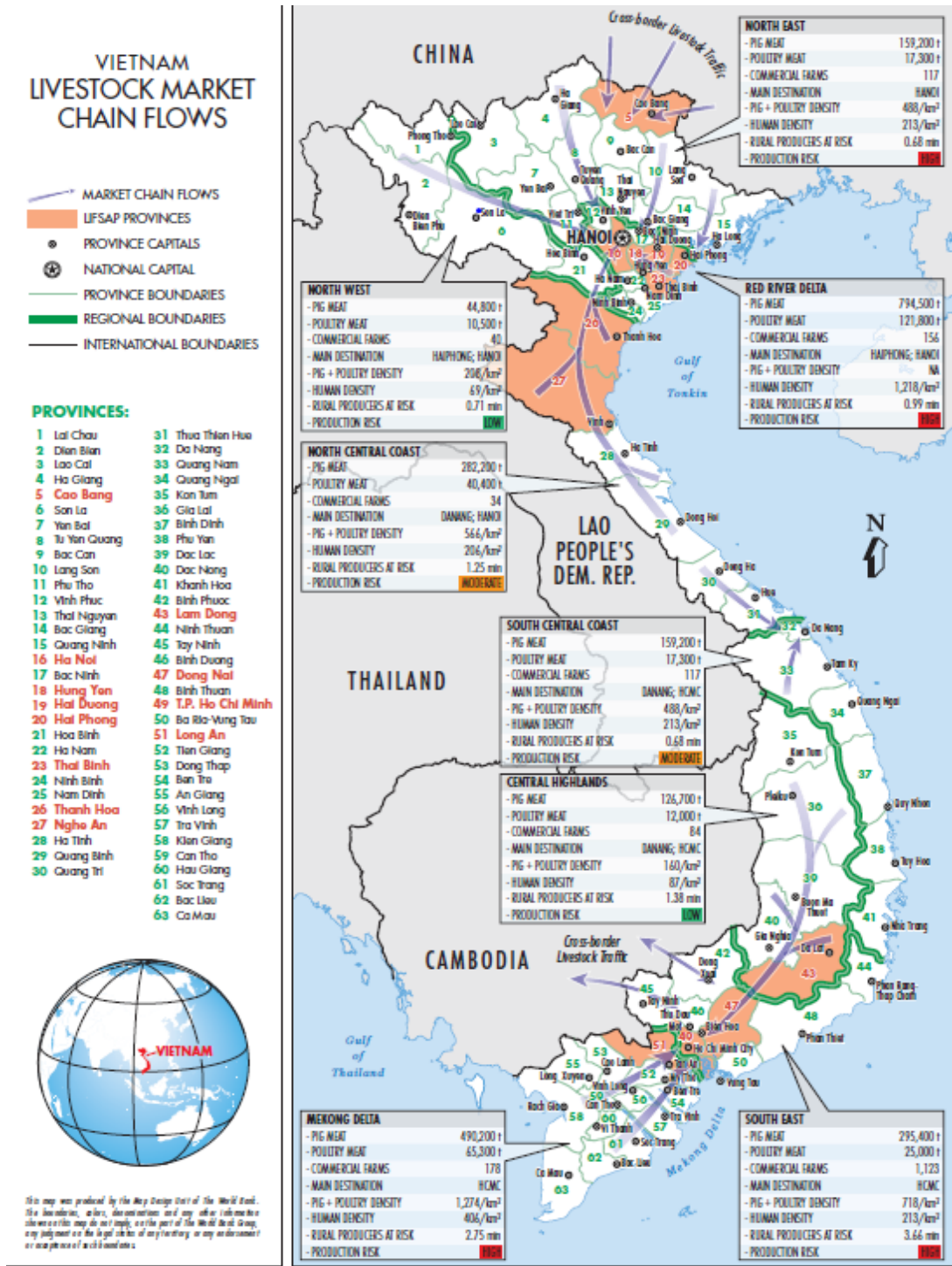
4. Number (if available) or estimated proportion of market linkages between producers and buyers (at project closing and currently)
5. The breakdown on type of buyers (traders, transporters, slaughterhouses, markets, breeders, and feed suppliers at project closing and currently)
6. Number of brands developed at project closure and how many are estimated to be sustained
7. The private and public sector vaccination coverage at project closing and currently in project areas
8. Incidence rates of African swine flu and mortality rates of pigs in project areas compared with nonproject areas
9. Current meat sample test results in project areas
10. Current animal feed test results in project areas
11. Current food safety monitoring results in slaughterhouses and meat markets supported by the project
12. Number of slaughterhouses that obtained certification for good manufacturing practices, good hygienic practices, and hazard analysis critical control point supported by the project (Are the figures at project closing sustained; if not, what are the current figures in project areas?)

Site Selection Criteria

1. Geographic criteria (North, South)
2. Production scale (small-, medium-, and large-scale farms; small- and medium-scale slaughterhouses)
3. Farming systems criteria and species criteria (GAHP pig farms, GAHP poultry farms) based on the number of households trained on GAHP and the percentage of pig and poultry producers adopting biosecurity measures-biogas
4. High-risk area (based on diseases, production competitiveness, livestock density, and market demand)
5. Province impacted by the recent African swine fever
6. Livestock production zone pilot area

7. Different phases (provinces participated in first and second phases, with phase 1 spanning 2010 to 2015 and phase 2 spanning 2016 to 2018)
8. Service system (number of slaughterhouses and food markets upgraded by the Livestock Competitiveness and Food Safety Project; percentage of slaughterhouses and meat markets adopting food hygiene, waste management, and biosecurity measures)
9. Ease of access and proximity to the city

Figure C.1. Map of Vietnam Livestock Market Chain Flows



Source: World Bank 2009.

Note: Field visits were in Thai Binh and Hai Phong in the Red River Delta at the north and Dong Nai and Ho Chi Minh City in the Southeast region. LIFSAP = Livestock Competitiveness and Food Safety Project.

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World Bank. 2009. "Vietnam—Livestock Competitiveness and Food Safety Project." Project Appraisal Document 50161-VN, World Bank, Washington, DC

World Bank. 2019. "Vietnam—Livestock Competitiveness and Food Safety Project." Implementation Completion and Results Report ICR00005020, World Bank, Washington, DC.

Appendix D. Additional Data

Table D.1. Site Visits

Province	Region	Production Risk Level	Farms Visited (no.)			
			Pig Farmer	Poultry Farmer	Slaughterhouse	Wet Market
Thai Binh	North	High	3	0	1	2
Dong Nai	South	Very High	3	0	1	1
Hai Phong	North	High	2	1	0	2

Source: Independent Evaluation Group.

Table D.2. Impact of African Swine Fever in Vietnam, 2019–22

Population	2019 ^a	2020 ^b	2021 ^b	2022 ^b
(1) Total pig population (no.)	28,095,238	22,028,000	28,100,000	28,800,000
(2) Total dead and culled (no.)	6,000,000	74,978	272,648	58,244
Share of total dead and culled per total population (1)/(2) (%)	21	0.34	0.97	0.20

Sources: a. ILRI 2020; b. Department of Animal Health, Ministry of Agriculture and Rural Development.

Table D.3. Impact of African Swine Fever in Thai Binh, 2019–22

Population	2019	2020	2021	2022
(1) Total pig population (no.)	868,183 ^b	571,200 ^a	604,600 ^a	689,300 ^b
(2) Total dead and culled (no.)	363,769 ^b	n.a.	1,177 ^c	34 ^c
Share of total and culled per total population (1)/(2) (%)	41.9 ^b	—	0.002	0.000

Sources: a. GSO-Vietnam; b. Thai Binh DARD-2022; c. Department of Animal Health, Ministry of Agriculture and Rural Development.

Note: — = not available; n.a. = not applicable.

Table D.4. Impact of African Swine Fever in Hai Phong, 2019–22

Population	2019	2020	2021	2022
(1) Total pig population (no.)	106,300 ^a	117,100 ^a	145,800 ^a	n.a.
(2) Total dead and culled (no.)	56,551 ^b	n.a.	306 ^c	55 ^c
Share of total and culled per total population (1)/(2) (%)	53.2 ^b	—	0.002	—

Source: a. GSO-Vietnam; b. Hai Phong DARD-2022; c. Department of Animal Health, Ministry of Agriculture and Rural Development.

Note: — = not available; n.a. = not applicable.

Table D.5. Impact of African Swine Fever in Dong Nai, 2019–22

Population	2019	2020	2021	2022
(1) Total pig population (no.)	1,817,600 ^a	1,862,400 ^a	2,140,900 ^a	2,560,000 ^a
(2) Total dead and culled (no.)	450,064 ^b	2,177 ^d	2,125 ^c	140 ^c
Share of total and culled per total population (1)/(2) (%)	24.8	0.12	0.10	0.01

Source: a. GSO-Vietnam; b. http://chicucthuydnai.gov.vn/Tint%E1%BB%A9c/tabid/138/isd_news_news/811/Default.aspx; c. Department of Animal Health; d. <http://www.baodongnai.com.vn/tintuc/202112/dich-ta-heo-chau-phi-co-nguy-co-lay-lan-tren-dien-rong-3096410/>; e. <http://sonongnghiep.dongnai.gov.vn/Pages/newsdetail.aspx?NewsId=3293&CatId=81>.

Table D.6. Avian Influenza Situation in Vietnam, 2021–22

Province	Year	Districts with Outbreaks (no.)	Communes with Outbreaks (no.)	Outbreaks (no.)	Villages (no.)	HH (no.)	Total Birds Infected (no.)	Total Dead (no.)	Total and Culled (no.)	Total Population (no.)	Share of Total and Culled per Total Population (%)
Thai Binh	2021	1	1	1	1	1	3,411	0	3,411	13,953,000 ^a	0.02
	2022	1	2	2	2	4	1,203	407	3,567	14,300,000 ^b	0.02
Hai Phong	2021	0	0	0	0	0	0	0	0	8,498,100 ^a	0
	2022	0	0	0	0	0	0	0	0	8,555,250	0
Dong Nai	2021	0	0	0	0	0	0	0	0	24,537,000 ^a	
	2022	2	2	2	2	2	4,400	3,080	4,400	26,000,000 ^c	0.02
Vietnam	2021	80	111	117	132	199	373,175	92,737	444,298	526,318,400	0.08
	2022	38	47	48	53	63	84,216	36,540	97,822	533,000,000	0.02

Source: Department of Animal Health in Vietnam; a. GSO-VN; b. <http://thaibinhvt.vn/news/65/79943/tong-dan-gia-cam-dat-14-3-trieu-con>; c. <http://www.baodongnai.com.vn/kinhte/202212/dong-nai-ung-dung-cong-nghe-cao-phat-trien-chan-nuoi-cong-nghiep-3150562>.

Note: HH = households.

Photo D.1. Photographs from Site Visits

a. Binh Dien Wholesale Market



b. Binh Dien Wholesale Market



c. Wet Market, Xã Vũ Quý, huyện Kiến Xương



d. Wet Market, Xã Vũ Quý, huyện Kiến Xương



e. Pig farm in Thai Binh



f. Pig farm in Thai Binh



g. Biogas burning



h. Small slaughterhouse in Thai Binh



i. Large slaughterhouse in Dong Nai with capacity for 400 animals



j. Farm in Hai Phong isolated by a pond that implements strict biosecurity measures



k. A farm that stopped rearing pigs due to African swine fever in Hai Phong



l. A farm that stopped rearing pigs due to African swine fever in Dong Nai livestock production zone



Source: Independent Evaluation Group.

Reference

ILRI (International Livestock Research Institute). 2020. "Economic Impacts of African Swine Fever in Vietnam." ILRI Research Brief 99, International Livestock Research Institute, Nairobi, Kenya.

Appendix E. Borrower Comment

Based on Project Performance Assessment Report Draft by the Independent Evaluation Group (IEG) of the World Bank Group on the “Vietnam Livestock Competitiveness and Food Safety Project” I would like to have some specific clarifications as follows:

1. Regarding the general context at the time of assessment:

ASF has occurred in 8,527 communes in 667 districts of all localities across the country with a total of nearly 6 million pigs culled. At the beginning of 2022, ASF still has a very complicated situation, with high prices of piglet, animal feed and gasoline due to the impact of the war between Russia and Ukraine... Farmers have many difficulties in pigs regenerating.

The Lifsap project is implemented in 12 provinces/cities with the establishment of 48 priority livestock areas. These are the regions with very high livestock density, the total livestock herd accounts for the largest proportion of the province. Therefore, some of the project provinces have been most severely affected in the country by ASF including Thai Binh, Hai Phong, Hung Yen, Dong Nai.

2. Regarding some comments and assessments in the draft Report:

The authorities in MARD revealed that the project-supported households and those not supported by the project were equally impacted by the ASF disease (but with some delay). On the other hand, large-scale pig-producing enterprises suffered minimal losses from the ASF pandemic. This comparison suggests that biosecurity adoption by pig producers in project areas was limited and/or the measures supported by the project were not sufficient to avoid ASF transmission to small-scale farms, when there is no vaccination available against ASF.

This statement is correct in terms of economic losses of livestock households with or without the project's support. However, it is not properly reflected in reality because:

(i) (i) At the time of ASF, as reported by the provinces participating in the Project, approximately 20% of households applying VietGAP (out of a total of more than 40,000 households) had pigs die due to ASF, while households do not apply VietGAP, the number of households with pigs die by ASF is over 80%. This confirms that the application of biosecurity measures according to the VietGAP provided by the project is effective in the prevention of ASF when there is no vaccine.

(ii) (iii) However, according to the epidemic prevention and control regulations, the area and control of the disease is carried out on a large scale (village, commune, district, province), so when detecting an outbreak, the animal health staff will conduct epidemic

zones, including culling pigs in households with infected pigs and surrounding households (even if there are no infected pigs). At the time of 2019, nearly 50% of livestock households applying the VietGAP supported by the project, even though they were not infected, still had to destroy pigs because they were in the epidemic area.

(iii) (v) Large-scale farms are less affected because these farms are located independently, far from residential areas, far from the radius of the epidemic area, so they will not be culled when those farms are no sick pigs.

GAHP Collaborative Groups and Cooperatives had weaknesses and GAHP adoption was barely sustained after the project closed.

After ASF, due to heavy economic losses, high prices of pig breeds and animal feed, and complicated epidemics, some households, livestock groups, cooperation groups, and cooperation groups supported by project have stopped re-herding. According to the report of the project provinces at the end of 2021, in total of 1,127 Livestock Groups/Cooperative Groups/Cooperatives supported by the Project, nearly 40% have not continued to re-herd due. These are located mainly in the provinces most affected by ASF such as Hung Yen, Thai Binh, Hai Phong, Dong Nai. However, from the end of 2022 until now, pig households, cooperative groups, and cooperatives have continued to re-herd quickly. Therefore, from the beginning of 2023, Vietnam did not have to import pork from some countries to stabilize pork prices due to lack of domestic supply.

The Ministry of Agriculture and Rural Development (MARD) did not scale up the project-supported GAHP group formation in its extension programs, citing budgetary and time constraints.

Currently, MARD and the provinces continue to support the program to support household livestock production, but the name may be different, such as: recirculating livestock, smart livestock farm. But the essence of these models is still applying VietGAP household.

However, due to the removal of Extension Centers in the localities and transformation into Agricultural Service Centers, it has greatly affected the expansion and continued support of livestock households to apply VietGAP.

GAHP certifications were not renewed:

The certificate of VietGAP household is valid for 3 years. During the recent business trips to the localities, we consulted on this issue, and the localities reported that they had renewed VietGAP certification for many Livestock Cooperatives/Cooperatives. This is a mandatory requirement when they supply pork and chicken products to supermarkets, Schools, Industrial Parks...However, with the removal of District Veterinary Stations,

District Extension Center in recent times (merged into District Agricultural Service Center) has also made it more difficult to issue VietGAP certification for farmer organizations.

The Livestock Planning Zone (LPZ) pilot showed that the concept had many weaknesses:

(i) LPZ is a completely new idea, formed after the outbreak of avian influenza in Vietnam in the period 2004–07, with the aim of bringing household livestock out of residential areas, focusing on controlling livestock production. disease control as well as easy provision of agricultural extension services, causing scientific controversy from many management agencies, because no country has applied this model. Therefore, after considering, the WB and Vietnam agreed to "pilot" 11 LPZ zones within the framework of the LIFSAP project. However, identifying many potential technical risks when investing in LPZ, at the time of the midterm evaluation of LIFSAP Project in 2013, MARD proposed and approved by WB, reducing from 11 LPZ (each 1 area, except Ho Chi Minh City) to pilot only 1 LPZ area in Dong Nai province (where land planning is ready, veterinary system is relatively good).

(ii) When ASF occurs, the LPZ in Dong Nai is assessed to be easy to control and localize the disease. However, when a farm in the LPZ has an outbreak of ASF, the farms near that area still have their pigs destroyed or the pigs are not transported out of the LPZ for sale. This means that many livestock farms still have to destroy pigs to receive support from the Government. However, the LPZ area in Dong Nai is almost the last place where the ASF outbreak takes place. Because the livestock households in the LPZ all raise livestock on a relatively large scale (over 100 heads of pigs), after ASF, the re-hereditation of these households is very slow due to the large amount of investment, while the buying breed and animal feeds must be paid immediately, not buying debt as before.

(iii) However, the Law on Livestock has taken effect from January 1, 2020, including regulations banning livestock production in residential areas, so now it is in order to ensure livelihoods for livestock households (more than 3 million households) many Provincials have been planning a model similar to the LPZ in Dong Nai to move livestock households in residential areas to these areas. Typically: Hanoi, Vinh Phuc, Thanh Hoa, Nghe An, Thai Binh, Binh Duong, Tay Ninh...)

Activities to form market linkages and product brands through productive partnerships had mixed results. At project closing some formal marketing connections had been established and 30 product brands were developed by the cooperatives / collective groups, but there was no indication that new linkages or brands were formed after the

project closed, rather many that had been formed were lost, in parallel with the dissolution of GAHP groups and cooperatives.

During the ASF, it is true that some of the links in the project were broken due to the very slow rate of reintroduction of pigs. However, after that, basically, the linkages during the project period are still being maintained and developed due to the signing of long-term contracts with VietGAP certification such as: Soc Son hill chicken, Safe pork An Ha, San Ha, Hung Yen Herbal Pig...some were newly formed such as HC Farm, Hien Nhuan in Thanh Hoa, Thanh Huan in HaNoi...

Biogas technology did not work well for small holders after the project closed.

In the first phase of the Project (2009–15), biogas technology was evaluated as a relatively comprehensive solution for household farming with the goal of managing livestock waste, minimizing environmental, besides the agricultural extension programs of the government to support farmers to build biogas, there are many foreign projects supporting this activity such as QSEAP funded by ADB (target 30,000 biogas cellars), SNV (target 300,000 biogas digesters) ... Besides the above biogas investment target, SNV's project also sold 2 million USD worth of carbon emission reduction credits through this activity.

However, from the end of 2014 to the Additional Financing period (2016–19), the project added composting technology to give farmers more options to manage livestock waste. Therefore, the final result of the project, out of a total of 25,171 livestock households supported by the project to strengthen livestock waste management measures, there are 16,423 households using biogas technology, 8,748 households choose composting technology.

With the target of developing organic agriculture, using composting technology to manage livestock waste is more widely applied and has higher economic efficiency. However, in remote areas, where electricity is not regular, there is no gas supply service, or livestock farms too far from residential areas, without electricity, biogas technology is still used to provide electricity, used as gas to reduce the use of fossil fuels.

GAHP collaborative groups lacked sustained economic gains to continue functioning as a group.

(i) The cooperation groups/ Cooperatives to buy animal feed has helped member households save from 400 to 720 VND/kg of animal feed, accounting for 2.8–5.1% of production costs, not including breeds, veterinary drugs...; (ii) In addition, Cooperative Group/Cooperatives can sign output contracts with enterprises and slaughterhouses; (iii) According to the report of the Department of Cooperative Economy –MARD, the

number of livestock cooperatives in Vietnam has increased relatively rapidly in recent years, including the provinces participating in the Lifsap Project.

Formal market linkages (productive partnership) for small holders were not part of original project design and are extremely important.

This review is absolutely correct. Although not included in the project's design, identifying the issue of market linkage is a success factor in order to maintain results after the project ends, so right from 2015, the Project took the initiative to organize various market linkage activities such as fairs in Ho Chi Minh City, Hanoi to introduce and promote the safe pork and chicken brands of the Cooperative/Cooperative Group. communes and associated enterprises, connecting businesses that provide inputs for veterinary services and consume output products, and connect neighboring provinces to access large consumption markets such as Hanoi, Ho Chi Minh City, Hai Phong... Currently, National Agricultural Extension Center continuing to maintain these forums, DARDs in provinces/cities such as Hanoi, Ho Chi Minh City, and Hai Phong continue to maintain these forums.