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INTERNATIONAL DEVELOPMENT ASSOCIATION
IMPLEMENTATION COMPLETION AND RESULTS REPORT
(IDA 46490 and IDA 56920)

ON A

CREDIT

IN THE AMOUNT OF SDR 74.3 MILLION
(US\$109.94 MILLION EQUIVALENT)

TO THE

REPUBLIC OF VIETNAM

FOR THE

VIETNAM LIVESTOCK COMPETITIVENESS AND FOOD SAFETY PROJECT

December 27, 2019

Agriculture and Food Global Practice
East Asia and Pacific Region

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CURRENCY EQUIVALENTS
(Exchange Rate Effective June 30, 2019)

Currency Unit =	Vietnamese Dong (VND)
VND 23,275.00 =	US\$1

FISCAL YEAR
July 1–June 30

ABBREVIATIONS AND ACRONYMS

AF	Additional Financing
AMR	Antimicrobial Resistance
AFSP	Agri-Food Safety Project
ASF	African Swine Fever
CPF	Country Partnership Framework
DAH	Department of Animal Health
DARD	Department of Agriculture and Rural Development
DLP	Department of Livestock Production
DONRE	Department of Natural Resources and Environment
EA	Economic Analysis
EMF	Environmental Management Framework
ERR	Economic Rate of Return
FAO	Food and Agriculture Organization of the United Nations
GAHP	Good Animal Husbandry Practices
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GoV	Government of Vietnam
HPAI	Highly Pathogenic Avian Influenza
ICR	Implementation Completion and Results Report
KPI	Key Performance Indicator
LIFSAP	Livestock Competitiveness and Food Safety Project
LPZ	Livestock Planning Zone
MARD	Ministry of Agriculture and Rural Development
MIS	Management Information System
NPV	Net Present Value
O&M	Operation and Maintenance
OIE	World Organisation for Animal Health
PAD	Project Appraisal Document
PCU	Project Coordination Unit
PCR	Project Completion Report
PDO	Project Development Objective
PPMU	Provincial Project Management Unit
WOP	Without Project
WP	With Project

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DATA SHEET

BASIC INFORMATION

Product Information

Project ID	Project Name
P090723	Vietnam Livestock Competitiveness and Food Safety
Country	Financing Instrument
Vietnam	Investment Project Financing
Original EA Category	Revised EA Category
Partial Assessment (B)	Partial Assessment (B)

Organizations

Borrower	Implementing Agency
Socialist Republic of Vietnam	LIFSAP PCU

Project Development Objective (PDO)

Original PDO

The project development objectives (PDOs) are to increase the production efficiency of household-based livestock producers, to reduce the environmental impact of livestock production, processing and marketing, and to improve food safety in livestock product supply chains (mainly meat) in selected provinces.



FINANCING

	Original Amount (US\$)	Revised Amount (US\$)	Actual Disbursed (US\$)
World Bank Financing			
IDA-46490	65,260,000	65,183,272	62,790,000
IDA-56920	44,680,000	42,266,844	42,640,000
Total	109,940,000	107,450,116	105,430,000
Non-World Bank Financing			
Borrower/Recipient	23,770,000	0	26,970,770
Total	23,770,000	0	26,970,000
Total Project Cost	133,710,000	107,450,116	132,400,000

KEY DATES

Approval	Effectiveness	MTR Review	Original Closing	Actual Closing
22-Sep-2009	10-Mar-2010	25-Mar-2013	31-Dec-2015	30-Jun-2019

RESTRUCTURING AND/OR ADDITIONAL FINANCING

Date(s)	Amount Disbursed (US\$M)	Key Revisions
29-Nov-2018	97.43	
16-Jan-2019	97.43	Change in Loan Closing Date(s)

KEY RATINGS

Outcome	Bank Performance	M&E Quality
Satisfactory	Satisfactory	Modest



RATINGS OF PROJECT PERFORMANCE IN ISRs

No.	Date ISR Archived	DO Rating	IP Rating	Actual Disbursements (US\$M)
01	08-Jun-2010	Satisfactory	Satisfactory	1.59
02	10-Jun-2011	Satisfactory	Satisfactory	4.05
03	06-Apr-2012	Moderately Satisfactory	Moderately Satisfactory	6.46
04	27-Feb-2013	Moderately Unsatisfactory	Moderately Unsatisfactory	18.60
05	20-Oct-2013	Moderately Satisfactory	Moderately Satisfactory	27.82
06	30-Dec-2013	Moderately Satisfactory	Moderately Satisfactory	32.27
07	18-Oct-2014	Satisfactory	Satisfactory	49.47
08	22-Apr-2015	Satisfactory	Satisfactory	59.01
09	09-Nov-2015	Satisfactory	Satisfactory	62.72
10	12-May-2016	Satisfactory	Moderately Satisfactory	66.85
11	21-Nov-2016	Satisfactory	Moderately Satisfactory	70.85
12	18-May-2017	Satisfactory	Moderately Satisfactory	75.79
13	18-Nov-2017	Satisfactory	Moderately Satisfactory	81.42
14	16-May-2018	Satisfactory	Satisfactory	91.03
15	30-Dec-2018	Satisfactory	Satisfactory	98.02
16	04-Nov-2019	Satisfactory	Satisfactory	106.48

SECTORS AND THEMES

Sectors

Major Sector/Sector (%)

Agriculture, Fishing and Forestry	66
Agricultural Extension, Research, and Other Support Activities	10
Fisheries	28
Livestock	28



Health	34
Health	34
Themes	
Major Theme/ Theme (Level 2)/ Theme (Level 3)	(%)
Finance	18
Finance for Development	18
Agriculture Finance	18
Urban and Rural Development	65
Rural Development	65
Rural Markets	18
Rural Infrastructure and service delivery	38
Land Administration and Management	9
Environment and Natural Resource Management	18
Renewable Natural Resources Asset Management	18
Biodiversity	9
Landscape Management	9

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I. PROJECT CONTEXT AND DEVELOPMENT OBJECTIVES

A. CONTEXT AT APPRAISAL

Context

1. At the time of appraisal, the project was consistent with the World Bank's Vietnam Country Partnership Framework (CPF) for 2011–2015. Specifically, it supported three of its four objectives: (a) improved business environment by strengthening competitiveness and providing a level playing field for household livestock producers; (b) stronger inclusive growth by making basic services accessible and affordable to the poor, namely the rural smallholder livestock producers; and (c) the sustainable management of natural resources and environment by introducing livestock waste treatment technology to limit environmental pollution.
2. **Progress in reducing rural poverty.** At the time of appraisal, agricultural growth had significantly contributed to the reduction of rural poverty in Vietnam. Within agriculture, the expansion of smallholder livestock production had been a major contributor to increasing household/farm incomes and reducing rural poverty.
3. **Livestock production in the economy.** In 2009, the agriculture sector accounted for 22 percent of gross domestic product (GDP) and more than 60 percent of employment, of which the livestock subsector accounted for 27 percent of agriculture's contribution to GDP (about 6 percent of total GDP). Livestock production was on a fast-growing trajectory, with pig production being a major contributor and projected account of the sub-sector to reach about 42 percent of agriculture GDP by 2020.
4. **Rising demand for livestock products.** The meat production increased from an estimated 2.0 million tons in 2000 to 3.3 million tons in 2007, an average annual increase of 7.5 percent, following rapidly rising demand driven by increasing incomes and growth of the middle class. The average annual meat consumption in Vietnam was about 40 kg per capita in 2009, with a projected increase to 57 kg per capita by 2020. Pork and poultry dominated meat consumption with 76 percent and 13 percent of the total meat market, respectively.
5. **Livestock production as a major source of income for households.** In 2009, livestock played a significant role in generating income in rural Vietnam, as it was dominated by small-scale household pig and poultry production. The output of household-based livestock producers comprised about 70 percent of the overall livestock sector production. An estimated 8.3 million households produced poultry and 7 million household pigs. For poor households, livestock was a major source of food and a means to save and accumulate capital. Raising livestock in addition to cash crops has contributed to diversification of livelihoods in rural communities. Livestock also provided draught power, transport, organic fertilizer, and a source of cash.
6. **Challenges faced by household-based livestock producers.** At the time of project preparation, household-based livestock producers faced several constraints when trying to intensify their production and become more competitive and profitable: (a) limited knowledge of—and access to—innovations, resulting from weak extension services; (b) reactive rather than preventive disease control driven by weak



decentralized animal health services and limited understanding of the basic concepts of on-farm biosecurity; (c) lack of farmer organization, preventing sharing experiences, learning new husbandry practices, and commanding greater purchasing and bargaining power for such production inputs as animal feed; and (d) inability to meet food safety standards. They also faced constraints due to limited access to capital. In a rural finance system where the only collateral accepted by commercial banks was a land tenure certificate, it was difficult to access large financial support and expand the farming scale. Finally, with limited numbers of farms having waste treatment technologies, livestock production was also a source of groundwater and surface water pollution.

7. **The threat of animal diseases.** The 2003 highly pathogenic avian influenza (HPAI) epidemic put the lives and livelihoods of an estimated 8.3 million household poultry producers at risk. The economic impact of the epidemic illustrated that highly contagious animal diseases in pigs and poultry could bankrupt a producer with a single outbreak. Such disease outbreaks placed the small-scale household producers at serious risk, whether from lack of knowledge, lack of access to veterinary services, or the absence of basic biosecurity procedures. In addition, the lack of technical and financial resources affected the overall resilience of household livestock producers to external shocks and increased the risk of losing market shares in favor of medium- and large-scale commercial producers. Under the World Bank's Global Program for Avian Influenza Control and Human Pandemic Preparedness and Response (GPAI) program, Vietnam benefited from the Avian and Human Influenza and Human Pandemic Preparedness (2007–2014) Project, which was rated 'highly satisfactory' by the Independent Evaluation Group.

8. **Challenges faced by the veterinary services.** The performance of the veterinary services was assessed in 2007 by the World Organisation for Animal Health (OIE), with a follow-up assessment and a good agriculture practices analysis in 2010. Field services to cover livestock diseases were weak. Veterinary curricula were in need of review, especially in undergraduate training and epidemiology. Laboratory services at the central level were considered well organized with capable staff. Disease surveillance remained weak and reactive. Chronic underfunding of veterinary services had left the service short of equipment, field transport, and recurrent operating budgets. These constraints had temporarily been lifted during the HPAI crisis (see paragraph #6). The crisis caused the Government of Vietnam (GoV) to rethink its view of veterinary services as an important tool in countering devastating losses cause by infectious disease epidemics.

9. **Livestock competitiveness and food safety.** Food safety standards form an important part of the quality elements of competitiveness, defined as the ability of the producers to capture part of the market through production efficiency, favorable product attributes, and/or particular appeal to consumer preferences. As urban incomes increase, expectations for food safety also increase. In 2009, more than 90 percent of Vietnam's consumers were serviced by local meat markets, most of them without proper hygienic conditions or waste treatment. These meat markets were supplied by backyard and local small-scale slaughterhouses, with unhygienic conditions and an absence of proper meat inspections. In addition to food safety, the benefits of upgrading slaughterhouses and markets included enhancing disease surveillance and control in high-risk areas. To keep pace with the large-scale production, household producer competitiveness and food safety needed to exist as interlinking phases along the meat marketing chain. Efficient meat production by the household producer (competitiveness), with access to hygienic meat markets that are attractive to consumers (food safety), was to generate higher demand (profitability).



10. **Household-based livestock producers at the interface of rural and urban economies.** As higher incomes for urban dwellers led to increased meat consumption, more demand for meat could also increase incomes for household producers in rural areas, provided they could overcome the above-mentioned constraints and become more competitive and safer. Providing these producers with an opportunity to compete in the rapidly expanding meat market was identified as a way to improve rural income.

11. **The preparation of the project benefited from a long-standing involvement of the World Bank in the agriculture sector.** Over the decade before the project, the World Bank had provided substantial support to the agricultural sector in Vietnam and intensively engaged with the GoV on the broader agenda of poverty alleviation, rural development, and agriculture competitiveness. All IDA-financed agricultural projects had included a livestock component. Also, the World Bank had been deeply involved in the response to the HPAI crisis, thereby becoming one of the key partners of the Government in the livestock sector and forging strategic alliances with other stakeholders.

12. **Analytical underpinning.** In 2006, the World Bank supported the Ministry of Agriculture and Rural Development (MARD) to prepare the Vietnam Food Safety and Agricultural Health Action Plan, commissioned the Food and Agricultural Organization of the United Nations (FAO) to conduct a study on the Competitiveness of the Livestock Sector in Vietnam, and supported OIE to assess the performance of veterinary services (see paragraph #7). These initiatives had established a sound basis on which to build a project that would address important constraints relating to livestock competitiveness and food safety and contribute to further increases in rural income in Vietnam.

13. **International experience and knowledge.** The GoV was also interested in tapping into the international experience of the World Bank which had supported similar projects elsewhere in the region and the Regional Livestock Waste Management in East Asia Project financed by the Global Environmental Facility and implemented in China, Thailand, and Vietnam.

Theory of Change (Results Chain)

14. **Theory of change (ToC).** A theory of change was not prepared at appraisal. However, an ex-post ToC is presented below (figure 1), based on the project components and Results Framework which define long-term goals and changes were implied by each component.

15. **The project objective** was to increase the production efficiency of household-based livestock producers; to reduce the environmental impact of livestock production, processing, and marketing; and to improve food safety in livestock product supply chains (mainly meat) in selected provinces. A first critical step was to improve animal husbandry practices of household-based producers, together with the upgrading of slaughterhouses and meat markets and the strengthening of the institutional capacity in biosecurity, basic epidemiology, disease control, farm, slaughterhouse and other related waste management, quality of livestock feeds, sale and use of feed additives, hygiene standards, and meat inspection.

16. **The initiatives introduced by the project required a new mindset** (good animal husbandry practices [GAHP], hygiene, and food safety), which called for implementation to involve stakeholders and enhance adoption and sustainability. The initiatives were reinforced through robust institutional



strengthening and capacity building. At the institutional level, the capacity of the livestock production department would be strengthened by developing/updating (a) GAHP standards, procedures, and methodology for monitoring and certification and (b) guidelines and regulations for biosecurity, livestock waste management, quality of livestock feeds, sale and use of feed additives, hygiene standards, and meat inspection. In addition, training and capacity building would be provided to GoV services on new GAHP certification, information collection, and dissemination. Training, awareness raising, and technical assistance would be provided to implementing agencies, MARD technical departments (Department of Livestock Production [DLP] and Department of Animal Health [DAH]), representatives of local government, and stakeholder groups to familiarize them with the new approaches.

17. **At the farm level** (households), the project planned to invest in adoption of GAHP and improved technologies in existing livestock production area to improve biosecurity and waste management and increase vaccination coverage for common disease for animals. The project also planned to pilot the concept of livestock production zones (LPZ), to promote the establishment of cooperatives, and partnerships with private sector. Farmers would be trained on GAHP, improved quality of feed, better ration formulation/feed balancing for animals, animal husbandry practices, biosecurity and GAHP demonstration models were implemented in communes. Matching grants supporting construction of biodigesters, composting facilities, slurry treatment, and implementation of biosecurity measures were considered for farmers. These, in the short term, would help increase efficiency of household-based livestock producers while reducing the environmental impact of livestock production. This was also aimed at enhancing the quality of services (livestock production and animal health) and increase support to farmers to implement GAHP along with monitoring and inspection of farms. The piloting of LPZ was proposed through financing of upgrading basic public infrastructures (roads, electricity, and water supply system), capacity-building activities of livestock production and veterinary services on GAHP, basic epidemiology, data recording and disease monitoring, upgrading of waste management through the implementation of biodigesters infrastructure, and financing for biosecurity measures at the farm and communal level. The livestock producer groups would be established through the project and provided with extension services. The groups (collaborative groups and cooperatives) were intended to encourage harmonized/collaborative implementation of upgrades and improved practices, which also required a behavioral change. The pilot would be evaluated to assess results and sustainability for potential scaling-up.

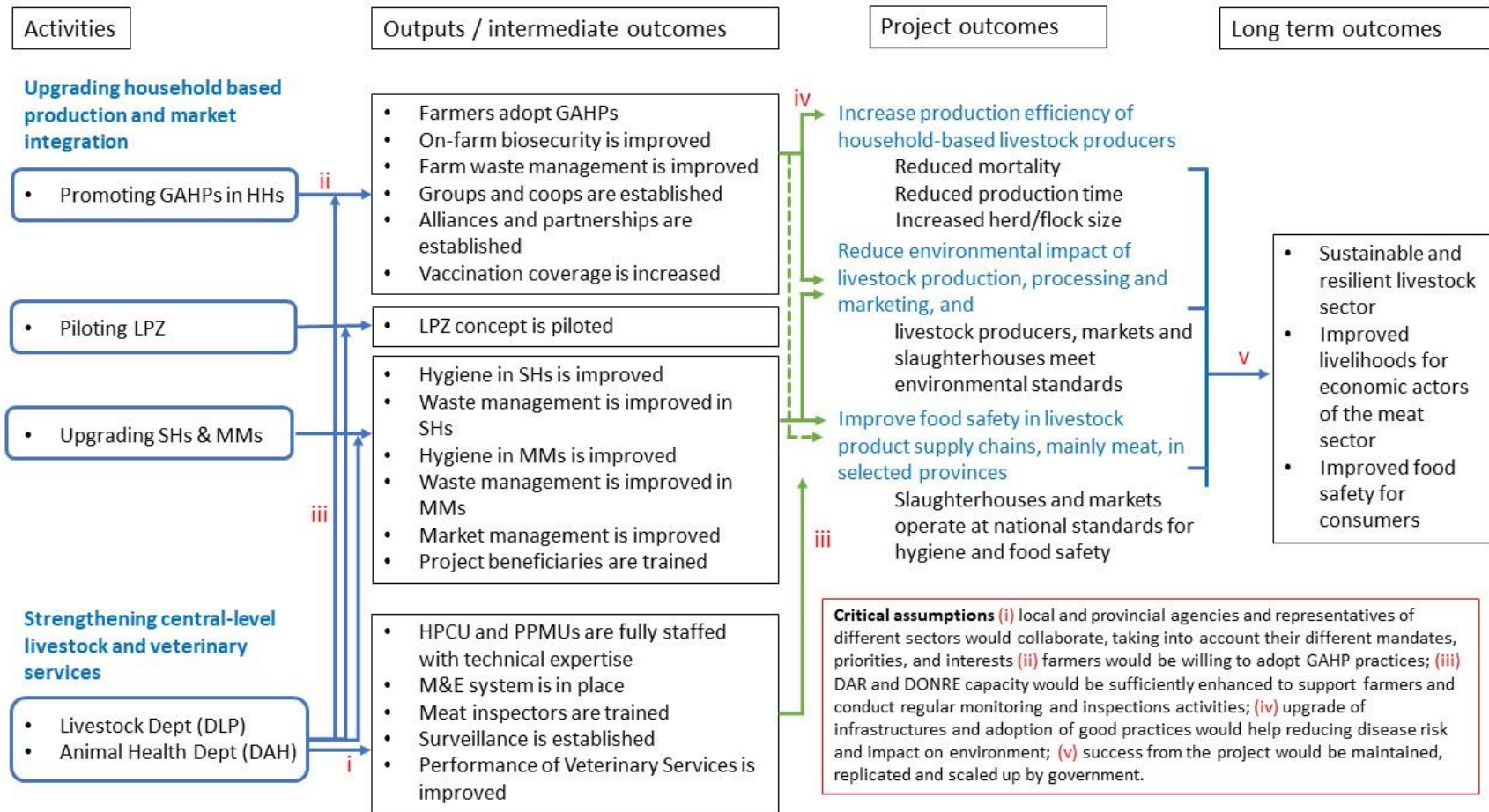
18. **At the processing level** (slaughterhouses), the project would finance upgrades and improvements of meat slaughterhouses and wet markets, adoption of food and safety standards and implementation of waste treatment and management. The proposed activities included upgrading of slaughterhouse and market waste treatment and management; purchasing of equipment for safe and hygienic slaughtering; butchering and meat handling throughout the value chain; and training on food safety of veterinary staff, butchers, and middlemen. In addition, meat inspectors would be trained on proper meat inspection. Also, the provincial sub-DAH was to be equipped for proper meat inspection. This aimed to contribute to enhancing quality of services, as well as monitoring and inspection of markets, and slaughterhouses. The project also planned to establish and maintain sero-surveillance, allowing for the detection of targeted diseases in the project areas as well as feed quality testing, which would inform farmers about reliable sources of feed with quality control. These, in the short term, would help reducing the environmental impact of the sector during processing, and marketing and improving food safety in livestock product supply chains in selected provinces.



19. The results chain presented in figure 1 was formulated using the following critical assumptions: (i) local and provincial agencies and representatives of different sectors would collaborate, considering their different mandates, priorities, and interests; (ii) farmers would be willing to adopt GAHP practices; (iii) institutional capacity (Department of Agriculture and Rural Development [DARD] and Department of Natural Resources and Environment [DONRE]) would be sufficiently enhanced to support farmers and conduct regular monitoring and inspections activities; (iv) upgrade of infrastructures and adoption of good practices would help reducing disease risk and impact on environment; and (v) success from the project would be maintained, replicated and scaled up by government.



Figure 1. Results Chain





Project Development Objectives (PDOs)

20. The PDO was to increase the production efficiency of household-based livestock producers, to reduce the environmental impact of livestock production, processing and marketing, and to improve food safety in livestock product supply chains (mainly meat) in selected provinces.

Key Expected Outcomes and Outcome Indicators

21. **The key outcomes and performance indicators (KPIs)** were the following:

(a) Increased production efficiency of household-based livestock producers:

- i. livestock (pigs) mortality reduced
- ii. livestock (chickens) mortality reduced
- iii. livestock (pigs) fattening times shortened
- iv. livestock (chicken) fattening times shortened
- v. livestock (pigs) herd numbers increased
- vi. livestock (chicken) flock numbers increased

(b) Reduced environmental impact of livestock production, processing and marketing:

- i. Households supported by the project with lessened adverse environmental impact from their production
- ii. Small slaughterhouses supported by the project with lessened adverse environmental impact from slaughtering
- iii. Medium and large slaughterhouses supported by the project meeting national environmental standards
- iv. Wet markets supported by the project meeting national environmental standards

(c) Improved food safety in livestock product supply chains (mainly meat) in selected provinces:

- i. Small slaughterhouses upgraded by the project producing meat of improved quality and safety
- ii. Medium and large supported slaughterhouses meeting national food safety standards
- iii. Supported wet markets meeting national meat quality and safety standards
- iv. Direct project beneficiaries, of whom % female.

22. **The project intended to support up to 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); and 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 the project preparation (see annex 1 of the Project Appraisal Document [PAD] for detailed assessments).

Components

23. **Component A: Upgrading Household-based Livestock Production and Market Integration.** (Total IDA allocation US\$89.79 million, of which original IDA allocation US\$53.77 million and Additional Financing [AF] allocation US\$36.02 million; total Government counterpart funding US\$3.32 million and private sector funding US\$16.61 million; total IDA disbursed was US\$86.81 million, actual Government funding US\$5.25 million, and actual private sector contribution US\$18.83 million).¹ This component would support the improvement of competitiveness of household-based livestock production; food safety and hygiene along the meat supply chain linking household producers, slaughterhouses, and local meat markets; and environmental management of livestock waste. This would be achieved through three subcomponents implemented by DARDs in each of the project provinces.

1. **Promoting GAHP in existing livestock production areas.** The subcomponent would finance (i) the training of farmers, extension officers, and animal production, and veterinary staff in the application of GAHP including feed conversion technology, proactive disease control measurements, and others; (ii) the forming of the producer groups to have better negotiation power to reduce the feed cost and improve access to market; (iii) the provision of equipment and goods to strengthen provincial- and district-level livestock services delivery, including animal disease control and surveillance; (iv) support to waste management and biosecurity investments at the farm level (that is, matching grants for constructing biogas digesters and biosecurity measures); (v) support to DARD and the DONREs for monitoring feed quality and environment impact; and (vi) the design and implementation of a pilot livestock identification system for pigs.
2. **Piloting LPZs.** This subcomponent would support the producers in the LPZ to increase competitiveness through (i) consultant services for spatial planning, design, and ex post evaluation of the LPZs; (ii) the construction of basic public infrastructure, including small access roads and electricity and water supply systems; (iii) the provision of livestock production and veterinary services and training in data recording and disease monitoring with the establishment of livestock producer groups; and (iv) support to waste management and biosecurity investments at the farm level (for example, biogas digesters) and communal level (for example, central lagoon and pipe systems).
3. **Upgrading slaughterhouses and meat markets.** This subcomponent would support the processing and markets linking with the household producers through (i) eligible civil works for upgrading slaughterhouses and meat markets with links to household producers to improve their hygienic conditions and waste treatment and management; (ii) basic equipment for safe and hygienic slaughtering and meat handling; (iii) training of meat inspectors to carry out proper inspection; (iv) training of veterinary staff, butchers, and middlemen; and (v) equipment and operating costs for provincial sub-DAHs to implement meat inspection.

¹ The financing numbers provided in this document were sourced from Bank records and the Government implementation completion report. While the Bank and Government records were overall consistent, there were slight differences due to rounding and different exchange rates applied.



24. **Component B: Strengthening Central-Level Livestock and Veterinary Services** (Total IDA allocation US\$8.48 million, of which original IDA US\$4.21 million and AF allocation US\$4.27 million; total Government counterpart funding US\$0.18 million and private sector funding US\$0.0 million; total IDA disbursed was US\$7.15 million, actual Government funding was US\$0.02 million). This component would support the strengthening of the capacity of DLP and DAH under MARD in developing and monitoring the implementation of animal health including livestock disease, biosecurity, animal production technology, food safety, and livestock waste management policies and technical standards. The component would finance (a) consultant services to review and update the GAHP standards and guidelines and to carry out strategic studies; (b) the training of trainers in GAHP (for example, production efficiency, disease control and prevention, regulatory enforcement for DLP, and integrated risk management and meat inspection for DAH); (c) piloting of innovative approaches (for example, breed quality certification, true-labeling feed quality certification); (d) equipment and incremental costs for DLP to monitor livestock breed and feed quality and for DONRE to monitor livestock waste management and environmental compliance; and (e) equipment and incremental costs for DAH to support disease surveillance and prevention and meat inspection at the provincial level as well as the upgrading of the collection and monitoring of zoo sanitary and food safety data.

25. **Component C: Project Management, Monitoring and Evaluation** (Total IDA allocation US\$9.87 million, of which original IDA allocation US\$7.28 million and AF allocation US\$2.59 million; total Government counterpart funding US\$3.65 million and private sector funding US\$0.0 million; total IDA disbursed was US\$11.71 million and actual Government funding US\$2.87 million). This component would support project implementation through the strengthening of coordination of the various government agencies at central, provincial, and district levels, and the monitoring and evaluation (M&E) of project activities and impact. This component would be implemented by a Project Coordination Unit (PCU) appointed by MARD at the national level and Provincial Project Management Units (PPMUs) at the provincial level. The component would finance (a) an international Chief Technical Assistant and national consultants to strengthen the project management capacity of the PCU and PPMUs, (b) equipment and incremental staff and operating costs for the PCU and PPMUs, and (c) project M&E through consultant services, training, workshops, and studies.

B. SIGNIFICANT CHANGES DURING IMPLEMENTATION

Revised PDO and Outcome Targets

26. The PDO was not revised throughout the project; it remained identical for the AF period. A number of indicators were amended for the AF; they are summarized in table 1.



Table 1. Result Framework and Its Revisions in the AF

Original project indicators	AF indicators	Comment/Justification
PDO Indicator 1. Increase production efficiency of household-based livestock producers	Increase efficiency of household-based livestock production through adoption of GAHP	Changed wording order to express the objective more precisely
Reducing mortality rate by 30%	Livestock mortality rates reduced from 15% to 10% for pigs and from 41% to 29% for poultry	More specific targets for the AF period, set in light of the project's experience. The wording order were changed to improve clarity. Measuring units were changed from 'percentage of' to absolute number for ease of monitoring and clarity.
Reducing fattening period by 15%	Livestock fattening times shortened from 135 to 116 days for pigs and from 66 to 56 days for poultry	
Increasing the size of flocks by 15%	Herd/flock numbers increased from 26 to 40 for pigs and from 935 to 1,800 for poultry	
PDO Indicator 2. Reduce environmental impact of livestock production, processing, and marketing	Unchanged	
Percentage of livestock producers supported by the project meeting environmental standards (from 0 to 70%)	Households supported by the project with lessened environment impacts from their production (from 9,905 in Year 5 to 25,000 in Year 9).	Specification of the targeted number of households. No environmental standard for household-level production exists. The indicator was revised to capture precisely the nature of the project support to GAHP households to reduce the adverse environmental impacts of household livestock production.
Percentage of slaughterhouses supported by the project meeting environmental standards (from 0 at the baseline to 90% in Year 5)	Small slaughterhouses supported by the project with lessened adverse environmental impact from slaughtering (from 124 in Year 5 to 310 in Year 9).	Added to monitor progress of the work with small slaughterhouses introduced by the project at midterm.
	Medium and large slaughterhouses supported by the project meeting national environmental standards (from 19 in Year 5 to 40 in Year 9).	Medium and large slaughterhouses separated from small slaughterhouses, as the provided project assistance was different.
Percentage of meat markets supported by the project meeting environmental standards (from 0 at the baseline to 90% in Year 5)	Wet markets supported by the project meeting national environmental standards (from 311 in Year 5 to 500 in Year 9).	Numerical target replaced percentage.
PDO Indicator 3. Improve food safety in livestock product supply chains, mainly meat, in selected provinces	Unchanged	
Percentage of slaughterhouses supported by the project operating at the national hygienic standards	Small slaughterhouses supported by the project producing meat with improved quality and safety (from 143 in Year 5 to 335 in Year 9).	Added to monitor progress of the work with small slaughterhouses introduced by the project.



Original project indicators	AF indicators	Comment/Justification
(from 0 at the baseline to 90 in Year 5)		

Revised Components

27. The components and subcomponents were not revised (see next para).

Other Changes

28. An IDA additional financing in the amount of US\$44.68 million with a project restructuring was approved in October 2015. The AF activities emphasized capacity building initiatives, including support to cooperatives and less formal groups for production and marketing, improving management of meat markets, and assistance to GoV for legal and policy dialogue and reform.

29. A first project restructuring was approved on November 2018 to:

- Reduce the project end target for the intermediate outcome Indicator ‘Groups of livestock producer households in priority production areas having received GAHP certification’ from 1,200 to 700
- Replace the intermediate outcome indicator ‘Animal Breeding and Feeding Center appointed National Reference Center’ which was replaced by ‘National Center for Veterinary Hygiene Inspection No. 1 appointed National Reference Center’

30. A second project restructuring was approved in January 2019 to extend the project closing date from December 31, 2018, to June 30, 2019.

Rationale for Changes and Their Implication on the Original Theory of Change

31. The AF and associated restructuring were aimed at scaling up the interventions, consolidating achievements of the first phase and improving the project’s sustainability, i.e.:

- Scale up interventions for GAHP household producers, wet markets, and small slaughterhouses to enhance impact, with targets higher than the originals as geographic coverage was expanded within the 12 original project provinces. These activities were primarily in Component A.
- Consolidate achievements of the first phase and improve the project’s sustainability nationwide by (a) building on the GAHP households’ achievements by introduction of a group/cooperative approach for households as the medium for development of livestock production under Component A and (b) increasing support for institutionalization by the GoV of its successes such as adoption of the food safety guidelines as national standards and strengthening and accreditation of the laboratory network under Component B.

32. The first restructuring aimed at adjusting the target for one intermediate outcome indicator and replacement for another intermediate outcome indicator. This was meant to correct the earlier oversight



in the AF PAD and to be in line with MARD’s feasibility study agreed upon at the AF negotiations. This was also meant to reflect MARD’s decision of assigning the National Center for Veterinary Hygiene Inspection No. 1 to be a National Reference Center instead of the Animal Breeding and Feeding Center with the support from the LIFSAP.

33. With the second restructuring, the closing date was extended to allow for the completion of project activities delayed because of constraints placed by the GoV on IDA budget allocations in 2016. The reason for this proposed no-cost six-month extension was to enable the project to improve the quality of the remaining investments and properly complete some of the ongoing work due to accumulated delays since 2016 when the project was not sufficiently allocated implementation budget. At the same time, it was expected that the no-cost extension of closing date would help MARD use some of the resources gained through SDR-US\$ exchange to support the preparation of the proposed Agriculture Food Safety Project (AFSP).²

34. These changes did not alter the long-term objective of the project nor the PDO outcome indicators in the results chain.

II. OUTCOME

A. RELEVANCE OF PDOs

Assessment of Relevance of PDO and Rating

Rating: High

35. To date, the PDO remains in alignment with the World Bank’s Country Partnership Strategy for 2018–2022 (Report Number 111771), which has three focus areas to (a) enable inclusive growth and private sector participation, (b) invest in people and knowledge, and (c) ensure environmental sustainability and resilience, with governance as a cross-cutting engagement area. The project also contributed to the CPF’s objective of broadening the economic participation of ethnic minorities, women, and vulnerable groups and, to a growing extent, to future developments to be supported by the CPF’s Focus Area 1 (Enable Inclusive Growth and Private Sector Participation), in which the promotion of private sector participation and agribusiness development and enhancement of trade competitiveness are emphasized for the agriculture sector.

36. The project’s objective is also consistent with the Government’s development priorities outlined in the 2011–2020 Socioeconomic Development Strategy and subsequent 2016–2020 Socioeconomic Development Plan (Resolution No.142/2016/QH13), in which the GoV sets the objectives for future development including reforms and growth targets on “a new environmentally sustainable growth model based on improved productivity and competitiveness, and investments in infrastructure development”.

² The GoV also expressed its intention to extend the project further after June 30, 2019, by another year to help respond to the ASF. However, this never materialized because the official request was not delivered on time and the World Bank Management advised the task team to proceed to close the project and prepare the Implementation Completion and Results Report (ICR).



37. The objectives of the project are also in line with the Agricultural Restructuring Plan in the agricultural sector toward increased added values and sustainable development approved by the Prime Minister under Decision No. 899 /QD-TTg dated in June 2013, with the objective “to maintain growth, improve efficiency and competitiveness through increased productivity, quality and added values, to better meet the needs and tastes of domestic consumers and to boost exports ...” and “... to reduce greenhouse gas emissions and other negative impacts on the environment...” An updated Agricultural Restructuring Plan was signed in 2018, with which project objectives remain aligned.

38. The project objectives were fully consistent with objectives set out in restructuring the livestock production toward increased added values and sustainable development, approved by the Minister of Agriculture and Rural Development under Decision No. 984 / QD-CN dated in September 2014 with the aim of “promoting the advantages of some types of livestock production to enhance productivity, quality, competitiveness and added values; sustainable development to contribute to ensuring social security and environmental protection.”

39. The objectives of the project also remain relevant to the national concerns regarding food safety. In particular, they are still in line with the national strategy on food safety for 2011–2020 and vision to 2030 approved by the Prime Minister under Decision No. 20/2014/QD-TTg dated January 2012. The project was an important step for the World Bank to enter into a longer-term engagement with Vietnam on this issue. After the project was closed, the Minister of MARD officially requested the World Bank to continue providing support for a follow-up operation on food safety built on the achievements of the LIFSAP.

B. ACHIEVEMENT OF PDOs (EFFICACY)

Assessment of Achievement of Each Objective/Outcome

40. By the closing date, the project had achieved all its outcomes. The project has benefited 155,728 direct beneficiaries (of which 49 percent are female beneficiaries), about 15 percent higher than the target of 135,000 direct beneficiaries.

41. For most of the outcome indicators, such as the reduction in pig and chicken mortality rates, shortening of fattening/finishing times, and increase in the number of pigs/birds per herd/flock, the end-of-project targets have been exceeded. The summary of levels of achievement for all the KPIs is shown in table 2. The results reported here are aggregated from the 12 implementing Provinces.



Table 2. Summary of Results, Expressed in Terms of Achievements for Each Objective Outcome

Outcome Indicator	Unit of Measurement	Original baseline 2010	With AF baseline 2015	Actual Achievement 2019	End of Project Target (2019)
Outcome 1: Increase the Production Efficiency of Household-Based Livestock Producers					
Livestock mortality rates reduced	Percentage of pigs	15	11.8	10	10
	Percentage of chickens	41	31.12	13.9	29
Livestock fattening times shortened	Days for pigs	135	118	116.03	116
	Days for poultry	66	58	55.96	56
Number of pigs/birds per herd/flock increased	Number of pigs	26	31	40.00	40
	Number of birds	935	1,400	1,826	1,800
Outcome 2: Reduce the Environmental Impact of Livestock Production, Processing, and Marketing					
Households supported by the project with lessened ³ adverse environment impacts from their production	Households	—	10,999	25,172	25,000
Small slaughterhouses supported by the project with lessened adverse environmental impact from slaughtering	Number	—	193	303	310
Medium and large slaughterhouses supported by the project meeting national environment standards	Number	—	42	70	40
Wet markets supported by the project meeting national environmental standards	Number	—	378	572	500
Outcome 3: Improve Food Safety in Livestock Product Supply Chains in Selected Provinces					
Small slaughterhouses upgraded by the project producing meat of improving quality and safety	Number	—	235	373	350
Supported wet markets meeting national meat quality and safety standards	Number	—	378	572	500
Direct project beneficiaries (including female)	Number	—	120,819	155,728 (49% female)	135,000

Source: Project M&E Records, 2015 and 2019; some of the achieved figures have been rounded up.

42. **The project has increased the production efficiency at three levels (outcome 1):** (a) individual household-based livestock producers, (b) collaborative groups and cooperatives, and (c) LPZ.

³ Improved waste management measures adopted.

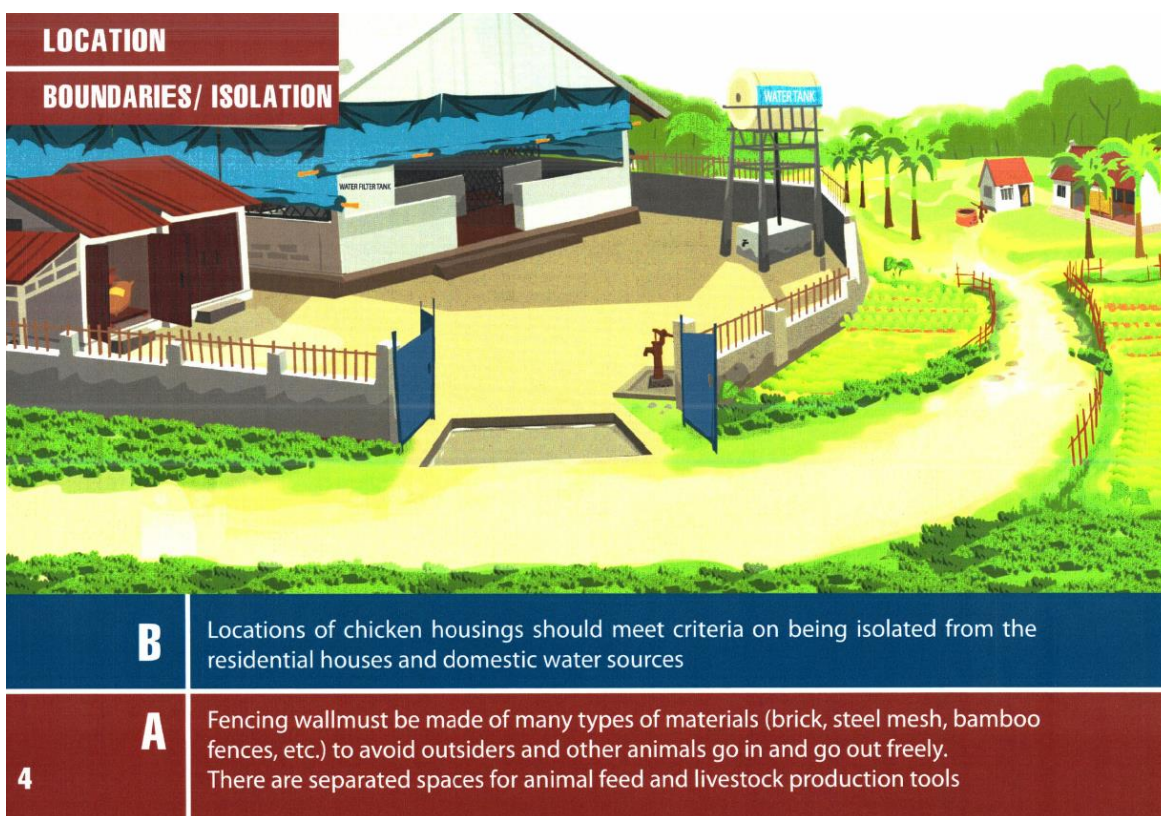


- (a) **At the micro level, for household-based livestock producers**, the project achievement relates to increased flock/herd size, reduced mortality, and reduced fattening times, all being reflective of the project performance through adoption of GAHP by small producers, intensification of extension services, grants for investments relating to animal health (including biosecurity, quarantine areas, footbaths, disinfection, vaccination, good quality feed without antibiotics or hormones), disease monitoring and reporting, inspection for GAHP compliance and certification. According to the Government's Project Completion Report (2019) and as reflected in the project's M&E records, the average pig herd size per GAHP household supported by the project has increased from 26 heads at project start in 2010 to 40 heads (increase of 55 percent). Chicken flock size averages increased from 935 heads per GAHP household to 1,826 heads during the same period. Thus, more than 100 percent of the targets were achieved (pigs: 40 heads/household; chicken: 1,800 heads/household). The adoption of GAHP with 715 groups of livestock producers being GAHP certified was key to achieving the PDOs in combination with the increased support from better capacitated extension workers and veterinary staff particularly in epidemiology, data recording, disease monitoring, GAHP standards, and so on. It was also critical to reduce mortality among animals. This is reflected in the achievement of the following PDO indicators: (a) average mortality rates for pigs and chicken were reduced from 15 percent (pigs) and 41 percent (chicken) in 2010 to 10 percent for pigs (that is, the target) and 13.9 percent for chicken (target 29 percent); (b) average livestock fattening times were shortened from 135 days (pigs) and 66 days (chicken) in 2010 to 116 days (pigs) and 56 days (chicken), respectively, thereby fully achieving the targets (see table 2). These results have led to improved biosecurity and disease control at farm, slaughterhouses, and market levels. Vaccination for common diseases for animals reached 93.7 percent.
- (b) **At the meso level** (GAHP household collaborative groups and cooperatives), the number of collaborative groups (n = 232) and cooperatives (n = 19) established is also reflective of the project performance. According to the Government's Project Completion Report (2019), a total of 1,217 farmers in collaborative groups were supported by the project. Collaborative groups and cooperatives were able to secure links with sellers to access quality inputs at lower prices, links with buyers to provide critical mass quantities of meat, and also technical assistance. Cooperatives were to establish productive alliances with traders, transporters, slaughterhouses, markets, breeders, and feed suppliers. Higher levels of efficiency were obtained through the collaborative/cooperative model. The joint purchase of animal feed by collaborative groups helped member households save from VND 400 to VND 720 per kg of animal feed, accounting for 2.8–5.1 percent of production cost (According to the Government's Project Completion Report, 2019).

Box 1. Good Animal Husbandry Practices

Animal husbandry is the branch of agriculture concerned with animals (livestock) that are raised for meat, milk, eggs, or other products. It includes day-to-day care, selective breeding, and the raising of livestock. Animal husbandry practices range from dehorning cattle to preventing injury to herd mates and farm hands to methods for housing livestock, providing adequate nutrition, devising breeding strategies, and managing pets that live in the household. GAHP are all actions involved in primary production and distribution of food products of agricultural origin and livestock to ensure animal health and welfare, food safety as well as the protection of the environment and of the people who work on farms. The Livestock Competitiveness and Food Safety Project (LIFSAP) developed 'GAHP for household-based Production Handbook' for swine⁴ and for chickens⁵. The LIFSAP GAHP handbook covers nine topics: location of housing, housing and livestock production tools, animal breeding management, animal feed, drinking water, veterinary hygiene, consumption of animal, livestock waste management and environmental protection, and recording and filing. The recommendations are classified as 'must comply with' and 'need or should comply with'. The LIFSAP GAHP handbook displays recommendations under the forms of stylized illustration (figure 2).

Figure 2. Example of Recommendation Provided by the LIFSAP GAHP Handbook



Source: LIFSAP GAHP Handbook.

⁴ Swine: <https://drive.google.com/open?id=11rMDb3OPQhMPeHv31moujGglfq3OFz1Q>.

⁵ Chicken: <https://drive.google.com/open?id=13MIPDYcRS6PwYn8VcRZB9hEKmh7nejUC>.



- (c) **At the macro level (LPZ)**, the project piloted one scheme (designed as a miniature and enhanced GAHP zone) demonstrating that geographical concentration of the livestock activities enables higher efficiency (ease of extension and veterinary services, common wastewater treatment facilities, common waste management approaches, GAHP on a deeper basis in all participating farms, animal health activities across the livestock population, and so on). For example, in LPZ, proportion of vaccination for common diseases of pigs reached 95.8 percent (Government's Project Completion Report, 2019).

43. **The project achieved environmental benefits at three levels (Outcome 2):** (a) livestock producers, (b) slaughterhouses, and (c) meat markets:

- (a) **The project has supported a total of 25,172 households** in improvement of waste management measures to reduce negative environmental impacts from livestock production. Financial, technology transfer, and knowledge support were provided for 17,493 households and construction of biodigesters (biogas works), 1,608 households and construction of composting pits. In addition, 6,371 households received technology transfer support through provision of guidance on upgrading to a proper waste treatment system. It led to a reduction in (i) methane emissions from manure; (ii) greenhouse gas (GHG) emissions by reducing the use of traditional fuels; and (iii) GHG emissions by using fertilizers from bio-slurry to replace chemical fertilizers.
- (b) **The project supported in total 373 slaughterhouses** (70 medium- and large-scale with more than 30 pigs per day and 303 small-scale with 10–30 pigs per day) upgraded to improved veterinary and sanitation adaptation, which enabled the slaughterhouses to meet GoV environmental standards, and the project achieved 124 percent of the target of 350 slaughterhouses.⁶ Slaughterhouses supported by the project had simple or degraded wastewater treatment systems before upgrading them or constructing new. The project contributed to improved quality of post-treatment wastewater discharged into the environment, thereby reducing environmental pollution.
- (c) **The project has upgraded 572 meat markets** with a total of 20,538 counters, achieving 114 percent of the overall target for the project of 500. All upgraded meat markets have been supported in improvement of waste and wastewater treatment, resulting in reduced environmental pollution. A total of 572 wet markets and medium/large slaughterhouses supported by the project met national environmental standards.

44. **The project contributed to improved food safety at three levels (Outcome 3):** (a) livestock producers, (b) slaughterhouses, and (c) meat markets:

- (a) **On farms**, the results of food safety monitoring in project GAHP areas of seven provinces based on 204 pork samples of GAHP households showed that 100 percent of meat samples were negative in tests for chemical contamination; the samples contained neither hormones nor any

⁶ The lower than the project target for small slaughterhouses (303 instead of 310) was due to the preference of the GoV for medium to large slaughterhouses compared to small and more numerous facilities. As a result, the target for medium and large slaughterhouses supported by the project meeting national environment standards was exceeded (70 instead of 40).



banned substances. The same holds true for animal feeds when tested for hormones and banned substances.

- (b) **Food safety monitoring at slaughterhouses** has shown a reduced and low microbial contamination on carcass samples and slaughter tools, which demonstrates the effectiveness of project interventions in terms of upgrading structures and creating awareness in slaughterhouse operators to comply with existing regulations. However, the food safety monitoring also revealed areas for improvement in slaughtering and handling procedures in some slaughterhouses to improve meat quality, hygiene, shelf life, and consumer trust.
- (c) **According to food safety monitoring at meat markets** (see figure 3), around 90 percent of pork meat samples meet the required criteria on microbial contamination (*Escherichia coli*, *Salmonella*) criteria, while for chicken around 75 percent of samples met the requirement for *E. coli* criteria and 92 percent met the criteria required for *Salmonella*. At the same time, there are still some shortcomings and challenges, in particular regarding the use of appropriate equipment, with potential risks of microbial contamination of meat traded in the upgraded markets. However, the GoV will continue to address these issues in coordination with local authorities, meat market management boards, and sub-DAHs by providing recommendations, guidance, and supervision to enforce required operation procedures and improve food safety.

45. The project had significant spillover effects through its capacity-building activities. An additional 43,076 households outside the project benefited from GAHP trainings (22,906 project households were trained in GAHP). It is the result of enhanced capacity at the Livestock Department and Animal Health Department. The approach of collaborative GAHP groups has spread to other provinces.

Box 2. Comment from a Project Beneficiary

Ms. Nguyen Thi Kim Tuyet (born in 1969) in Hung Nhon Hamlet, Hung Loc Commune, Thong Nhat District, Dong Nai Province. Ms. Tuyet said, each year her family raised 2 cohorts, about 300 pigs each. Currently, her family has more than 280 pigs with 30 sows and more than 250 porkers, reaching about 20 tons per cohort. The current price of pig (January 2018) purchased by traders is VND 35,000 per kg, and hence her family receives a profit of about VND 4,000 per kg. If the price remains unchanged or increases slightly, her family can have some savings to cover all expenses and restart a new herd at the beginning of next year. Upon being asked, “What is the biggest benefit that your family gets when participating in the LIFSAP project?” Ms. Tuyet shared, “After six years of participating in the LIFSAP project, the biggest thing my family got was the opportunity to approach and learn advanced farming methods and techniques.” Currently, she is able to take care of pigs herself and treat some simple diseases for pigs. Ms. Cuc, VietGAHP team leader at Hung Nhon Hamlet, Hung Loc Commune, Thong Nhat District, Dong Nai Province, happily shared, “Even after the project ends, our VietGAHP team will continue to maintain activities so that we can exchange, learn and help each other.”

See also project stories in annex 6.

Figure 3. Examples of Wet Markets, before and after Project Implementation

Food hygiene and safety condition of meat counter area improved



Đô Hội market – Quốc Oai – before and after upgrade



Sóc Sơn market – Sóc Sơn - before and after upgrade

Source and photo credit: LIFSAP

Justification of Overall Efficacy Rating

Rating: Substantial

46. In terms of outcomes, the project achieved its objectives of increasing production efficiency of household producers through the adoption of GAHP by reducing animal and bird mortality rates, shortening the fattening period, and increasing the size of flocks and herds, and reducing negative environmental impact through the percentage of project-supported livestock producers, slaughterhouses, and meat market that have met environmental standards and improved food safety through the adoption of national hygiene standards.

47. The successes from the project have gone beyond the project beneficiaries, resulting in positive impacts throughout the poultry and pig sector. They have been widely replicated by other farmers



throughout the project areas and are good practices to be shared with other provinces. All but one of the end-of-project results targets at the component level were either met or exceeded.

48. The project also helped to increase resilience of farmers as indicated by fewer African swine fever (ASF) outbreaks in GAHP farmers than those who practiced conventional pig husbandry. LIFSAP data showed lower incidence of ASF infections in pigs that have been reared by the GAHP farmers compared to the average national rate of infection and mortality of pigs due to ASF infection. For example, data collected in Hanoi, in early October 2019, indicated that the percentage of ASF-affected households applying GAHP was lower (21.3 percent) compared to the overall percentage (38.9 percent). Also, the Livestock Planning Zone developed by the LIFSAP remained free from the infection at the time of project closing (see details on ASF outbreak in Vietnam in Box 3 below).

C. EFFICIENCY

Assessment of Efficiency and Rating

Rating: Substantial

49. The project has achieved or overachieved most indicator targets in the Results Framework while spending only about 96 percent (US\$105.43 million) of the total IDA funding (original plus additional financing) of US\$109.94. Actual counterpart funding (government and private sector) was higher than allocated. This indicates that the project has been highly efficient in terms of converting project resources into results. The project team also demonstrated a higher level of implementation efficiency as they addressed emerging implementation challenges in a time and effective manner.

50. The estimate of the overall project economic analysis (EA) is based on the livestock production benefits and the economic benefits from investments in biogas digesters. The potential economic benefits from project support to improved food safety at the levels of livestock producers, slaughterhouses, and meat markets have not been included in the project EA due to the limited data to support a credible analysis. Translation of food safety benefits in economic terms was not planned in the project. Globally, cost of unsafe food in low- and middle-income economies is estimated to be around US\$110 billion in lost productivity and medical expenses each year⁷. The ICR mission recommended that in subsequent projects (such as for example, the proposed Agri-Food Safety Project (P171187) there is a need to collect data on economic benefit of the enhanced food safety to provide evidence of improvement achieved and related economic gains through food safety project interventions.

51. The preliminary results show that the project contributed significantly toward improving incomes of the supported pig and poultry farmers while improving the food safety for a large number of consumers, as estimated using the standard methodology for estimating project's economic returns (annex 4). Income increases of slaughterhouse and meat market operators have not been estimated.

⁷ Jaffee, Steven; Henson, Spencer; Unnevehr, Laurian; Grace, Delia; Cassou, Emilie. 2019. The Safe Food Imperative: Accelerating Progress in Low- and Middle-Income Countries. Agriculture and Food Series; Washington, DC: World Bank. © World Bank. <https://openknowledge.worldbank.org/handle/10986/30568> License: CC BY 3.0 IGO.



Significant increases in profitability of many operators resulting from the project are expected, although data have not been made available.

52. The economic and financial analysis (EFA) results presented in table 3 shows that the project has generated economic returns above what was estimated at appraisal, even without including the potential economic benefits from improved food safety in the analysis. The benefits remain robust at different sensitivity scenarios of increased/reduced benefits.

Table 3. Summary of Overall Project Economic Analysis and Sensitivity Analysis

		Change					
		Base case	+10%	-10%	-20%	-30%	-40%
Pig benefits		Base case	+10%	-10%	-20%	-30%	-40%
Poultry benefits		Base case	+10%	-10%	-20%	-30%	-40%
Period of analysis: 25 years							
ERR		23.4%	26.5%	20.4%	17.4%	14.4%	11.4%
NPV at 9%	VND, millions	6,605,967	7,523,019	5,688,914	4,771,862	3,854,810	2,937,758
	US\$, millions	287.2	327.1	247.3	207.5	167.6	127.7
Period of analysis: 20 years							
ERR		22.5%	25.8%	19.3%	16.1%	12.8%	9.3%
NPV at 9%	VND, millions	4,361,054	5,043,191	3,678,918	2,996,782	2,314,646	1,632,510
	US\$, millions	189.6	219.3	160.0	130.3	100.6	71.0

Source: World Bank estimates.

Note: ERR: Economic rate of return; NPV: Net present value.

53. Regarding green-house gas (GHG) emission, the Government team has not been able to estimate the increase or reduction in GHG emissions as a result of the project interventions. Therefore, carbon pricing scenarios have not been included in the estimated ERR. Project interventions, such as biodigesters for example, are expected to have contributed to an overall positive impact on GHG emission by reducing relative emissions through more sustainable treatment of animal waste.

D. JUSTIFICATION OF OVERALL OUTCOME RATING

Rating: Satisfactory

54. The overall outcome rating is Satisfactory, which is based on the project’s high relevance, substantial efficacy, and substantial efficiency. The project succeeded in increasing production efficiency of household producers, reducing negative environmental impact, improving food safety along the pig and poultry value chains, and increasing volume of sales and profit made by slaughterhouses and meat traders. The project contributed to significantly improving incomes of the supported pig and poultry farmers (as shown in the financial and economic analysis) while improving the food safety for a large number of consumers.



E. OTHER OUTCOMES AND IMPACTS

Gender

55. According to the Government's Project Completion Report (2019), the number of women benefiting of the project is significant, 76,307, despite being below target in terms of share (49 percent of beneficiaries versus an end target of 55 percent). The project benefited about 10 different ethnic groups. The project reached 13,467 women farmers with agricultural assets and services and 13,720 women farmers adopted improved agricultural technology. The bulk of women beneficiaries are reached through the project market activities (including women from ethnic minority) as most meat vendors are female. The quality of impact on women with market activities included improved working conditions and occupational safety through training (for example, food safety) and better equipment (for example, ventilators and upgraded counter); more efficient processing and sale of meat products (that is, less time spent at the market) allowing women to spend more time on other tasks and activities, in some cases increased volume of sale due to the disappearance of vendors on the side of the market; and increased knowledge of consumers of GAHP meat. The group has been guided in the management and monitoring of savings and loans on the principle of self-governance, openness, and transparency.

56. To ensure women's full participation and benefits from activities, the project worked in coordination with the Central Vietnam Women's Union, the provincial Women's Union to improve livestock awareness, behavioral change, and strengthening links among women participating in GAHP.

Institutional Strengthening

57. The project has provided concrete examples of what the GoV can do to improve (on farm) hygiene and food safety among smallholders and small businesses in Vietnam. This has always been a challenging task and the LIFSAP has delivered a proof of concept in this respect, as the first donor-supported project to take on such a difficult issue. The experience of the LIFSAP has shaped the design of the institutional strengthening in the proposed Agri-Food Safety Project (AFSP, P171187) which the World Bank and the GoV have agreed to prepare and implement to scale up some of the successful interventions implemented under the LIFSAP to enhance food safety.

58. The project has strengthened the capacity of DLP and DAH through training and development of tools (manuals, guidelines, and so on). As a result, DLP and DAH are able to provide quality support to farmers in terms of biosecurity, livestock waste management, quality of livestock feeds, sale and use of feed additives, hygiene standards, and quality and frequency of meat inspection. It will be important for MARD to keep and enhance the institutional capacity gains of DLP and DAH by developing a long-term capacity-building plan to maintain and enhance its gains. It would require planning and budgeting for refresher training, scaling up of current training, and training materials (development/printing/translation in ethnic minority language). In addition, veterinary undergraduate curricula have been upgraded with provision of courses on food safety along animal sourced food value chains.

59. The project acted as a proof of concept for a number of new approaches used in livestock production and management, such as for example, introduction of good animal husbandry practices (GAHP), the application of bio-security measures for disease control and prevention and the piloting of Livestock Planning Zones (LPZ). These new approaches and concepts have been reflected in the



formulation of the Livestock Law and the Veterinary Law, contributing to (a) feed quality monitoring program by changing the feed quality management method from feed portfolio management method to feed quality management; (b) supporting DLP to develop farm information monitoring system software and system software to provide market information about livestock products; (c) humanitarian treatment of animals for slaughtering; and (d) institutionalization of animal disease monitoring and tools to manage the small slaughterhouses by the requirements on veterinary hygiene for small slaughterhouses.

60. The project has contributed to the reinforcement of institutional capacity through the training of the workforce. As an example, a total of 4,628 agricultural and veterinary extension workers were trained on GAHP processes, GAHP certification process, disease reporting systems, livestock waste management, and food safety (Project M&E Records, as highlighted in the Government's Project Completion Report, 2019). About 10,665 veterinary staff in charge of supervising slaughterhouse operation and quarantine at slaughterhouses and markets were trained. Nineteen cooperatives were established with 552 members.

61. Since 2016, the project phased out from monitoring animal feed at local agencies and transferred this annual task to specialized agencies in charge. Aflatoxin B1 mycotoxin was not found in livestock feed at the households, which indicated their high awareness and knowledge in selecting and preserving materials and animal feed. The design and procedures of the slaughterhouses' and wet markets' management and operation have been followed by all units throughout the country. Currently, MARD is also reviewing for dissemination and application during implementation of the New Rural Development Program in the whole country.

Mobilizing Private Sector Financing

62. The project helped stakeholders along the meat value chain (pig and poultry) to establish and consolidate productive alliances or partnerships to ensure well-functioning markets to supply quality and safe meat products, as well as inputs (feed, veterinary drugs, and services) to producers. By supporting the upgrading of medium- and large-scale slaughterhouses, through matching grants mechanism, the project leveraged private sector funding to support the pig and poultry sector.

63. In late 2016 and 2017, pig production in the whole country suffered from a deep and prolonged decline in the price down to VND 17,000–25,000 per kg, which was much lower than the production cost. Pig farmers had to leave the barn empty or stop raising livestock, but the GAHP households still produced owing to clear production plans and fixed consumption contracts with businesses and purchasing units. Right after the pig price recovered at the end of 2017, all GAHP households had increased their herds again while non-GAHP households had not been able to conduct reproduction due to losses.

64. The project has helped develop 30 product brands in 12 provinces such as Soc Son hill free-range chicken, Ha Noi A–Z (clean pork A–Z) of Hoang Long Cooperative - Hanoi Herbal pork.

Poverty Reduction and Shared Prosperity

65. The project had a positive impact on ethnic minorities and women. Some minorities adopted GAHP but could not get certified (mainly because they could not meet the A type criterion on record keeping); nevertheless, these groups benefited from GAHP support training and equipment.



Other Unintended Outcomes and Impacts

66. Gas from biodigester is used as fuel for cooking food, cooking animal feed, and water boiling. The project was able to establish that each household saved from US\$15 to US\$20 per month by looking at savings in terms of gas, wood, coal, and so on. Biodigester also contributes to other impacts that cannot always be measured such as less flies, reduction of bad smell, no mosquito larva, and less coliform density. In some cases, the leftovers from the biodigester were used as compost fertilizer for rice fields.

67. The project was an example to the government on how to conduct different awareness campaign (newspaper, TV, radio, electronic papers, and so on) on GAHP meat to increase consumers' knowledge on the benefits of GAHP meat and potentially increase demand for safe livestock from farm to fork. This experience has also been useful to manage the ASF crisis.

68. There are several spillover effects: (a) the upgrading of market also benefited other traders (fish and vegetables traders) and (b) farmers neighboring GAHP areas started learning from their neighbors and implementing GAHP.

69. The project has contributed to addressing the challenge of antimicrobial resistance (AMR) by promoting GAHP, which implies better prevention of infectious diseases and the prudent use of antibiotics in the pig and poultry sectors, the segments of the livestock sector that generally have the highest use of antibiotics. Antimicrobials are widely used in both humans and livestock and have greatly contributed to better human and animal health. However, these benefits are being threatened by the global emergence of AMR. Because humans and animals often share the same bacteria and may be treated with the same types of antibacterial drugs, resistance to antibiotics is the most critical aspect of AMR for the livestock sector. One way to mitigate the emergence of AMR is to reduce the overall use of antibiotics by combining prudent and medically rational use with other disease preventive measures.

III. KEY FACTORS THAT AFFECTED IMPLEMENTATION AND OUTCOME

A. KEY FACTORS DURING PREPARATION

70. The project introduced new concepts and approaches to sustainable livestock management, which required enough time to be understood and customized to the local context. For example, concepts such as GAHP, biosecurity measures, food safety practices, livestock waste management, while not entirely new to Vietnam, were not consistently applied by various stakeholders along the pig and poultry livestock value chains. Most of these concepts and approaches required a mindset change in terms of practices and behaviors, much more than just investments. As such mainstreaming such concepts required enough time and a clear approach and design to ensure success in the implementation of the new concepts.

71. Given the novelty of the approaches introduced under the LIFSAP, there was need for a lot of capacity building of technical staff in the responsible departments of MARD and at the provincial DARDs to ensure their active participation in the training of producers and other stakeholders in the new concepts and approaches to sustainable livestock production. This, too, required a lot of time and



adequate planning, including the review of procedures and manuals to conform to the new concepts and approaches.

B. KEY FACTORS DURING IMPLEMENTATION

72. Overall, the positive project results can be attributed to a combination of factors including appropriate project design targeted to local conditions; demonstrated benefits to stakeholders and farmers leading to adoption of the methods introduced or promoted; support provided by the Government through funding, laws, and regulations which were put in place; endorsements, for example, its collaboration in awareness raising which contributed to behavioral changes in project agencies and management, and the facilitation and technical support provided by local government agencies. However, there were also challenges during project implementation, which slowed down the project during some periods of implementation and disbursement.

73. It took MARD and the provinces more than two years to familiarize themselves with the project approach. It was only after the advanced midterm review that the project came back on track.

74. There was market fluctuation due to food scares over lean meat substance abuse and unstable export to China through informal channels.

75. **Budget and funding constraints.** As mentioned in relation to the second restructuring, constraints were placed by the GoV on IDA budget allocations in 2016, leading to project activities being delayed and need for the closing date to be extended.

76. The ongoing ASF outbreak is likely to have negatively affected (or even reverse) some of the project outcomes, achieved through interventions. LIFSAP beneficiary households have been less affected by ASF at the onset of the outbreaks—because of the application of GAHP including the implementation of biosecurity measures. However, the advantage of GAHP may be wiped out by the magnitude of the ASF crisis (see also box 3).

77. Some of the new concepts/approaches, such as the LPZ, raised a lot of expectations at design but during implementation it became clear that environmental, economic, technical risks needed to have been considered and as such a decision was made to just implement a pilot scheme through which such risks could be re-examined further before scaling up. The LPZ pilot has worked quite well and lessons will be drawn for the GoV to consider its scaling-up in the new Livestock Development Strategy.



Box 3. ASF and Biosecurity in Vietnam Smallholders Pig Value Chains

The ASF was reported in Vietnam in February 2019. Since then, the disease—which can kill up to 100 percent of infected pigs—has spread to all 63 provinces/cities and resulted in culling of 5,800,000 in an attempt to control the disease. As of September 2019, the pig population in the country is 19 percent less than that of 2018 indicating a large damage to the country’s pig industry.

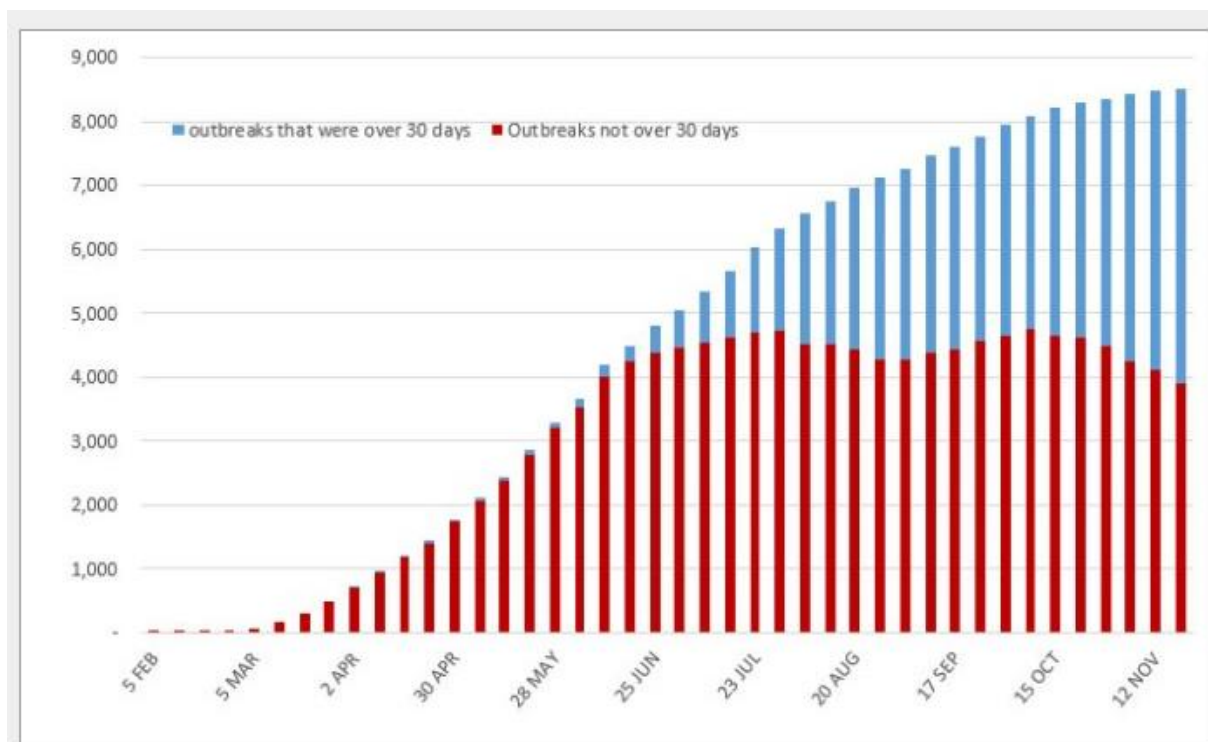
ASF virus is highly resistant and can live in pigs, in cooked (<70°C, <30 min) or uncooked pork products, wastes (blood, faeces, and tissues), and in the contaminated environment between 11 days and more than 33 months. Thus, in the absence of a vaccine against ASF, increased biosecurity combined with stamping out of infected pigs and those pigs that have been exposed to the virus (for example, came in contact with the infected ones - suspected) remain the main means to control the outbreaks. Costs of 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 challenge is to implement foolproof biosecurity in Vietnam’s pig and pork industry, particularly in household-based systems.

Pig production in Vietnam is largely in the hands of smallholders with complex value chains. This includes, but is not limited to, pig production units of various scales (minimum one pig in a household to several hundred pigs for fattening and breeding stocks) and service providers: breeders, brokers, feed traders, transporting of live animals, live animal markets, abattoirs (households, small scale, and industrial scale), transportation of carcasses, meat and other edible by-products, and traditional pork production and trading.

The LIFSAP developed a set of GAHP, which have been adopted by the project beneficiary pig producers and beyond. Throughout implementation of the project, the mortality of pigs was reduced from 15 percent in 2015 to 10 percent in 2019. It is likely that the mortality has been counted after excluding the pigs that were stamped out for ASF control purpose. In response to the outbreak, the biosecurity component of GAHP was strengthened to reduce risk of transmission of the disease. LIFSAP data tend to show lower incidence of ASF infections in pigs that have been reared by the GAHP farmers compared to the average national rate of infection and mortality of pigs due to ASF infection. For example, data collected in Hanoi, in early October 2019, indicated that the percentage of ASF-affected households applying GAHP was lower (21.3 percent) compared to the overall percentage (38.9 percent). Also, the Livestock Planning Zone developed by the LIFSAP remained free from the infection at the time. However, the continuing increasing number of outbreaks and outbreaks lasting longer than 30 days tends to indicate that the country is losing ground in controlling ASF (figure 4), which will likely affect LIFSAP beneficiaries as well.

Lessons learned are the following: (a) the adoption of GAHP that has evidently resulted in reduced pig mortality in household-based pig production caused by common pig diseases; (b) while additional biosecurity measures for containing ASF in household-based pig production were developed through the LIFSAP, this has not been fully able to contain ASF, most likely because they have not been implemented methodically; (c) ASF is a disease transmitted to animal by human activities and so farmer awareness and education on biosecurity remain crucial to prevent spread of ASF and its economic impact; and (d) professional communication needs to build a general awareness among public. Overall, because backyard and household-based pig and pork operations in Vietnam provide substantial support to households’ livelihood, implementation of locally effective biosecurity measures through the adoption of GAHP and community based participatory approaches remains the most effective tool for containing spread of ASF in the country.

Figure 4. Cumulative Number of Affected Communes Per Week in Vietnam



Source: Food and Agriculture Organization of the UN (FAO) 2019.

IV. BANK PERFORMANCE, COMPLIANCE ISSUES, AND RISK TO DEVELOPMENT OUTCOME

A. QUALITY OF MONITORING AND EVALUATION (M&E)

M&E Design

78. The Results Framework included adequate indicators to capture the project outcomes and sub-outcomes even if they would have benefited from being designed in a clearer manner. The 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, which confirmed the accuracy of the data collected by the project. The staffing arrangements were adequately designed for data to be regularly collected by veterinary services and GAHP officers from GAHP leaders (GAHP leaders collect data from farmers for their group), markets, and slaughterhouses. The staffing to support the M&E system was robust both at the national and provincial levels. In addition, detailed and user-friendly reporting formats were developed by the project for beneficiaries to report on project progress and outcomes. The project would have, nevertheless, benefited from more detailed definitions for some of the indicators such as the number of beneficiaries adopting GAHP. This indicator is broad as it includes some indirect/partial beneficiaries of the project. Also, 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 M&E system would also have benefited from diversification of data sources (outside of government system) and tools (qualitative evaluations, case studies, thematic evaluation [gender/ethnic minorities], and so on). It would



have enhanced triangulation of data, helped explore/understand some issues/success in depth to further develop lessons learned, better address needs of women/ethnic minorities, and ensure potential scale-up. The project design did not plan for the development of a management information system (MIS). It could have been helpful during implementation to explore having a simple web-based MIS for some of the key results indicators (it could have helped save time and would have provided real time access to key data).

79. The design of the M&E system was adequate despite shortcomings and remained relevant even after the project was restructured and was able to capture data for the indicators, which were changed with the processes of restructuring. The project, however, did not plan for an end line impact assessment, which would have provided for a proper assessment of attribution. However, this shortfall was corrected by ensuring that the system collected data on control groups against which project impacts could be deduced.

M&E Implementation

80. The M&E system was capable of reporting efficiently on activities, outputs, and outcome. It even included data, which were regularly collected by veterinary services and GAHP officers from GAHP leaders (GAHP leaders collect data from farmers for their group), markets, and slaughterhouses. A large amount of data was also collected beyond the Results Framework indicators (for example, data on the impact of biodigesters, data collected on the quality of capacity building), but there was limited analysis of data collected at the district, provincial, and national levels due to staff time constraints. It led to some underreporting of project results and potentially less lessons learned.

81. The quality of data was ensured by regular data auditing conducted by veterinary services, GAHP officers, PPMU, and PCU staff. Early challenges with the baseline were overcome, and a good end line to baseline comparative data was generated which helped in preparing the Government's Project Completion Report at the original closing date in 2015 (PCR 2015) as well as informing largely the data used in the preparation of the World Bank's ICR. An independent impact assessment study could not be undertaken mainly due to the uncertainty regarding the project closing date, as the Government had intended to extend the project beyond the revised closing date of June 30, 2019, to have the project continue to facilitate the fight against the ASF epidemic.

M&E Utilization

82. The M&E system was an effective management tool, useful in gauging progress and informing the strategic decision-making process. The information collected through the M&E system helped the Government to make timely and well-informed decisions on many issues including, but not limited to, disease outbreak preparedness, the financial impact of biodigesters, and the speeding-up of the upgrading of meat markets and slaughterhouses, for example.

Justification of Overall Rating of Quality of M&E

83. The overall quality of the program M&E is rated Modest. The M&E system was adequately designed and satisfactorily implemented with some shortcomings (see sections above). The reporting under the Results Framework is available and highlighted in the Project Completion Report (PCR) and the M&E



Records. Nevertheless, the project did not conduct the final independent impact evaluation to address issues of project impacts attributable to project interventions. However, even though the independent impact assessment was not conducted, the data presented in the final Project Completion Report (i.e. Government's ICR included data on control groups for some indicators. That ICR however rated overall M&E quality as Modest due to the lack of the independent impact evaluation.

B. ENVIRONMENTAL, SOCIAL, AND FIDUCIARY COMPLIANCE

Environmental Safeguards

84. At appraisal, the LIFSAP was assigned an environmental category of B – partial assessment. Two environmental safeguard policies were triggered: OP 4.01 (environmental assessment) and OP 4.09 (Pest Management). MARD prepared an Environmental Management Framework (EMF) which was approved and disclosed before appraisal of the original project. The EMF included mechanisms for screening and excluding activities that might cause significant adverse impacts on the environment and measures for mitigating other possible environmental impacts. During implementation, the PCU and PPMUs monitored the environmental, health and safety aspects closely according to the EMF. Mitigation measures have been applied at various stages of project implementation including detailed design, bidding, construction, and operations. Environmental compliance of the project improved as the project progressed and was rated Satisfactory in the last implementation support missions. However, the EMF needed to be updated to include the requirements to comply with OIE Code Chapters on animal welfare and address environmental pollution resulting from chemicals for cleaning and disinfection purposes.

85. Overall, the project has brought about significant positive environmental impacts by reducing pollution levels from animal husbandry processes including at farms, slaughterhouses, and wet markets. The 9,391 biogas digesters built under the project helped managing biochemical oxygen demand, total suspended solids, total-N, total-P, and coliforms; however, sometimes the biogas digesters have been overloaded due to excess number of pigs being raised. Also, the quasi totality of N and P nutrients is found in effluents, and there is uncertainty on how biogas outflow is used, be on production sites, markets or slaughterhouses. To overcome overloads, 142 post-biogas effluent treatment schemes were built in Hai Phong, Hai Duong, Thanh Hoa, Nghe An, and Ho Chi Minh City to help reduce pollution from pig cages. In addition, the biogas digesters also help reduce GHG emission, estimated at 40,800 tons of CO₂ equivalent per year. The benefited households can also save about VND 2 million per month when using biogas for cooking. Environmental performance at 100 percent of the 235 slaughterhouses and 97.8 percent of the 378 wet markets supported by the project has been improved; among these, 80 percent of the supported slaughterhouses and 60 percent of the wet markets have their treated effluent meeting applicable Vietnamese standard QCVN 40 - column B. More importantly, the project helped raise environmental and food safety awareness for a large number of officers and farmers with 84,000 trainees participating in the training on GAHP processes, waste management, and biosecurity.

86. Through the project, environmental management capacity has also been built at both central and provincial levels, particularly on livestock waste management and environmental quality monitoring (laboratories and sampling) and reporting. With DONRE involvements and extensive environmental quality monitoring program designed as part of the project, a relative comprehensive database has been built proving the treatment efficiency of the project investments.



Social Safeguards

87. On social safeguards, the project triggered two policies: OP4.12 (Involuntary Resettlement) and OP 4.10 (Indigenous Peoples). MARD reviewed and updated the Resettlement Policy Framework (RPF) and Ethnic Minority Policy Framework (EMPF) which together with the related management tools (the Resettlement Plan and Ethnic Minority Development Plan) were disclosed before the appraisal of the original project. However, throughout its implementation the project did not result in any displacement, while land acquisition was minor and applied only in upgraded market. Compensation was paid following the agreed framework and no complaint was reported from the local people. Project information was delivered to local farmers in a proper manner, at the right time, and at no cost. A Policy Framework for Ethnic Minority Development was formulated to set out the policy, principles, and mechanisms to ensure equitable participation of the ethnic minority people and to address the impacts of the project investments on ethnic minority communities. As a result of the implementation of the Policy Framework for Ethnic Minority Development, ethnic minority people benefited from the project and they were well informed, consulted, and no grievances were reported. The project established a clear, updated, and systematic data of beneficiaries aggregated by ethnicity, gender, and economic status. The suggestion for the project was to continue monitoring operation of slaughterhouses to ensure they create no environmental and social problem after the closure of the project and also ensure GAHP such as storing slaughtered pigs in closed containers and providing safety uniform/equipment to workers. The project's compliance with social safeguards was rated Satisfactory.

Procurement

88. The procurement actions agreed with the client based on the findings of the procurement capacity assessment, which were fully implemented. Procurement planning has been undertaken well. The client prepared the initial 18-month Procurement Plan at the appraisal stage and the subsequent detailed annual procurement plans for each procurement package during the implementation years. The procurement performance was assessed to be consistent with the World Bank's procurement guidelines and the legal agreements. The World Bank frequently provided technical support to the client such as procurement and contract management trainings. By the closing date, the project had successfully implemented 867 packages of all kinds with total contract awarded value of US\$81.42 million, including 530 civil works, 288 goods, and 49 consulting service packages. There were a few cases of rebidding; however, they were conducted successfully and therefore no major complaint was received during the bidding processes. No mis-procurement was declared during project implementation.

89. Shortcomings observed during the World Bank's supervision missions included (a) slightly slow preparation, submission, and updating of procurement plans from the provinces; (b) lengthy and sometimes inadequate bid evaluation and approval processes; (c) a few errors in procurement documents' preparation; and (d) delays in budget allocation leading to delays in payment as stipulated in the contract provisions. However, procurement capacity of the PCU and PPMUs had improved over time due to timely and comprehensive support of the World Bank through discussions, workshops, and training courses on procurement/contract management organized by the PCU in collaboration with the World Bank. The training provided better procurement and contract management knowledge for PPMUs and procurement staff to improve the quality of bidding documents, bid evaluation, and contract management of the PCU and PPMUs. This contributed to speeding up the project's procurement progress



each year and significantly improving the bidding documents and evaluation reports. The overall procurement performance of the project is rated Satisfactory.

Financial Management

90. The FM reviews in regular supervision missions identified that an adequate financial management system was in place that could provide, with reasonable assurance, accurate and timely information that the IDA credit proceeds were being used for the intended purposes. The project FM rating ranged from primarily Moderately Satisfactory to recent Satisfactory ratings in 2018 and 2019. The reviews also recognized adequacy of financial management staffing, accounting and internal control systems, maintenance of supporting documents in the project and implementation of the recommendations from the annual audits. During project implementation, the Bank team acknowledged the efforts from the PMU in managing FM work, monitoring fund flows and consolidating FM reports from the 12 participating provinces. The PMU also played an active role in closely conducting the internal control procedures and internal audits at all project implementing agencies. Regular quarterly financial reports with acceptable quality have been submitted on time.

91. Annual audited financial reports have been mostly submitted to the Bank on time with unqualified (clean) audit opinions. The project accounting systems were observed to be in order and payments were well-controlled. Independent performance audit is a good practice and provides another layer of control in addition to the checks on outputs performed by the project and the supervising consultants.

C. BANK PERFORMANCE

Quality at Entry

92. The World Bank's performance at entry was Satisfactory. The project was designed with a sound concept, providing appropriate expertise and new initiatives to address the difficult issue of food safety along the food chain. Measures to ensure quality at entry were adequate and possible risks correctly identified. The project was also prepared with a high level of interest and commitment from the Government. Ownership was also strongly indicated in the preparation plans presented to the World Bank during the preparation phase and the Government's participation in the preparation missions.

93. The project design was built on the Government's existing systems and structures with appropriate plans to mobilize and strengthen these for project implementation. Adequate budget and technical assistance were allocated for capacity building of implementing agencies, and an appropriate implementation support plan was developed to provide timely support to these agencies during project implementation.

Quality of Supervision

94. The World Bank's performance during supervision was satisfactory. Missions were regularly carried out twice a year with adequate skills mix and enough field time. Interim technical missions were also carried out wherever needed to provide additional training to the PCU and PPMUs and help them unlock implementation constraints. There was close supervision and follow-up during the early, challenging stages of implementation and throughout the project. The supervision reports closely tracked targets to



ensure links with impact. Problems were reported and addressed promptly by the World Bank Task Team Leaders and the safeguards and fiduciary specialists stationed in-country, and assistance was provided with on-site visits and appropriate national or international expertise was mobilized when required. Close coordination with the Government implementation teams was effective in moving the project forward.

95. For technical support, the World Bank provided its own expertise and coordinated with the FAO through its Cooperation Program to bring in international specialists to assist the project in technical matters such as food safety and biosecurity. The team also collaborated with the International Livestock Research Institute and the OIE. With regard to M&E, the World Bank, with the PCU, held several training workshops for the PPMUs until data quality and reporting improved. The World Bank was prompt in addressing concerns stated in the World Bank's internal review processes. The task team addressed design complexity by adjusting Subcomponent A.1 in Component A, in relation to LPZs, during the preparation of the AF. The World Bank team was responsive and proactive in project restructuring to make the necessary changes on time to unblock implementation constraints.

Justification of Overall Rating of Bank Performance

96. **Satisfactory.** Project preparation and supervision processing was timely and effective, with strong skills mix and good collaboration with the Government teams. Close follow-up in supervision assisted Government teams in reaching targets toward the end of the project.

D. RISK TO DEVELOPMENT OUTCOME

97. The PDO is likely to be sustained because the capacity and skills developed with the project support will remain in the provinces among the implementing agencies, technical agencies, farms, slaughterhouses, and markets. The LIFSAP can be considered as a milestone in the longer-term perspective of improving the safety of the food chain. Its impact was on a small scale within the targeted areas and focused mainly on pig and poultry sectors. There is a need to scale up GAHP throughout the country for those value chains as well as other sectors of the food system. The proposed follow-up AFSP is expected to build on the LIFSAP foundations and substantially scale up the adoption of good practices for food safety to create greater impact on the country's food systems.

98. Substantial risks remain in inappropriate implementation of GAHP or backsliding, with impact on productivity as well as outbreak of diseases and environmental pollution if provinces, farmers, and operators revert to old practices. Some practices (for example, growth promoters) have been institutionalized into Government laws and regulations; therefore, the policy risks are low from this point of view. However, the risks are substantial in implementation and enforcement, especially in terms of resources allocation in the context of high levels of public debt. There is a risk that the premium price for animal source food produced under GAHP certification is insufficient to maintain the incentive of good practices. There is also a risk of inadequate budget for maintaining the upgraded infrastructure (that is, wet markets) after the project closes. The authorities need to work with the private sector and local beneficiaries on cost recovery approaches to ensure they can fully cover both operation and maintenance (O&M) costs, as this is the only way to ensure the sustainability of the investments supported by the project.



99. Animal diseases are constant threats to the development and sustainability of the livestock sector, causing destruction of the stocks, market disruption, additional costs for health management and disease control, and increases in the vulnerability of the local population. Effects from the ongoing outbreak of ASF are substantial with high number of animals dying from the disease or being culled for disease control (see box 3). This is serious as it could also mean the exclusion of many smallholder farmers from the business unless concerted efforts are made to facilitate restocking (after addressing biosecurity and GAHP issues). These risks are not new as they were identified during the project preparation. The relative resilience of project areas and beneficiaries, compared to other areas in the country, demonstrates the value of GAHP and increased biosecurity. However, the scaling-up of the LIFSAP approach and additional risk management options should be further examined and included for mitigation in the follow-up project.

V. LESSONS AND RECOMMENDATIONS

100. **Importance of the project on the national Livestock Strategy --being developed--** and how the interventions implemented under the LIFSAP will help shape the future of the livestock industry in Vietnam. Notable interventions such as GAHP for better on-farm practices and improved productivity, biosecurity and animal health management, biodigesters and reduced environmental impact, and LPZs will contribute to this strategy because the LIFSAP provides a proof of concept on those particular aspects and results are available to inform the strategy under discussion and preparation. To this effect, some points would deserve special attention: integrating animal welfare into GAHP, improving biosecurity and animal health management to higher levels and along the value chain (for example, including transport), and refining the LPZ concept based on the evaluation of the pilot scheme. Of even greater importance, the LIFSAP should inform the strategy on sustainability along three main thrusts of environment and climate change, animal health and veterinary public health, and equity.

101. **Replicability of the slaughterhouse and wet market models** introduced under the project—and the extent to which these models will be replicated and sustained going forward. The upgrading of the slaughterhouses and wet markets has improved the hygienic conditions in the slaughter and processing and marketing of meat (pig and chicken) compared to the situation before the project. However, questions linger as to whether the more elaborate slaughterhouses and wet markets supported under the project will be replicated after the project. This will depend on whether the private sector will be able to afford the cost of establishing these structures, including affording the routine operations and maintenance costs of running such structures. This largely depends on whether their business has been boosted due to increased demand for meat, given the more hygienic conditions. This is an area, which should be considered for further scaling-up and support under the proposed AFSP.

102. **Linking of the project's interventions on the future projects such as the proposed AFSP**—and the extent to which the LIFSAP can inform the design of some interventions under the AFSP. The proposed AFSP will benefit from several lessons learned during the implementation of the LIFSAP. This project will aim to improve food safety management systems and infrastructure in targeted cities and reduce food safety risks in selected value chains. In terms of food safety, transformative changes and upgrades are needed. The aim should be to not simply react to immediate concerns or even to have food safety management capacity catch up to the past accumulation of food safety hazards but to put in place systems, practices, and knowledge which will be able to anticipate and manage emerging issues and restore consumers' trust and confidence as diets and demographics continue to change. Any investments



to improve food safety management and restore consumers' trust and confidence are critical for economic development, trade strengthening, social stability, and environmental protection. The LIFSAP has demonstrated high effectiveness of an integrated food chain approach combining improved regulatory oversight, support to production of clean agricultural products, upgrades in market infrastructure (for example, slaughterhouses, wholesale markets, and wet markets), and measures to change farmer and food handler practices. These and other approaches need to be implemented at greater scale and replicated across a range of food value chains in which the safety of primary, intermediate, or final products poses a risk to consumers as well as a risk to the competitiveness and livelihoods of Vietnamese farmers, food manufacturers, and food service providers. Building from the lessons of the LIFSAP, another aim of the AFSP investments will be to crowd in private investments in slaughterhouses and wholesale food markets through matching grants and/or investment in essential public infrastructure needed for these facilities to operate effectively. Through the implementation of the LIFSAP, much has been learned about the scope and limitations of certain approaches. There has been less experience in Vietnam with applying progressive programs to raise awareness and improve practices among market and street food vendors and in engaging and empowering consumers. However, much can be learned from interventions in these areas in other Asian countries to ensure that the AFSP builds upon the LIFSAP in areas where it has not been as effective in promoting a safe food system.

103. **Ensuring a robust design for the M&E system.** It will be critical for new projects to have a more robust M&E design that will include (a) at least two quantitative evaluations for the midterm review and end line (with impact evaluations with control group when relevant); (b) other independent qualitative evaluations to further explore issues and impacts (such as gender, awareness of consumers on GAHP, quality of implementation of biosafety measures); and (c) plan for the development of an MIS. It will imply budgeting and planning for evaluations, MIS, other M&E activities, and development of a detailed M&E manual at the design stage. It would enhance triangulation of data, help further explore/understand/analyze some issues/success in depth to further develop lessons learned, better address needs of women/ethnic minorities, and ensure potential scale-up. Then, the M&E system will be able to play its full role for management and learning.



ANNEX 1. RESULTS FRAMEWORK AND KEY OUTPUTS^{8,9}

A. RESULTS INDICATORS

A.1 PDO Indicators

Objective/Outcome: Increase production efficiency of household-based livestock producers

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Direct project beneficiaries	Number	105609.00	135000.00		155728.00
		31-Dec-2014	30-Jun-2019		30-Jun-2019
Female beneficiaries	Percentage	47.70	55.00		49.00

Comments (achievements against targets): over-achieved in terms of direct project beneficiaries; although, only partially achieved for female beneficiaries. There is no baseline available in 2010; this indicator was introduced for the AF, along with female beneficiaries, which had become one of the required core sector indicators to be collected in 2015.

⁸ Most baselines were not available at project approval and were added at the time of the AF, as shown in the table. Baselines for 2010, where available, have been included in the comments.

⁹ Except otherwise specified, all data to assess achievements have been provided by the Government.



Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Increase the Production Efficiency of Household-based Livestock Producers through: a) livestock (pigs) mortality rates reduced	Percentage	11.80 01-Nov-2015	10.00 30-Jun-2019		10.00 30-Jun-2019

Comments (achievements against targets): achieved. The original target of the project was to reduce the mortality rate by 30%. At project closing, the mortality rate in pig farms was reduced by 30%, from a 15% baseline in 2010 to 10% currently.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Increase the Production Efficiency of Household-based Livestock Producers through: b) Livestock (chickens) mortality rates reduced	Percentage	31.12 01-Nov-2015	29.00 30-Jun-2019		13.90 30-Jun-2019

Comments (achievements against targets): over-achieved. The original target of the project was to reduce the mortality rate by 30%. At project closing, the mortality rate in poultry farms was reduced by more than 33%, from a 41% baseline in 2010 to 13.9% mortality currently.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
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Increase the Production Efficiency of Household-based Livestock Producers through: c) livestock (pigs) fattening times shortened	Days	118.00 01-Nov-2015	116.00 30-Jun-2019		116.03 30-Jun-2019
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Comments (achievements against targets): achieved. The original target of the project was to reduce the fattening time by 15%. At project closing, the fattening time for pigs was reduced by 15.5%, from an estimated 135 days baseline in 2010 to 116 days currently.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Increase the Production Efficiency of Household-based Livestock Producers through: d) Livestock (poultry) fattening times shortened	Days	58.00 01-Nov-2015	56.00 30-Jun-2019		55.96 30-Jun-2019

Comments (achievements against targets): achieved. The original target of the project was to reduce the rearing time by 15%. At project closing, the rearing time for poultry was reduced by 15.2%, from an estimated 66 days baseline in 2010 to 55.96 days currently.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Increase the Production Efficiency of Household-based Livestock Producers	Number	31.00 01-Nov-2015	40.00 30-Jun-2019		40.05 30-Jun-2019



through: e) Herd/flock (pigs) numbers increased

Comments (achievements against targets): achieved. The original target of the project was to increase the average size of the flocks/herds by 15%. At project closing, the average size was increased significantly (more than 30%), from an estimated average size of pig herds of 25.6 animals in 2010 to 40.05 today.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Increase the Production Efficiency of Household-based Livestock Producers through: f) Herd/flock (poultry) numbers increased	Number (Thousand)	1400.00 01-Nov-2015	1800.00 30-Jun-2019		1826.00 30-Jun-2019

Comments (achievements against targets): achieved. The original target of the project was to increase the average size of the flocks/herds by 15%. At project closing, the average size of poultry flocks was significantly increased (more than 40%), from an estimated average size 935 birds in 2010 to 1826 currently.

Objective/Outcome: Reduce the environmental impact of livestock production, processing and marketing

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Reduce the Environmental Impact of Livestock Production, Processing and Marketing through: a)	Number	11000.00 01-Nov-2015	25000.00 30-Jun-2019		25172.00 30-Jun-2019



Households supported by the project with lessened adverse environment impacts from their production

Comments (achievements against targets): achieved. The project has slightly exceeded the target. There was no baseline provided in 2010. In 2014, the project had supported 9905 households with lessened adverse environment impacts from their production.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Reduce the Environmental Impact of Livestock Production, Processing and Marketing through: b) Small slaughterhouses supported by the project with lessened adverse environmental impact from slaughterin	Number	193.00 01-Nov-2015	310.00 30-Jun-2019		303.00 30-Jun-2019
Medium and large slaughterhouses supported by the project meeting national environmental standards	Number	42.00	40.00		70.00

Comments (achievements against targets): over-achieved. There was no baseline provided in 2010. The project has slightly exceeded the target, overall. However, it is worth noting the partial achievement for small slaughterhouses (303 vs 310) compared to an over-achievement for large slaughterhouses (70 vs 40). The Government changed its preference towards medium and large slaughterhouses over to small operations; and this explains the over-achievement of medium and large slaughterhouses.



Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Reduce the Environmental Impact of Livestock Production, Processing and Marketing through: d) Wet markets supported by the project meeting national environmental standards	Number	378.00 01-Nov-2015	500.00 30-Jun-2019		572.00 30-Jun-2019
<p>Comments (achievements against targets): over-achieved. No baseline available in 2010. In 2014, a total of 311 wet markets has been supported by the project to meet national environmental standards. Overall, the project has achieved 114% of the target.</p>					

Objective/Outcome: Improve food safety in livestock product supply chains in selected provinces

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Medium and large supported slaughterhouses meeting national environmental standards	Number	25.00 01-Nov-2015	40.00 30-Jun-2019		70.00 30-Jun-2019
<p>Comments (achievements against targets): over-achieved. No baseline available in 2010. In 2014, only 19 medium and large slaughterhouses had been supported by the project to meet national environmental standards. Overall, the project has achieved 175% of the target.</p>					



Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Improve Food Safety in Livestock Product Supply Chains in selected provinces through: a) Small slaughterhouses upgraded by the project producing meat of improving quality and safety	Number	235.00	350.00		373.00
		01-Nov-2015	30-Jun-2019		30-Jun-2019

Comments (achievements against targets): achieved. No baseline available in 2010. In 2014, 143 small slaughterhouses had been supported by the project to meet national environmental standards.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Improve Food Safety in Livestock Product Supply Chains in Selected Provinces through: c) Supported wet markets meeting national meat quality and safety standards	Number	378.00	500.00		572.00
		01-Nov-2015	30-Jun-2019		30-Jun-2019

Comments (achievements against targets): over-achieved. No baseline available in 2010. In 2014, 311 wet markets had been supported by the project to meet national environmental standards. Overall, the project has achieved 114% of the target.



Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Improve Food Safety in Livestock Product Supply Chains in Selected Provinces through: b) Medium and large supported slaughterhouses meeting national food safety standrads	Number	25.00	40.00		70.00
		01-Nov-2015	30-Jun-2019		30-Jun-2019
<p>Comments (achievements against targets): over-achieved. No baseline available in 2010. In 2014, only 19 medium and large slaughterhouses had been supported by the project to meet national environmental standards. Overall, the project has achieved 175% of the target.</p>					

A.2 Intermediate Results Indicators

Component: Upgrading Household-based Livestock Production and Market Integration

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Component A: Upgrading Household-based Livestock Production and Market Intergration through: a) Groups of livestock producer households in priority	Number	456.00	700.00		715.00
		01-Nov-2015	30-Jun-2019		30-Jun-2019



production areas having received GAHP certification					
Comments (achievements against targets): achieved. No baseline available for 2010.					

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Component A: Upgrading Household-based Livestock Production and Market Integration through: b) GAHP collaborative groups are established and in effective operation	Number	0.00 01-Nov-2015	100.00 30-Jun-2019		232.00 30-Jun-2019

Comments (achievements against targets): over-achieved. No baseline available for 2010.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Component A: Upgrading Household-based Livestock Production and Market Intergration through c) GAHP cooperatives are established and in effective operation	Number	0.00 01-Nov-2015	15.00 30-Jun-2019		19.00 30-Jun-2019



Comments (achievements against targets): achieved. No baseline available for 2010.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Component A: Upgrading Household-based Livestock Production and Market Integration through: d) Proportion of vaccination coverage for common diseases for animals owned by project HHs	Percentage	90.00 01-Nov-2015	90.80 30-Jun-2019		93.70 30-Jun-2019

Comments (achievements against targets): over-achieved. No baseline available for 2010. According to the Government completion report, the vaccination coverage in GAHP households is even higher, 95.8%, well above the target. It is also important to note that the project has carried-out sero-surveillance for most common diseases of pigs and poultry to be monitored.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Component A: Upgrading Household-based Livestock Production and Market Integration through: f) Slaughterhouses inspected	Number	235.00 01-Nov-2015	350.00 30-Jun-2019		373.00 30-Jun-2019

Comments (achievements against targets): achieved. No baseline available in 2010. All slaughterhouses supported by the project have been inspected.



Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Component A: Upgrading Household-based Livestock Production and Market Intergration through: g) Meat Markets inspected	Number	378.00 01-Nov-2015	500.00 30-Jun-2019		572.00 30-Jun-2019
Comments (achievements against targets): achieved. No baseline available in 2010. All markets supported by the project have been inspected.					

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Component A: Upgrading Household-based Livestock Production and Market Integration through: e) Slaughterhouses supported by project certified gor GMP/GHP/HACCP	Number	0.00 01-Nov-2015	30.00 30-Jun-2019		30.00 30-Jun-2019
Comments (achievements against targets): achieved.					

Component: Strengthening Central-Level Livestock and Veterinary Services



Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Component B: Strengthening Central -level Livestock and Veterinary Services through: a) brand-name of GAHP products adopted and sustainably developed	Number	0.00	30.00		30.00
		01-Nov-2015	30-Jun-2019		30-Jun-2019
Comments (achievements against targets): achieved.					

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Component B: Strengthening Central-level Livestock and Veterinary Services through: b) Food safety good practices included in the national veterinary curriculum	Yes/No	N	Y		Y
		01-Nov-2015	30-Jun-2019		30-Jun-2019
Comments (achievements against targets): achieved.					

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Component B: Strengthening	Yes/No	N	Y		Y



Central-level Livestock and Veterinary Services through: c) Animal Breeding and Feeding Center appointed National Reference Center		01-Nov-2015	30-Jun-2019		30-Jun-2019
National Center for Veterinary Hygiene Inspection No. I appointed National Reference Center	Yes/No	N	Y		Y
Comments (achievements against targets): achieved. The National Center for Veterinary Hygiene Inspection No. I was appointed National Reference Center.					

Component: Project Management, Monitoring and Evaluation

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Farmers reached with agricultural assets or services	Number	11201.00 01-Nov-2015	23071.00 30-Jun-2019		25172.00 30-Jun-2019
Farmers reached with agricultural assets or services - Female	Number	48.00	55.00		53.50
Comments (achievements against targets): over-achieved in terms of number of farmers reached by the project; although, only partially achieved for female farmers, with a final percentage of 53.5% instead of the targeted 55%.					



Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Farmers adopting improved agricultural technology	Number	11201.00 01-Nov-2015	25000.00 30-Jun-2019		26312.00 30-Jun-2019
Farmers adopting improved agricultural technology - Female	Number	5280.00	13750.00		13720.00
Farmers adopting improved agricultural technology - male	Number	5720.00	11250.00		12175.00

Comments (achievements against targets): achieved. Although the gender targets are not fully achieved.



B. KEY OUTPUTS BY COMPONENT

Objective/Outcome 1: Increase production efficiency of household-based livestock producers	
Outcome Indicators	<ol style="list-style-type: none"> 1. Direct project beneficiaries, of which percentage of female 2. Livestock mortality rates reduced (pigs and poultry) 3. Livestock (pigs and poultry) fattening times shortened 4. Herd/flock numbers (pigs and poultry) increased
Intermediate Results Indicators	<ol style="list-style-type: none"> 1. Groups of livestock producer households in priority production areas having received GAHP certification 2. GAHP collaborative groups are established and in effective operation 3. GAHP cooperatives are established and in effective operation 4. Proportion of vaccination coverage for common diseases for animals owned by project households 5. Proportion of vaccination coverage for common diseases for animals owned by project households 6. Slaughterhouses inspected 7. Meat markets inspected 8. Slaughterhouses supported by project certified for GMP/GHP/HACCP
Key Outputs by Component (linked to the achievement of the Objective/Outcome 1)	<ol style="list-style-type: none"> 1. GAHP standards, procedures, and methodology for monitoring and certification updated/established. 2. Livestock producers trained on GAHP. 3. GAHP practices adopted by farmers. 4. Farmers certified in GAHP. 5. GAHP demonstration models in communes implemented. 6. Producers' performance on GAHP monitored. 7. Extension workers and veterinary staff at commune/district level trained and equipped to provide GAHP training to producers.



Objective/Outcome 2: Reduce the environmental impact of livestock production, processing, and marketing	
Outcome Indicators	<ol style="list-style-type: none"> 1. Households supported by the project with lessened adverse environmental impacts from their production 2. Small slaughterhouses supported by the project with lessened adverse environmental impact from slaughtering 3. Medium and large slaughterhouses supported by the project meeting national environmental standards 4. Wet markets supported by the project meeting national environmental standards
Intermediate Results Indicators	<ol style="list-style-type: none"> 1. Brand-name of GAHP products adopted and sustainably developed
Key Outputs by Component (linked to the achievement of the Objective/Outcome 2)	<ol style="list-style-type: none"> 1. Environmental pollution, diseases, and food quality regularly assessed by DONRE. 2. Vaccination coverage increased. 3. Matching grants support for construction of biodigesters, composting facilities, slurry treatment, and implementation of biosecurity measures.
Objective/Outcome 3: Improve food safety in livestock product supply chains in selected provinces	
Outcome indicators	<ol style="list-style-type: none"> 1. Small slaughterhouses upgraded by the project producing meat of improved quality and safety 2. Supported wet markets meeting national meat quality and safety standards
Intermediate Results Indicators	<ol style="list-style-type: none"> 1. Food safety good practices included in the national veterinary curriculum 2. National Center for Veterinary Hygiene Inspection No. 1 appointed National Reference Center
Key Outputs by Component (linked to the achievement of the Objective/Outcome 3)	<ol style="list-style-type: none"> 1. LPZ concept successfully implemented. 2. Waste management and biodigester infrastructure upgraded. 3. Slaughterhouses and meat markets waste treatment and management upgraded. 4. Equipment for safe and hygienic slaughtering and meat handling purchased. 5. Meat inspectors trained on proper meat inspection. 6. Veterinary staff, butchers, and middlemen trained on food safety. 7. Provincial sub-DAHs equipped to implement meat inspection.



ANNEX 2. BANK LENDING AND IMPLEMENTATION SUPPORT/SUPERVISION

A. TASK TEAM MEMBERS

Name	Role
Preparation	
Son Thanh Vo	Task Team Leader (AF)
Binh Thang Cao	Task Team Leader
Thang Toan Le	Procurement Specialist
Ha Thuy Tran	Senior Financial Management Specialist
Hoa Thi Phuong Kieu	Team Member
Nga Thuy Thi Nguyen	Procurement Team
Thao Cong Nguyen	Social Specialist
Son Van Nguyen	Environmental Specialist
Franck Berthe	Team Member
Tam Thi Do	Team Member (Program Assistant)
Stephan Forman	Senior Livestock Specialist
Ijeoma Emenanjo	Natural Resources Management Specialist
Nina Masako Eejima	Senior Counsel
Implementation	
Franck Berthe	ICR Main Author/ ICR Team Leader
Hardwick Tchale	Task Team Leader
Binh Thang Cao	Task Team Leader
Thang Toan Le	Procurement Specialist
Ha Thuy Tran	Senior Financial Management Specialist
Hoa Thi Phuong Kieu	Team Member
Nga Thuy Thi Nguyen	Procurement Team
Thao Cong Nguyen	Social Specialist
Son Van Nguyen	Environmental Specialist

**B. STAFF TIME AND COST**

Stage of Project Cycle	Staff Time and Cost	
	No. of staff weeks	US\$ (including travel and consultant costs)
Preparation		
FY05	9.100	60,347.32
FY06	24.494	107,335.03
FY07	13.562	78,387.89
FY08	25.760	139,513.11
FY09	28.799	93,501.50
FY10	8.775	45,272.18
Total	110.49	524,357.03
Supervision/ICR		
FY10	10.150	60,300.26
FY11	16.525	70,899.53
FY12	15.875	68,004.73
FY13	43.382	126,743.39
FY14	24.663	83,591.38
FY15	19.850	86,128.18
FY16	19.567	81,190.33
FY17	36.372	243,959.71
FY18	22.175	145,845.38
FY19	13.160	102,314.12
FY20	8.020	70,366.47
Total	229.74	1,139,343.48



ANNEX 3. PROJECT COST BY COMPONENT¹⁰

Components	IDA Amount at Approval (US\$, millions)	IDA Additional Financing (US\$ millions)	Actual IDA disbursed at Project ¹¹ Closing (US\$, millions)	Percentage of Approval (percent)
Upgrading Household-based Livestock Production and Market Integration	53.8	36.02	86.57	96.4
Strengthening Central-Level Livestock and Veterinary Services	4.2	4.27	7.15	84.4
Project Management, Monitoring and Evaluation	7.2	2.59	11.71	119.6
Total	65.2	44.68¹²	105.43	96.0

Total Project Financing Plan (Original and Additional Financing, US\$ million)

Component	Financier			
	IDA	Gov	Private	Total
Parent Project				
A. Upgrading Household-Based Livestock Production and Market Integration	53.8	1.9	10.4	66.0
B. Strengthening Central-Level Livestock Production and Veterinary Services	4.2	0.2	0.0	4.3
C. Project Management and Monitoring and Evaluation	7.2	1.4	0.0	8.7
Total Cost Parent Project	65.2	3.4	10.4	79.0
Additional Financing				
A. Upgrading Household-Based Livestock Production and Market Integration	36.02	1.42	6.25	43.69
B. Strengthening Central-Level Livestock Production and Veterinary Services	4.27	0.09	0.0	4.36
C. Project Management and Monitoring and Evaluation	2.59	2.24	0.0	4.83
D. Contingency	1.8	0.0	0.0	1.8
Total Cost Additional Financing	44.68	3.75	6.25	54.68
Total Parent and Additional Financing				
A. Upgrading Household-Based Livestock Production and Market Integration	89.82	3.32	16.65	109.69
B. Strengthening Central-Level Livestock Production and Veterinary	8.47	0.29	0.0	8.66

¹⁰ The figures in the second table show Bank financing along with Government and Private counterpart financing. The figures in annex 3 are consistent with the figures in the original project (see the original PAD on page 44, table 1: Project costs; and table 3 on page 19 of the Additional Financing Project Paper).

¹¹ Includes original appraisal estimate and the AF.

¹² The total includes a contingency of US\$1.8 million (see the second table in this annex).



Services				
C. Project Management and Monitoring and Evaluation	9.79	3.64	0.0	13.53
D. Contingency	1.8	0.0	0.0	1.8
Total Cost All Project (Original + Additional Financing)	109.88	7.25	16.65	133.68

Source: Additional Financing Project Paper (table 4 – Project Financing Plan, Page 20); small rounding errors noted in the Financing Plan prepared at Additional Financing.



ANNEX 4. EFFICIENCY ANALYSIS

A. Introduction and Methodology

1. The EFA of the project at completion is based on quantifiable economic and financial benefits from improved (a) competitiveness and profitability of pig and poultry producers supported by the project and (b) environmental management of livestock waste. Benefits from improved food safety resulting from project interventions have been described and estimated; however, these were not included in the overall project EFA. The latter would have required to make a number of assumptions for which there is presently no sound basis due to lack of data. However, the results of the EFA presented in table 4.1 clearly show that the project is likely to generate economic returns above what was estimated at appraisal, even without including food safety benefits in the analysis.

2. The project has achieved or overachieved most indicator targets in the Results Framework, while spending less than the originally planned.¹³ This indicates that the project has been highly efficient in terms of converting project resources into results. Table 4.1 provides an overview of the achievement of main project outcomes and outputs that are relevant for the EFA. A comparison between the project costs at appraisal and the actual disbursement is presented in annex 3.

3. The project has reached 160,000 direct beneficiaries and 25,472 farmers have been reached with agricultural assets or services, corresponding to average costs (a) per direct beneficiary of US\$767 (based on total project costs) and (b) per farmer reached with agricultural assets or services of US\$1,306 (considering costs of Subcomponent A.1). As there were no targets set at appraisal, it is not possible to assess project efficiency in terms of the actual costs per beneficiary/farmer reached, in relation to the planned costs. However, the analysis allows for a comparison with similar projects in the region in the ICR (see table 4.3 which also provides cost per slaughterhouse/meat market upgraded and per biodigester provided to farmers).

Table 4.1. Overview of Main Project Outcomes and Outputs Related to Economic and Financial Analysis

RF	Indicator	Unit	Baseline 2010	End of Project (EOP)				
				Target	Actual	c (%)	d (%)	
Increase the production efficiency of household-based livestock producers								
PDO	Livestock mortality rates reduced	Pig	%	15	10	10	100	-33
		Chicken	%	41	29	13.9	208	-67
PDO	Livestock fattening times shortened	Pig	Day	135	116	116.03	100	-14
		Chicken	Day	66	56	55.96	100	-15
PDO	Herd/flock numbers increased	Pig	No.	26	40	40.05	101	55
		Chicken	No.	935	1,800	1,826	101	195
Reduce the environmental impact of livestock production, processing, and marketing								
PDO	Households supported by the project with lessened adverse environment	No.	0	25,000	25,172	101	n.a.	

¹³ Includes total IDA funding of US\$ 109.94 million (original plus additional financing) of which US\$105.43 million was actually disbursed by project completion, representing about 96% of the total IDA funding.



RF	Indicator		Unit	Baseline 2010	End of Project (EOP)			
					Target	Actual	c (%)	d (%)
	impacts from their production							
PDO	Small slaughterhouses supported with lessened adverse environmental impact from slaughtering ^a		No.	0	310	303	98	n.a.
PDO	Medium and large slaughterhouses supported meeting national environmental standards ^b		No.	0	40	70	175	n.a.
PDO	Wet markets supported by the project meeting national environmental standards		No.	0	500	572	114	n.a.
Improve food safety in livestock product supply chains in selected provinces								
PDO	Slaughterhouses upgraded by the project producing meat of improving quality and safety		No.	0	350	373	106	n.a.
PDO	Supported wet markets meeting national meat quality and safety standards		No.	0	500	572	114	n.a.
PDO	Direct project beneficiaries			0	135,000	160,000	119	n.a.
Component A: Upgrading Household-based Livestock Production and Market Integration								
IR	Farmers reached with agricultural assets or services		No.	0	23,107	25,472	110	n.a.
IR ^e	Farmers adopting improved agricultural technology		No.	0	25,000	26,312	105	n.a.
IR	Groups of livestock producer households in priority production areas having received GAHP certification		No.	0	700	714	102	n.a.
IR	GAHP collaborative groups are established and in effective operation	Groups	No.	0	100	232	232	n.a.
	GAHP collaborative cooperatives are established and in effective operation		No.	0	15	19	127	n.a.
—	Number of GAHP households in operation	Pig	No.	0	n.a.	21,983	n.a.	n.a.
		Chicken	No.	0	n.a.	923	n.a.	n.a.

Source: Project Progress Report, October 2019.

Note: RF = Results Framework indicator; IR = Intermediate result; n.a. = Not applicable.

a. Up to 30 heads per day.

b. >30 heads per day.

c. Actual as percentage of target.

d. Change from baseline to end-of-project actual.

e. Indicator is actually at the PDO level.



Table 4.2. Main Project Outputs and Cost Per Unit of Output

Item	Unit	No. of Units			Average Cost Per Unit (US\$)		
		Original project	AF	Total	Original project	AF	Total
Direct project beneficiaries reached ^a	Person	120,819	160,000	160,000	606	767	767
Farmers reached with agricultural assets or services ^b	Household	11,201	14,271	25,472	1,652	1,034	1,306
Slaughterhouses upgraded ^c	No.	235	133	368	e	e	e
Meat markets upgraded ^c	No.	378	165	543	e	e	e
Biogas digesters provided to farmers ^d	No.	9,391	8,102	17,493	f	f	f

Note: a. Number of units cumulative (original project and AF); based on total project costs.

b. Based on costs of Subcomponent A.1.

c. Based on total costs of slaughterhouse/meat market upgrading.

d. Based on total costs of biogas digesters provided.

e. Presently, no breakdown of Subcomponent A.3 Upgrading Slaughterhouses and Meat Markets costs available.

f. Presently, no breakdown of biogas digester cost by original project/AF is available.

B. Assessment of Project Outcomes on Livestock Production

Pig Production

4. The analysis was carried out separately for the two main production systems, (a) finishing only and (b) breeding and finishing, and for three farm size categories. The results are summarized in table 4.3. The average number of production cycles per year per sow is 2.1 for without project (WOP, non-GAHP farmers) and with project (WP, GAHP farmers supported by project) farmers across all farm size categories. Overall, it can be observed that the average number of cycles of pig finishing per year for the ‘finishing only’ farmers is higher than for the ‘breeding and finishing’ farmers, with lower average weight per finished pig for the first group. It should be noted that sales of finished pigs and revenues per household do not always reflect the different farm size categories (for example, average sales in the category ‘breeding and finishing’, WOP > 80 pigs are lower than in the category 25–80 pigs). This results from a relatively small sample size in these categories with some farmers producing less than what the farm size category suggests.

5. Given the large differences of production scales within farm size categories and between WOP and WP farmers, the average revenue and net profit were calculated per kg meat sold. As can be seen from table 4.3, the average net profit per kg meat sold (household labor valued) for WP households is significantly above the average net profit for WOP households (see exception in table footnote c). On the basis of the average volume of sales in each category and the average net profit per kg meat sold, the average net profit per household was calculated showing a considerable increase for the WP households for both production systems and all farm size categories.



Table 4.3. Pig Production Survey - Summary of Results

		Production System											
		Finishing						Breeding and Finishing					
		Farm Size Category (no. of pigs)											
		<25		25–80		>80 ^c		<25		25–80		>80	
		WOP	WP	WOP	WP	WOP	WP	WOP	WP	WOP	WP	WOP	WP
Avg. no. of sows in production								3.1	3.7	9.4	10.9	11.3	18.0
Avg. no. of cycles/sow per year								2.1	2.1	2.1	2.1	2.1	2.1
Mortality rate of pigs until finishing ^a		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Avg. no. of cycles of pig finishing per year		2.5	2.6	2.7	2.4	2.6	2.1	2.2	2.1	1.9	2.1	2.0	2.1
Avg. sales of finished pigs per year	Head	46	39	76	64	86	228	47	43	70	77	54	94
	Kg	4,237	3,767	7,146	6,002	8,205	27,842	4,989	4,502	7,221	7,779	5,814	9,640
	VND (thousands)/kg	43.4	46.6	45.8	49.2	50.3	43.6	44.7	46.3	44.7	46.6	47.1	46.9
	VND, thousands	172,228	174,943	326,781	293,493	411,236	1,173,258	219,106	210,138	317,231	356,750	271,666	424,569
Avg. weight per finished pig	Kg	90	97	100	94	90	115	103	103	101	101	110	105
Per kg meat sold													
Total revenue ^b	VND, thousands	43.7	46.8	46.2	49.3	50.4	43.6	45.7	47.9	45.5	47.8	50.0	47.7
Total costs - household labor not valued	VND, thousands	33.1	30.2	34.4	28.4	34.7	32.3	28.4	28.9	30.8	29.4	38.3	32.5
Net profit - household labor not valued	VND, thousands	10.6	16.6	11.8	20.9	15.7	11.4	17.3	19.0	14.7	18.3	11.7	15.1
Total costs - household labor valued	VND, thousands	39.8	34.2	37.7	33.1	36.1	34.6	37.1	37.1	36.3	36.3	41.3	38.3
Net profit - household labor valued	VND, thousands	3.9	12.6	8.5	16.2	14.3	9.0	8.6	10.8	9.2	11.4	8.7	9.3
	US\$	0.2	0.5	0.4	0.7	0.6	0.4	0.4	0.5	0.4	0.5	0.4	0.4
Per average household													
Net profit - household labor valued	VND, thousands	16,525	47,394	60,503	97,057	117,197	251,660	42,710	48,773	66,692	88,802	50,368	89,986
Increment	VND, thousands		30,869		36,554		134,463		6,063		22,111		39,618
	US\$		1,342		1,589		5,846		264		961		1,723

Note: a. Number of averages can be calculated as the large majority of farmers did not report mortality or reported zero mortality, which may not reflect the situation. Mortality rates reported ranged from 1 percent to 8 percent for WP farms and 2 percent to 10 percent for WOP farms.

b. Including recovery value of culled sow, sales of piglets, sales of finishers, sales of manure, value of biogas.

c. Based on only three households with the production system 'finishing' for each WP and WOP in the farm size category > 80 pigs, for which survey data was usable. Net profit per kg meat sold not comparable due to small sample size and large difference in sales between WOP and WP farmers.



6. On the basis of pig production survey data, conservative assumptions were made to develop average production models which were used for the overall project EFA. For each production system and farm size category, the net profit per kg meat sold and the sales per household were estimated for an average WOP household. For the WP (GAHP) households, a 20 percent increase of net profit per kg meat sold as well as of pig sales per household was assumed. Table 4.4 provides the details.

Table 4.4. Assumptions for EA - Pig Production Households

		Production System											
		Finishing						Breeding and Finishing					
		Farm Size Category (no. of pigs)											
		<25		25–80		>80		<25		25–80		>80	
		WOP	WP	WOP	WP	WOP	WP	WOP	WP	WOP	WP	WOP	WP
Net profit per kg^a	VND, thousands	4.0	4.8	8.0	9.6	9.0	10.8	8.0	9.6	9.0	10.8	9.0	10.8
Increment ^b	VND, thousands		0.8		1.6		1.8		1.6		1.8		1.8
Pig sales per household per year	kg	4,000	4,800	7,000	8,400	10,000	12,000	4,000	4,800	7,000	8,400	10,000	12,000
Increment ^c	kg		800		1,400		2,000		800		1,400		2,000
Net profit per household per year^a	VND, thousands	16,000	23,040	56,000	80,640	90,000	129,600	32,000	46,080	63,000	90,720	90,000	129,600
Increment	VND, thousands		7,040		24,640		39,600		14,080		27,720		39,600

Source: Estimated based on farm survey data.

Note: a. Household labor valued.

b. Assumption: 20 percent increase for WP.

c. Assumption: 20 percent increase for WP.

7. In the absence of exact information about the distribution of farm sizes and building on the assumptions made for the ICR EFA for the original project, it has been assumed that 50 percent of GAHP households supported by the project keep less than 25 pigs, 30 percent 25–80 pigs, and 20 percent more than 80 pigs. The distribution between the two main production systems has been estimated on the basis of farm survey data. Table 4.5 gives an overview. The assumptions presented in Tables 4.4 and 4.5 were used in the overall EA of the project presented in section E.

Table 4.5. Number of Pig Production GAHP Farmers Supported by Project by Production System and Farm Size Category

Production System	Farm Size Category (no. of pigs)			Total
	<25	25–80	>80	
Breeding and finishing	8,573	5,474	4,001	18,048
Finishing only	2,418	1,121	396	3,935
Total	10,992	6,595	4,397	21,983
Farm size category share of total	50%	30%	20%	

Note: Farm size category share of total estimated. Share of production system estimated based on survey data in table 4.3.



Poultry Production

8. **Broilers.** On average, the surveyed WP (GAHP) broiler farms had more than double the number of broilers in production (2,535) than the WOP (non-GAHP) farms (1,222). WOP farmers had on average lower mortality rates and more broiler cycles per year, with increased average weights of broilers sold. Average net profit per broiler place and year (household labor valued) for WP farms was VND 66,000, which is 71 percent above the net profit per broiler place for the WOP farms (VND 39,000). Multiplying the average net profit per broiler place with the average number of broiler places, the calculated average net profit per household for WP farms is VND 167 million, around 3.5 times the average net profit for WOP farms (see table 4.6).

Table 4.6. Poultry Production Survey - Summary of Results: Broilers

		WOP	WP	Increment	
Avg. total no. of broilers in production per household^a		1,222	2,535	1,312	107%
Avg. no. of broiler cycles/year		2.6	2.8	0.2	7%
Avg. mortality rate per cycle		7.1%	4.5%	-2.6%	-37%
Avg. total number of broilers sold per household per year		3,131	6,855	3,724	119%
Avg. weight of broiler sold	kg	2.0	2.1	0.1	3%
Avg. total weight of broiler sold per household per year	kg	6,690	13,650	6,960	104%
Per broiler place and year (average)					
Total revenue	VND, thousands	311	343	33	11%
Total costs - household labor not valued	VND, thousands	246	235	-11	-4%
Net profit - household labor not valued	VND, thousands	64	108	44	68%
Total costs - household labor valued	VND, thousands	272	277	5.2	2%
Net profit - household labor valued	VND, thousands	39	66	27	71%
Per average household and year					
Net profit - household labor valued	VND, thousands	47,342	167,758	120,417	254%
	US\$	2,058	7,294	5,236	254%

Source: Farm survey data.

Note: a. Number of broiler places.

9. On the basis of the above survey data, an average broiler production model was developed which was used for the overall project EA, assuming for the average WP farm a 20 percent increase above the average WOP farm for (a) number of broilers in production, (b) net profit per broiler place, and (c) total weight of broilers sold per year. Table 4.7 provides the details. The assumptions can be considered conservative, as the actual average number of chickens per project GAHP poultry producer (not differentiated between broiler and layer farms) was reported to be 1,826 for the Results Framework indicator monitoring.

Table 4.7. Assumptions for EA - Poultry Production Households: Broilers

		WOP	WP	
Avg. no. of broilers in production per household^a		1,200	1,440	
	Increment ^b		240	20%
Net profit per broiler place per year	VND, thousands	39.0	46.8	
	Increment ^c		7.8	20%
Total weight of broilers sold per household per year	kg	6,690	8,028	



	Increment ^d kg		1,338	20%
Net profit per household per year^e	VND, thousands	46,800	67,392	
	Increment	VND, thousands	20,592	44%

Source: Estimated based on farm survey data (see table 4.6).

Note: a. Number of broiler places.

b. Assumption: 20 percent increase for WP.

c. Assumption: 20 percent increase for WP.

d. Assumption: 20 percent increase for WP.

e. Household labor valued.

10. **Layers.** While the surveyed WP (GAHP) layer farms had on average 890 layers less than the average surveyed WOP (non-GAHP) farms, WP farms had on average lower mortality rates and slightly more layer cycles per year, with higher numbers of eggs per layer and per year. Average net profit per layer and per year (household labor valued) for WP farms was VND 48,000, which is 41 percent above the net profit per broiler place for the WOP farms (VND 34,000). Given the fact that the flock size of project poultry farmers has doubled since project start (see table 4.2), it is safe to assume that the average flock size of WP layer farms is not below the average flock size of WOP layer farms. Consequently, for the calculation of average net profit per household, the average number of layers for the WOP farms was also used for WP farms. Details are provided in table 4.8.

Table 4.8 Poultry Production Survey - Summary of Results: Layers

		WOP	WP	Increment	
Average no. of layers in production per household ^a		5,475	4,585	-890	-16%
Average no. of layer cycles per year		0.76	0.77	0.01	2%
Mortality rate per year		5.2%	4.4%	-0.8%	-15%
Per layer and year (average)					
No. of eggs produced ^a		216	225	8	4%
Total revenue ^{b c}	VND, thousands	387	410	23	6%
Total costs - household labor not valued	VND, thousands	329	345	16	5%
Net profit - household labor not valued	VND, thousands	58	65	7	13%
Total costs - household labor valued	VND, thousands	353	362	9	3%
Net profit - household labor valued	VND, thousands	34	48	14	41%
Per average household and year					
Net profit - household labor valued	VND, thousands	188,421	264,852	76,431	41%
	US\$	8,192	11,515	3,323	41%

Source: Farm survey data.

Note: a. Higher average number of layers for WOP sample does not reflect trend of increasing numbers of layers with project support.

b. Including eggs sold, unsold, and home consumption.

c. Eggs unsold and home consumption valued.

11. The assumptions for the average layer model which was developed for the overall project EA on the basis of the above survey data are presented in table 4.9.

Table 4.9. Assumptions for EA - Poultry Production Households: Layers

		WOP	WP	
--	--	-----	----	--



Avg. no. of layers in production per household		4,000	4,400	
Increment ^a			400	10%
Net profit per layer per year	VND, thousands	34.0	40.8	
Increment ^b	VND, thousands		6.8	20%
Sales of eggs per layer per year	kg	216	225	
Increment ^c	kg		9	4%
Sales of eggs per household per year	Egg number	864,000	990,000	
Increment ^d	Egg number		126,000	15%
Net profit per household per year^e	VND, thousands	136,000	179,520	
Increment	VND, thousands		43,520	32%

Source: Estimated based on farm survey data (see table 4.8).

Note: a. Assumption: 10 percent increase for WP.

b. Assumption: 20 percent increase for WP.

c. Assumption: 4 percent increase for WP.

d. Household labor valued.

e. Household labor valued.

12. As the share of broiler and layers farms out of the total number of poultry GAHP farms supported by the project is presently not known, a share of 80 percent (broiler) and 20 percent (layer) has been assumed (see table 4.10). The numbers will be updated once actual data are available. The assumptions presented in tables 4.7, 4.8, and 4.9 were used in the overall EA of the project presented in section E.

Table 4.10. Number of Poultry Production GAHP Farmers Supported by Project by Production System

Production System	Total	Share of total (%)
Broiler	738	80
Layer	185	20
Total	923	100

Note: Based on estimated share of production system of total number of farmers. Will be updated once project data are available.

13. **Impact on production.** On the basis of tables 4.7, 4.8, 4.9, and 4.10, the impact of the project on production of meat and eggs was estimated. As can be seen from table 4.11, pig production by project GAHP farmers accounts for an estimated 4.3 percent of total pig production in Vietnam, while project poultry GAHP farmers produce around 0.6 percent of broilers and 1.7 percent of eggs in the country.

Table 4.11. Estimated Project Impact on Production

Total production project GAHP pig farmers^a		Ton	160,916	4.3%^d
Total pig production in Vietnam ^b		Ton	3,733,300	
Incremental production project GAHP pig farmers		Ton	48,011	1.3% ^d
Total production project GAHP poultry farmers^c	Broiler	Ton	5,928	0.6%^d
	Layer	Egg (million)	182.8	1.7%^d
Total poultry production in Vietnam ^b	Broiler	Ton	1,031,900	
	Layer	Egg (million)	10,637	
Incremental production project GAHP poultry farmers	Broiler	Ton	988	0.1% ^d
	Layer	Egg (million)	23.3	0.2% ^d

Note: a. 2019; estimated based on tables 4.8 and 4.9.

b. 2017; General Statistics Office of Vietnam.



c. 2019, estimated based on tables 4.11, 4.13, and 4.14.

d. Estimated percentage of total production in Vietnam.

C. Assessment of Environmental Benefits

Overview

14. The project achieved environmental benefits at three levels: (a) livestock producers, (b) slaughterhouses, and (c) meat markets. The EFA attempts a quantification of some of the environmental benefits at the livestock producers (farm) level, while the benefits at the slaughterhouse and meat market level are also briefly described below.

15. **Farm level.** The project has supported a total of 25,472 households in improvement of waste management measures to reduce negative environmental impacts from livestock production. Support was provided for 17,493 households in construction of biogas works, 1,608 households in construction of composting pits, and 6,371 households with guidance on upgrading to a proper waste treatment system (see table 4.12).

Table 4.12. Project Support to Improved Livestock Production Waste Management Measures

Measure	No. of households		
	Phase 1	AF Phase	Total
Construction of biogas works	9,391	8,102	17,493
Construction of composting pits	1,608	0	1,608
Guidance on upgrading to proper waste treatment system	0	6,371	6,371
Total improvements of waste management measures	10,999	14,473	25,472

Source: Project Progress Report October 2018.

Note: Numbers will be updated once inconsistencies have been resolved.

16. **Slaughterhouses.** The project supported in total 368 slaughterhouses (68 medium- and large-scale with more than 30 pigs per day and 298 small scale with 10–30 pigs per day) in upgrading for improvement of veterinary and sanitation hygiene which meets Government’s environmental standards, thereby achieving 105 percent of the target in the Results Framework of 350 slaughterhouses. While all the slaughterhouses supported had simple or degraded wastewater treatment systems before upgrading/newly constructing, the project contributed to improved quality of post-treatment wastewater discharged into the environment, thereby reducing environmental pollution (see relevant section in PCR).

17. **Meat markets.** The project has upgraded 543 meat markets with a total of 20,538 counters, achieving 109 percent of the overall target for the project of 500. All upgraded meat markets have been supported in improvements of waste and wastewater treatment. Presently, 499 meat markets have been handed over and are in operation. The quality of the wastewater of meat markets after upgrade has been improved significantly, resulting in reduced environmental pollution (see relevant section in PCR).

Results

18. At the farm level, the livestock production waste management measures introduced by the project helped reduce not only environmental pollution but also GHG emissions through reducing (a)



methane emissions from manure, (b) GHG emissions by reducing the use of traditional fuels, and (c) GHG emissions from the use of chemical fertilizers by replacing them with fertilizer from biogas residues.

19. The ICR of Phase 1 in 2015 estimated that the introduction of biogas digesters would reduce CO₂ emissions from approximately 442 tons of manure per day, corresponding to 40,800 tons of CO₂ per year. It was also stated that the use of gas generated from biogas for cooking reduces methane (CH₄), emissions, although this has not been quantified. It was estimated that the installation of a biogas digester producing gas for cooking and replacing other fuels (liquefied petroleum gas, coal, wood, and other materials) would save each household on average VND 3.4 million every year. This amounts to annual overall savings of around VND 32 billion for the 9,391 biogas digesters established by the project in Phase 1. The value of by-products, such as residues and wastewater, obtained from biogas production and mostly reused as fertilizer for irrigation and fish farming had not been quantified.

20. The 40,800 tons of CO₂ emissions reduced per year represent 40,800 certified emission reductions.¹⁴ Based on an assumed price per certified emission reduction of US\$10, the resulting estimated annual revenues from the introduction of biogas digesters in Phase 1 amounted to US\$408,000 per year. The impact of the project interventions at the farm level on GHG reductions and the economic value for the overall project will be estimated once the relevant data are available.

21. Tables 4.13 and 4.14 present cost-benefit analyses for standard biogas digesters introduced in Phase 1 and AF phase (unit costs still to be verified). It can be seen that for both scenarios, investment in biogas digesters yields satisfactory returns to the farmer (above the opportunity cost of capital), even without estimating the economic value of the environmental benefits as described earlier.

Table 4.13. Cost-Benefit Analysis of Investment in One Biogas Digester - Phase 1

		1	2	3	4-20
Investment costs		VND, thousands	4,452		
O&M costs^a 11% of investment costs per year		VND, thousands		500	500
Value of biogas^b		VND, thousands		1,806	1,806
Net incremental benefit		VND, thousands	-4,452	1,306	1,306
		Useful life			
		20 years	10 years		
Internal rate of return		29.1%	25.6%		
NPV at 9% VND, millions		6.64	3.10		
US\$		289	135		

Source: Investment costs, O&M costs and value of biogas based on ICR EFA for the original project.

Note: a Lump sum per year: VND 500,000.

b. Estimated value of fertilizer and replacement of fuel/electricity.

Table 4.14. Cost-Benefit Analysis of Investment in One Biogas Digester - AF Phase

		1	2	3	4-20
Investment costs		VND, thousands	15,000		
O&M costs 5% of investment costs per year		VND, thousands		750	750

¹⁴ Certified emission reductions are an emissions unit issued by the Clean Development Mechanism Executive Board for emission reductions achieved by Clean Development Mechanism projects and verified by a Designated Operational Entity under the rules of the Kyoto Protocol, which may be traded in emissions trading schemes.



		1	2	3	4-20	
Value of biogas		VND, thousands		3,500	3,500	3,500
Net incremental benefit		VND, thousands	-15,000	2,750	2,750	2,750
		Useful life				
		20 years	10 years			
Internal rate of return		17.5%	11.4%			
NPV at 9% VND, millions		8.82	1.36			
		US\$	383	59		

Source: Investment costs from the PCU, O&M costs estimated, value of biogas estimated based on farm survey.

Note: a. Estimated value of fertilizer and replacement of fuel/electricity.

D. Assessment of Food Safety Benefits

Overview

22. The project contributed to improved food safety at three levels: (a) livestock producers, (b) slaughterhouses, and (c) meat markets. The food safety benefits have been described in qualitative terms and the number of consumers benefiting from improved food safety has been estimated. Furthermore, an attempt was made to estimate the economic impact of improved food safety resulting from the project. Under Subcomponent B.2: Support for DAH Enhancing Biosecurity and Disease Control, food safety monitoring has been implemented to ensure livestock products are monitored at all three levels: (a) farm-level inspections, (b) slaughter control, and (c) veterinary hygiene inspection at upgraded slaughterhouses and meat markets.

23. **Farm level.** The results of food safety monitoring in project GAHP areas of seven provinces based on 204 pork samples of GAHP households showed that 100 percent of meat samples were negative, containing neither hormones nor any banned substances. The same holds true for hormones and banned substances in animal feed (see relevant section in PCR).

24. **Slaughterhouses.** Food safety monitoring at slaughterhouses has shown a reduced and low microbial contamination on carcass samples and slaughter tools, which demonstrates the effectiveness of project interventions in terms of upgrading structures and creating awareness in slaughterhouse operators to comply with existing regulations. However, the food safety monitoring also revealed areas for improvement of slaughter procedures in some slaughterhouses to improve meat quality and hygiene (see relevant section in PCR). Table 4.15 provides an overview of project support to upgrading of slaughterhouses. It is estimated that a total of 2.6 million consumers benefit from project support to slaughterhouses in terms of access to safe meat (assuming an average meat consumption per capita of 40 kg per year).

Table 4.15. Project Support to Upgrading of Slaughterhouses

	Slaughterhouses Handed Over and in Operation		
	Small Scale ^a	Medium/Large Scale ^b	Total
Total no. of slaughterhouses	298	68	366
Avg. no. of pigs slaughtered per slaughterhouse per year ^c	2,500	12,000	4,265
Total no. of pigs slaughtered by all slaughterhouses per year^c	745,000	816,000	1,561,000



Avg. liveweight per pig slaughtered (kg)	95	95	95
Avg. liveweight of pigs slaughtered per slaughterhouse per year (ton)	237.5	1,140.0	405.2
Total liveweight of pigs slaughtered by all slaughterhouses per year (ton)	70,775	77,520	148,295
Avg. share of carcass weight of liveweight (%)	72	72	72
Avg. carcass weight of pigs slaughtered per slaughterhouse per year (ton)	171.0	820.8	291.7
Total carcass weight of pigs slaughtered by all slaughterhouses per year (ton)	50,958	55,814	106,772

Note: a. Up to 30 heads per day.

b. >30 heads per day.

c. Estimated.

25. **Meat markets.** According to food safety monitoring at meat markets, around 90 percent of pork meat samples meet the requirements on micro-organism (*E. coli*, *Salmonella*) criteria, while for chicken around 75 percent of samples meet requirements on *E. coli* criteria and 92 percent meet *Salmonella* criteria. At the same time, there are still some shortcomings and challenges, in particular regarding the use of appropriate equipment, with potential risks of microbial contamination of meat traded in the upgraded markets. However, the project is addressing these issues in coordination with local authorities, meat market management boards, and sub-DAHs by providing recommendations, guidance, and supervision to enforce required operation procedures and improve food safety (see relevant section in PCR). Table 4.16 provides an overview of project support to upgrading of meat markets. It is estimated that at least 1.8 million consumers benefit from project support to meat markets in terms of access to safe meat (assuming that most of the estimated 116,000 consumers of other meat marketed in the upgraded markets are consumers of pork meat).

Table 4.16. Project Support to Upgrading of Meat Markets

	Total	Pork	Other
Total no. of upgraded meat markets	543		
No. of upgraded meat counters in operation	20,538	20,000	538
Avg. quantity of meat sold per counter and per market day (kg) ^a		50	30
Avg. no. of market days operating per counter and per month		6	6
Avg. no. of months per counter operating per year		12	12
Avg. quantity of meat sold per counter per year (kg)		3,600	2,160
Avg. quantity of meat sold per market per year (ton)		132.6	2.1
Estimated total quantity of meat sold by all upgraded markets per year (ton)		72,000	1,162
Estimated meat consumption per capita per year (kg)		40	10
Estimated no. of consumers benefiting from upgraded markets per year		1,800,000	116,208

Note: a. Estimated.

Results

26. On the basis of the above analysis, table 4.17 presents the estimated number of consumers that benefit directly from improved food safety at the levels of livestock producers, slaughterhouses, and meat markets. The calculations were based on the estimated volumes of meat produced, slaughtered, and marketed, as well as the number of eggs produced, assuming average annual per capita consumption. The



overall numbers of benefiting consumers include (a) 2.9 million from GAHP pig production, (b) 590,000 from GAHP broiler production, (c) 1.2 million from GAHP egg production, (d) 2.7 million from safe pork meat from upgraded slaughterhouses, (e) 1.8 million from safe pork meat from upgraded meat markets, and (f) 116,000 from other safe meat from upgraded meat markets.

27. An attempt was made to estimate the economic impact of improved food safety on the basis of the assumption that 1.8 million consumers have access to safe meet from upgraded meat markets and that between 1 and 5 percent of consumers suffered from food poisoning at least once per year in the absence of the improved meat markets. Furthermore, for an average case of food poisoning, it has been assumed that (a) cost of treatment is VND 414,000 and (b) three working days will be lost with an income loss per day of VND 100,000. Table 4.18 presents the results, showing estimated total annual benefits from avoided food poisoning of US\$560,000, US\$1.12 million, and US\$2.79 million for the scenarios with 1, 2, and 5 percent of consumers avoiding food poisoning.

Table 4.17. Estimated Number of Consumers Benefiting from Improved Food Safety

	Unit	No. of Units
A. Support to livestock production		
Pig production		
Total production of project GAHP farmers (liveweight) ^a	Ton	160,916
Estimated no. of consumers benefiting from GAHP pig production^b	No.	2,896,480
Poultry production		
Broilers		
Total production of project GAHP farmers ^c	Ton	5,928
Estimated no. of consumers benefiting from GAHP broiler production^d	No.	592,788
Layers		
Total production of project GAHP farmers ^c	Egg (million)	182.8
Estimated no. of consumers benefiting from GAHP egg production^e	No.	1,218,360
B. Support to upgrading of slaughterhouses		
Total liveweight of pigs slaughtered per year ^f	Ton	148,295
Estimated no. of consumers benefiting from upgraded slaughterhouses^b	No.	2,669,310
C. Support to upgrading of meat markets		
Estimated total quantity of pork meat sold by all upgraded meat markets per year (ton) ^g	Ton	72,000
Estimated no. of pork meat consumers benefiting from upgraded meat markets^h	No.	1,800,000
Estimated total quantity of other meat sold by all upgraded meat markets per year (ton) ^g	Ton	1,162
Estimated no. of other meat consumers benefiting from upgraded meat markets^d	No.	116,208

Note: a. Estimated based on tables 4.8 and 4.9.

b. Assumption: Average share of carcass weight of liveweight: 72 percent.

Estimated average meat consumption per capita per year: 40 kg.

c. Estimated based on tables 4.11, 4.13, and 4.14.

d. Assumption: Estimated average meat consumption per capita per year: 10 kg.

e. Assumption: Estimated average egg consumption per capita per year: 150 eggs.

f. Estimated based on table 4.19.

g. Estimated based on table 4.20.

h. Estimated average meat consumption per capita per year: 40 kg.



E. Overall Project EA

28. The overall project EA is based on the livestock production benefits and the economic benefits from investments in biogas digesters as presented earlier. As explained, the potential economic benefits from project support to improved food safety at the levels of livestock producers, slaughterhouses, and meat markets have not been included in the project EA as there are no data that would support a credible analysis. The impact of the project on GHG reductions was not done because the Government team was not able to estimate the increase or reduction in GHG emissions as a result of the project interventions. Therefore, carbon pricing scenarios have not been included in the estimated ERR. However, project interventions, such as biodigesters for example, are expected to have contributed to an overall positive impact on GHG emission by reducing relative emissions through more sustainable treatment of animal waste.

29. The period of analysis is 25 years as it had been also used at appraisal, with a second scenario for 20 years. All project costs have been included in the EA (including IDA credit, Government and private sector contribution), using a Standard Conversion Factor of 0.9 which had been used for the EFA at appraisal and ICR for the original project prepared in 2015 to convert project costs into economic costs that also exclude taxes. O&M costs of slaughterhouse and market structures, as well as of biogas digesters supported by the project, have been calculated at 5 percent of investment costs per year and included for the entire period of analysis.

30. The ERR for the base case is 23.4 percent for the 25-year scenario and 22.5 percent for the 20-year scenario. The calculated NPV at 9 percent discount rate is US\$287.2 million for the 25-year scenario and US\$189.6 million for the 20-year scenario (see table 4.18). A sensitivity analysis has been conducted reflecting different scenarios of increased/reduced benefits. As can be seen, the ERR remains acceptable at 9.3 percent (above the social discount rate of 9 percent recently being used for World Bank-funded investment projects in Vietnam), even for a 40 percent reduction in benefits from both pig and poultry production.

Table 4.18. Summary of Overall Project EA and Sensitivity Analysis

		Change					
		Base case	+10%	-10%	-20%	-30%	-40%
Pig benefits							
Poultry benefits							
Period of analysis: 25 years							
ERR		23.4%	26.5%	20.4%	17.4%	14.4%	11.4%
NPV at 9%	VND, millions	6,605,967	7,523,019	5,688,914	4,771,862	3,854,810	2,937,758
	US\$, million	287.2	327.1	247.3	207.5	167.6	127.7
Period of analysis: 20 years							
ERR		22.5%	25.8%	19.3%	16.1%	12.8%	9.3%
NPV at 9%	VND, millions	4,361,054	5,043,191	3,678,918	2,996,782	2,314,646	1,632,510
	US\$, million	189.6	219.3	160.0	130.3	100.6	71.0

31. It can be concluded that the project contributed to significantly improving incomes of the supported pig and poultry farmers¹⁵ while improving the food safety for a large number of consumers.

¹⁵ While income increases of slaughterhouse and meat market operators have not been estimated, the available data also



The results clearly show that the project is likely to generate economic returns above what was estimated at appraisal, even without including the potential economic benefits from improved food safety in the analysis.

suggest significant increases in profitability of many operators resulting from the project.



ANNEX 5. BORROWER, CO-FINANCIER AND OTHER PARTNER/STAKEHOLDER COMMENTS

1. A stakeholder meeting with the LIFSAP team including participants from four provinces (Hanoi, Hai Phong, Thai Binh, and Hung Yen) which directly participated in the project was held on November 13, 2019. At the meeting, the draft ICR was presented and discussed with the key project implementers and stakeholders from the provincial DARDs. The stakeholders provided some comments and recommendations to improve the overall consistency of the ICR.

2. Overall, they indicated that the storyline is accurate, and the proposed ratings are consistent with the status of the project at completion. The project implementation team and stakeholders did not have major specific objections to the draft ICR. However, they suggested that the ICR should be reviewed in light of the following issues:

- **Clarification of the data.** The summary of results for the KPIs is consistent with the project M&E records. However, on the number of beneficiaries, the implementation team suggested showing the number of both direct and indirect beneficiaries. Due to the definition of direct beneficiaries (as in the original PAD), the number of people who benefited from the project seems so little relative to the investments and the time of implementation of the project. However, in reality the number of beneficiaries should be big, given that the project interventions such as wet markets and slaughterhouses benefited entire communities directly and indirectly. For instance, they indicated that the upgrading of wet markets and slaughterhouses, particularly those strategically located in main cities and towns (for example, Hanoi and Ho Chi Minh), benefited millions of people in terms of the supply of safe and high-quality meat products (pork and chicken). This means that the real number of beneficiaries could be several millions of people. The meeting resolved that for the ICR, the reports should clearly highlight the number of direct beneficiaries (achieved by the end of project), estimated as per the definition of direct project beneficiaries agreed at design. In the PCR, the implementation team will highlight both the direct and indirect beneficiaries and also demonstrate how these numbers are estimated.
- **Estimation of ERR.** Given the issue of the number of beneficiaries, the implementation team considers the ERR and NPV to be rather underestimated. However, the team considers the analysis, the data used, and most of the assumptions made to be consistent with their expectations.
- **Vietnamese version of the ICR.** The team proposed that the ICR should be converted to Vietnamese so that it can be widely circulated to all the implementing teams at the provincial level. The team suggested that, time permitting, they should consolidate any further comments from the implementers and stakeholders at the provincial level and submit the comments to the Task Team at the World Bank.
- **Reconciliation of the ICR and Government's PCR.** The Government implementation team expects that the key data used in the two reports (ICR and PCR) should be consistent with each other. They suggested using the translated version of the ICR to ensure that any issues with inconsistent data are addressed before both documents can be made available in the public domain.

ANNEX 6. PROJECT STORIES

Improvement of Food Safety and Production Efficiency through Development of Value Chain



Store of Hoang Long Cooperative in Hanoi



Head office of Soc Son Hill Chicken Production and Consumption Association in Hanoi



A-Z pork of Hoang Long Cooperative in Hanoi

Source and photo credit: LIFSAP

Mr. Nguyen Van Dong – Chairman of Soc Son Hill Chicken production and consumption Association said, “Soc Son Hill Chicken chain is a great success – thanks to LIFSAP’s great contribution. It is because of the fact that LIFSAP project has helped the Association build links, closed chain of production – slaughter – consumption to increase the value of Soc Son Hill Chicken products.”

Dong said, “Previously, the production of Soc Son hill chickens was at small scale, scattered, without any linkages, and lack of facilities for preliminary processing and slaughtering. Therefore, chickens were only sold in the traditional way which sells live chicken to Traders who squeeze price. They often fall into the scene of bumper crop – low price. In December 2014, I and some members established Soc Son Hill Chicken production and consumption Association. The livestock producers involved in the Association were trained and supervised the implementation of VietGAHP under the project. In 2016, the LIFSAP project provided me financial support for construction of a slaughterhouse to create a closed chain. At present, the Association has 30 members with production scale of 60-70 thousand chickens per year. All chickens of the Association are slaughtered ensuring hygiene and signed selling contract with businesses



for consumption. Therefore, the selling price of chicken increased more than 10% and the average net profit of households reached from VND 29-34 million /household/year.”



Mr. Nguyen Van Dong and members of Soc Son Hill Chicken Production and Consumption Association discuss plans for production and trading



Farm of Dong's family



Soc Son Hill Chickens are slaughtered ensuring food hygiene and safety



Soc Son Hill Chickens are packaged ensuring food hygiene and safety

Source and photo credit: LIFSAP



ANNEX 7. SUPPORTING DOCUMENTS

1. Project Appraisal Document for the original project, approved August 27, 2009 (Report No. 50161-VN).
2. Project Paper on the Proposed Additional Credit, approved June 9, 2015 (Report No. 91212-VN).
3. Selected Implementation Status and Results Reports, Aide Memoires, and Management Letters prepared by the World Bank Task Teams (filed in the operations portal).
4. Government's Project Completion Report for the original project, dated December 30, 2015.
5. Government's Project Completion Report for the overall implementation period, including the Additional Financing, dated November 12, 2019.