Internal Ex-Post Evaluation for Technical Cooperation Project (SATREPS[1])

conducted by Viet Nam Office: March, 2025

Country Name	**Project for Establishment of Cryo-bank System for Vietnamese Native Pig Resources and Sustainable Production System to Conserve Bio-diversity**
Socialist Republic of Viet Nam	

I. Project Outline

Background	The livestock sector in Viet Nam accounted for about 28% of the total agricultural output, and pork meat production occupied 75.4% of total meat production. Traditionally, pig farming was dominated by small-scale farmers (including ethnic minorities in mountainous regions) raising native pigs and their crossbreeds. The introduction of Western breeds and crossbreeding with native breeds to improve productivity resulted in some large-scale pig farming operations but led to a sharp decline in the number of rare native breeds. Of the 26 recognized native pig breeds, five were already extinct and nine were thought to be extremely rare breeds, making their conservation an urgent priority from the perspective of conserving biodiversity. In Viet Nam, village development was generally lagging, and many ethnic minorities, especially those living in mountainous regions, continued to live in poverty. Mountainous regions were not suitable for large-scale, modern agriculture or pig farming due to topography, accessibility, and other constraints. Therefore, there was a need for the development and introduction of sustainable livelihood improvement measures that utilized available local resources for small-scale farmers living in poverty. (The figures were taken from the Record of Discussions (R/D) of this project signed in December 2014.)		
Objectives of the Project	Through the establishment of a database and cryo-bank system based on lineage analysis of Vietnamese native pigs, the establishment of reproductive techniques from semen and/or embryo, and the development of the methodology of utilizing Vietnamese native pig genetic resources (preventive measures against infectious disease and establishment of production system), the project aims at establishing the conservation system of Vietnamese native pigs for identification, assessment, and utilization in Viet Nam, thereby contributing to the establishment of the biodiversity conservation system of Vietnamese native pigs. 1. Expected Overall Goal: Biodiversity conservation system of Vietnamese native pigs is established. 2. Project Purpose: The conservation system* of Vietnamese native pigs for identification, assessment, and utilization is established. *The conservation system is comprised of i) a database and cryo-preservation based on lineage analysis of Vietnamese native pigs, ii) reproductive techniques from semen and embryos, and iii) the methodology of utilizing Vietnamese native pig genetic resources (preventive measures against infectious disease and establishment of production system).		
Activities of the Project	1. Project site: Hanoi, whole area of Viet Nam (for the identification of Vietnamese native pig genetic resources,) and Da Bac District of Hoa Binh Province (for the provision of technical guidance on breeding Vietnamese native pigs). 2. Main activities: the establishment of a database and cryo-bank system, reproductive techniques from semen and/or embryo and the enhancement of reproduction/breeding techniques of Porcine Endogenous Retrovirus (PERV)-free or low copy-PERV of Vietnamese native pigs, and provision of technical guidance to local technicians, para-veterinarians (para-vets), etc. for improvement of income of model farmers in six communes of Da Bac District in Hoa Binh Province[2] for breeding Vietnamese native pigs. 3. Inputs (to carry out above activities) Japanese Side 1) Experts: (long-term) 1 person (short-term) 20 persons 2) Trainees received: 18 persons 3) Equipment: Real-time Polymerase Chain Reaction (PCR) system, fluorescence microscope with digital camera system, liquid nitrogen semen container, micromanipulator, etc. 4) Local costs Vietnamese Side 1) Staff allocated: 74 persons 2) Facilities and equipment: Project office, storage for project tools and equipment, embryo transfer facility, introductory quarantine facility, and artificial insemination (AI) facility 3) Local costs		
Project Period	(ex-ante) May 2015 – May 2020 (60 months) (actual) 5 May 2015 – 4 May 2020 (60 months)	Project Cost (Japanese side only)	(ex-ante) 417 million yen, (actual) 357 million yen
Implementing Agency	National Institute of Animal Science (NIAS)-V; Institute of Biotechnology (IBT) belonging to Vietnam Academy of Science and Technology (VAST); Vietnam National University of Agriculture (VNUA); and Department of Agriculture and Rural Development in Hoa Binh Province (Hoa Binh Provincial DARD)		
Cooperation Agency in Japan	National Agriculture and Food Research Organization (Institute of Agrobiological Sciences, National Institute of Animal Health, and Institute of Livestock and Grassland Science), Tokushima University, and Itochu Feed Mills Co., Ltd.		

II. Result of the Evaluation<Special Perspectives Considered in the Ex-Post Evaluation >

- As for Project Purpose Indicator 4 (Ten or more publications in international journals with citation index are coauthored by Vietnamese and Japanese

[1] SATREPS: Science and Technology Research Partnership for Sustainable Development.

[2] Initially, the project supported 15 model farmers from Cao Son Commune of Da Bac District. From 2017, Hoa Binh Sub Department of Animal Health (Sub-DAH)/DARD expanded the activities to 5 other communes of Da Bac District with their counterpart budget which started in the last quarter of 2017. The project also supported 75 model farmers in these communes.

researchers), continuation status was not checked because the continuation of joint research after the project completion is not mentioned in the Project Completion Report (Pro CR). For reference, the number of publications of research results in international journals was checked based on the recommendation of the Pro CR.

- Regarding Overall Goal Indicator 2 (Breeding is continued to produce at least one head of Vietnamese native pig (VNP) whose PERV number is lower than that at the end of the project), the target of the indicator was considered as "to produce at least one head of VNP whose PERV number is lower than that at the end of the project" and "breeding is continued" was considered as the means to achieve the target. The phrase "lower than that at the end of the project" was interpreted to be "lower than the lowest PERV copy number achieved during the project implementation" based on the perspective of the Pro CR.

1 Relevance/Coherence

[Relevance]

<Consistency with the Development Policy of Viet Nam at the Time of Ex-Ante Evaluation >

The project was consistent with the development policy of Viet Nam at the time of ex-ante evaluation. The national Socio-Economic Development Strategy (SEDS) (2011-2020) set forth the modernization and the improved productivity of agriculture, including livestock farming, by utilizing advanced technologies such as bioengineering as well as sustainable development according to local conditions and the alleviation of poverty among ethnic minorities in mountainous areas who had been left behind by development.

<Consistency with the Development Needs of Viet Nam at the Time of Ex-Ante Evaluation >

The project was consistent with the development needs of Viet Nam for establishing a conservation system of VNPs at the time of ex-ante evaluation as shown in "Background" above.

<Appropriateness of Project Design/Approach>

The project design/approach was highly appropriate. The project plans/approaches were changed flexibly and adaptably to manage risks caused by the outbreak and fast spread of African Swine Fever (ASF) in early 2019. The project gave detailed instructions on how to prevent contamination and spread of the virus to all relevant stakeholders, provided protective tools and materials as well as reallocation of budget to construct necessary preventive structures, which helped the Vietnamese side to be able to proactively diagnose diseases and develop proper control plans. Model farmers in Da Bac District received training on disease management. As a result, despite the ASF outbreak, the project did not cancel any planned activities. The project has contributed to improving the livelihood of small-scale pig farmers, including ethnic minorities, by selecting Da Bac District of Hoa Binh Province, located in the mountainous area with small-scale farmers, as the project site for the provision of technical guidance on breeding VNPs, supporting model farmers from communes with large ethnic minorities, and prioritizing the involvement of ethnic minorities as model farmers (also see <Other Impacts at the Time of Ex-Post Evaluation>). Prominent approaches for breeding VNPs, i.e. training farmers on feeding management (how to build cages and mix feed using locally available materials) and rearing techniques, have contributed to shortening birth intervals, increasing the number of annual deliveries, increasing offspring/reproduction numbers, and improving survival rates in native pigs.

<Evaluation Result>

In light of the above, the relevance of the project is ③[3].

[Coherence]

<Consistency with Japan's ODA Policy at the Time of Ex-Ante Evaluation>

The project was consistent with Japan's ODA policy to Viet Nam at the time of ex-ante evaluation. The Country Assistance Policy for the Socialist Republic of Viet Nam (2012) set forth support to develop rural areas under the Priority Area of "Response to Fragility", and the Rolling Plan for the Socialist Republic of Vietnam (2013) included "Agriculture and Rural Development" sector in the Cooperation Policy for Development Issue of "Social and Living Standard Improvements and Rectifying Disparities" under the Priority Area of "Response to Fragility".

<Collaboration/Coordination with JICA's Other Interventions>

No collaboration/coordination between the project and JICA's other intervention was clearly planned at the time of ex-ante evaluation and during the project period.

<Cooperation with other institutions/ Coordination with International Framework>

The collaboration/coordination with Food and Agriculture Organization (FAO) was not planned at the time of ex-ante evaluation but was implemented during project implementation, and the positive effects expected were confirmed at the time of ex-post evaluation. With the cooperation of FAO, NIAS-V started a project for freezing somatic cells of five VNP breeds in 2020, contributing to the cryo-conservation of VNP breeds as protection against loss from ASF.

<Evaluation Result>

In light of the above, the coherence of the project is ②.

[Evaluation Result of Relevance/Coherence]

In the light above, the relevance/coherence of the project is ③.

2 Effectiveness/Impact

<Status of Achievement of the Project Purpose at the Time of Project Completion>

At the time of project completion, the Project Purpose was mostly achieved as planned. NIAS-V started discussions with Ministry of Agriculture and Rural Development (MARD), Ministry of Science and Technology (MOST), and other related agencies regarding the conservation of VNP resources, and MARD already approved the NIAS-V's proposal to conserve by cryo-banking 15 VNPs' breeds (semen, oocytes, and embryos), only waiting for the budget decision (Indicator 1). No VNPs, of which the number of PERV copies is five or less, were produced (target: at least three male and five female VNPs, of which the number of PERV copies is five or less). For reference, the lowest copy numbers of PERV were 6.47 (male) and 6.47 (female) (Indicator 2). Technical guidelines for the raising management of VNPs were developed with three sections for para-vets, farmers, and AI technology, and endorsed by Hoa Binh Provincial DARD. For reference, two kinds of handbooks were also developed: one for para-vets and the other for farmers. Fifty copies of technical guidelines and 500 copies of each of the handbook were handed over to Hoa Binh Sub-DAH for application for their future activities (Indicator 3). Publication of research results coauthored by Vietnamese and Japanese researchers was in progress. Eight papers were published in

[3] ④ : very high, ③ : high, ② : moderately low, ① : low

international journals. Two more papers were submitted, reviewed, and resubmitted after the revision (target: 10 or more publications in international journals with citation index). For reference, some research results were also presented at international conferences in 2017 and 2019 (Indicator 4).

<Continuation Status of Project Effects at the Time of Ex-Post Evaluation>

By the time of the ex-post evaluation, the project effects have been continued. NIAS-V, VNUA, and IBT have continued related research and/or started new research projects based on the research outputs of this project such as cryo-bank system, reproductive techniques from semen and embryo, and preventive measures against infectious diseases. Many of these research activities have been supported by domestic or international organizations such as MARD, MOST, VAST, and FAO. So far, eight papers have been published in international journals and nine in national journals. In addition, one poster has been published at an international conference. It is noted that, from 2020 to 2022, NIAS-V conducted research to continue breeding to produce VNPs whose PERV copy number is lower than 6.47 (i.e., the lowest copy number achieved during the project implementation) and produced 121 piglets, in which 11 (5 males and 6 females) have PERV copy numbers lower than 6.47 (also see the results of Overall Goal Indicator 2). However, no VNPs, of which the number of PERV copies is five or less (i.e., the target of Project Purpose Indicator 2) were produced[4]. For reference, the lowest copy numbers of PERV achieved after the project completion are 5.78 (male) and 5.75 (female). NIAS-V, VNUA, and IBT have been maintaining and using the equipment provided by the project. All expensive (over two million Japanese yen) and key research equipment items provided are in good condition and utilized for scientific research purposes as originally intended. Some laboratory equipment items provided to VNUA are also used for training students. Key research outputs by the project have been utilized towards social implementation i.e., the establishment of the biodiversity conservation system of VNPs. For example, NIAS-V has utilized the database and cryobank system for establishing a frozen gene banking system of VNPs (see the results of Overall Goal Indicator 1 for details). NIAS-V has also shared reproductive techniques, preventive measures against infectious diseases, and the production system of VNPs, including manuals, guidelines, and handbooks, with stakeholders such as local extension workers, para-vets, etc., in all districts/city of Hoa Binh Province and some other provinces including Thai Nguyen, Yen Bai, and Hanoi, for them to provide technical guidance to farmers. They have been shared through seminars/workshops organized by NIAS-V and DARDs, uploading manuals on the NIAS-V's website as well as printing and distribution of guidelines and handbooks to Sub-DAHs/DARDs. Hoa Binh Sub-DAH has been utilizing the technical guidelines for the raising management of VNPs and handbooks not only in Da Bac District (the project site) but also in the remaining districts/city of Hoa Binh Province (see the results of Overall Goal Indicator 3 for details) in collaboration with NIAS-V. IBT has updated/improved the operational manual for reproductive techniques, which has been shared with NIAS-V and Hoa Binh Provincial DARD.

<Status of Achievement for the Expected Overall Goal at the Time of Ex-Post Evaluation>

At the time of ex-post evaluation, the Overall Goal has been mostly achieved as planned. Based on the proposal of NIAS-V stated in the results of Project Purpose Indicator 1, MARD approved the project "Cryopreservation of VNP sperm and embryos" (2020-2024) and NIAS-V has been utilizing a gene bank system established under the project to preserve sperm and embryos of three critically endangered VNP breeds[5]. NIAS-V confirmed that the operation of the gene bank system would continue in the future because the Government recognizes its importance and the necessary financial resources would be secured (Indicator 1). As mentioned earlier, NIAS-V has produced a total of 11 heads of VNPs with PERV copy numbers lower than the lowest PERV copy number of 6.47 achieved during the project implementation (target: at least one head of VNP produced). Although NIAS-V has stopped breeding using technologies developed by the project since 2023 due to a lack of research budget, the produced 11 heads of VNPs have been kept in a breeding house established by the project in NIAS-V Thai Nguyen Center (Animal Husbandry Research & Development Center for Northern Mountainous Region in Thai Nguyen Province) and raised for natural breeding. However, it is not clear whether the subsequent generations of VNPs have PERV copy numbers lower than 6.47 due to a lack of research budget to detect their PERV copy numbers. It is noted that NIAS-V is seeking additional financial sources to continue the breeding process to produce male and female VNPs with little or free PERV (Indicator 2). The number of communes in Da Bac District using the technical guidelines for raising management of VNPs (and handbooks) has increased from six at the project completion to 20 as planned. In addition, the technical guidelines (and handbooks) have been disseminated to and used in 110 communes in the remaining nine districts/city in Hoa Binh Province. They have been disseminated and used widely because the raising management of VNPs meets the needs of Hoa Binh Province, which is a mountainous province suitable for smallholder farming, especially raising VNP breeds that have been maintained for a long time, and the technical guidelines (and handbooks) are very practical for para-vets and indigenous pig farmers to apply (Indicator 3).

<Other Impacts at the Time of Ex-Post Evaluation>

No negative impacts have been observed. Meanwhile, various positive impacts have been observed. Through technical transfer by Japanese experts and training in Japan under the project, the research capacity of researchers was improved in the fields of cryo-bank system, reproductive techniques from semen and embryo, and preventive measures against infectious diseases (see the results of Project Purpose Indicator 4 for the number of publications of the research results), and the technical capacity of staff of Hoa Binh Provincial DARD was improved in native pig production. The scientific literacy of the related government organizations, such as MARD and MOST, was also improved by the project through discussions regarding the conservation of VNP resources, etc. As expected at the time of ex-ante evaluation, the livelihood of small-scale pig farmers, including ethnic minorities, in Hoa Binh Province has been improved. The model farmers from 6 communes of Da Bac District supported by the project and farmers in 130 communes in all districts/city of Hoa Binh Province, including the above-mentioned 6 communes, supported by Hoa Binh Sub-DAH after the project completion, utilizing the technical guidelines and handbooks of the project, have improved the efficiency and quality of VNP breeding, which has helped to increase their income. It is noted that the communes supported by the project are home to a large number of ethnic minorities; therefore, the project has contributed to increasing the income of ethnic minorities as well. The project has also contributed to hunger eradication and poverty

[4] According to NIAS-V, the breeding process is conducted based on random chromosome combinations. Therefore, (i) NIAS-V must increase the scale of breeding to increase the chances of achieving the desired chromosome combination, and (ii) it takes a lot of time to produce piglets of which the number of PERV copies is five or less. However, due to budget limitation, NIAS-V only received the budget from MARD to continue the research till the end of 2022. Therefore, it was difficult to produce piglets of which the number of PERV copies is five or less.

[5] According to NIAS-V, due to budget limitations, MARD could approve only enough to preserve sperm and embryos of some VNP breeds in the period from 2020 to 2024. Therefore, NIAS-V selected and proposed three breeds that were more critically endangered compared to the other breeds to conduct preservation with the approved budget. NIAS-V is still seeking an additional budget to cryopreserve the remaining VNP breeds.

reduction in Hoa Binh Province and narrowing the gaps among regions.

<Evaluation Result>

In light of the above, the effectiveness/impact of the project is ③.

Achievement of Project Purpose and Overall Goal

<table>
<tr><th>Aim</th><th>Indicators</th><th>Results</th><th>Source</th></tr>
<tr><td rowspan="4">(Project Purpose)
The conservation system of Vietnamese native pigs for identification, assessment, and utilization is established.</td><td>Indicator 1: Discussion on national operational plan of the conservation system has begun with MARD.</td><td>Status of the Achievement (Status of the Continuation): achieved as planned (continued)
(Project Completion)
- Discussion on national operational plan of the conservation system had begun with MARD, etc., and NIAS-V's proposal to conserve by cryo-banking 15 VNPs' breeds had already been approved by MARD, only waiting for the budget decision.
(Ex-Post Evaluation)
-The project "Cryopreservation of VNP sperm and embryos" (2020-2024) is implemented based on the NIAS-V's proposal approved by MARD.</td><td>ProCR and NIAS-V</td></tr>
<tr><td>Indicator 2: At least three male and five female VNPs, of which the number of PERV copies is five or less, are produced.</td><td>Status of the Achievement (Status of the Continuation): not achieved (not continued)
(Project Completion)
- No VNPs, of which the number of PERV copies is five or less, were produced. The lowest copy numbers of PERV were 6.47 (male) and 6.47 (female).
(Ex-Post Evaluation)
- No VNPs, of which the number of PERV copies is five or less, have been produced (see the results of Overall Goal Indicator 2).</td><td>ProCR and NIAS-V</td></tr>
<tr><td>Indicator 3: Technical guidelines for the raising management of VNPs are approved by Hoa Binh Province, DARD.</td><td>Status of the Achievement (Status of the Continuation): achieved as planned (continued)
(Project Completion)
- The technical guidelines for the raising management of VNPs, developed under the project, were endorsed by Hoa Binh Provincial DARD.
(Ex-Post Evaluation)
- The endorsed technical guidelines have been utilized by Hoa Binh Provincial DARD (see the results of Overall Goal Indicator 3).</td><td>ProCR and Hoa Binh Provincial DARD</td></tr>
<tr><td>Indicator 4: Ten or more publications in international journals with citation indexes are coauthored by Vietnamese and Japanese researchers.</td><td>Status of the Achievement: mostly achieved as planned
(Project Completion)
- Eight papers co-authored by Vietnamese and Japanese researchers were published in international journals with citation indexes. Two more papers were submitted and reviewed and both were resubmitted after the revision.
(Ex-Post Evaluation)
*Continuation status of Project Purpose Indicator 4 was not checked (see <Special Perspectives Considered in the Ex-Post Evaluation>). For reference, NIAS-V, IBT, and VNUA have continued related research and/or started new research based on the research outputs of this project. So far, eight papers have been published in international journals.</td><td>ProCR</td></tr>
<tr><td rowspan="3">(Expected Overall Goal)
Biodiversity conservation system of Vietnamese native pigs is established.</td><td>Indicator 1: The gene banking system of VNPs is operated (including the addition and distribution of gene resources) in NIAS.</td><td>Status of the Achievement: mostly achieved as planned
(Ex-Post Evaluation)
- The gene banking system of three breeds of critically endangered VNPs is operated (including the addition and distribution of gene resources) in NIAS-V through implementing the project "Cryopreservation of VNP sperm and embryos" (2020-2024) approved by MARD.</td><td>NIAS-V</td></tr>
<tr><td>Indicator 2: Breeding is continued to produce at least one head of VNP whose PERV number is lower than that at the end of the project.</td><td>Status of the Achievement: achieved as planned
(Ex-Post Evaluation) *See <Special Perspectives Considered in Ex-post Evaluation>
-The total number (head) of VNPs with PERV copy numbers lower than the lowest copy number achieved during the project implementation, produced through continued breeding, was 11 (by target year (2023) and as of August 2024).</td><td>NIAS-V</td></tr>
<tr><td>Indicator 3: The number of communes in Da Bac District using the technical guidelines for raising management of VNP has increased to 20 from the current number of six communes.</td><td>Status of the Achievement: achieved beyond the plan
(Ex-Post Evaluation)
> Number of communes in Da Bac District of Hoa Binh Province where the technical guidelines for the raising management of VNPs are used: 20 in total (by target year and as of August 2024)
<table>
<tr><th>2020
(Year of project completion)</th><th>2021</th><th>2022</th><th>2023
(Target year)</th><th>2024
(as of Aug)</th></tr>
<tr><td>6</td><td>20</td><td>20</td><td>20</td><td>20</td></tr>
</table>
> Number of communes in the other nine districts/city of Hoa Binh Province where the technical guidelines for the raising management of VNPs are used: 110 in total (by target year and as of August 2024)
<table>
<tr><th>2020
(Year of project</th><th>2021</th><th>2022</th><th>2023
(Target year)</th><th>2024
(as of Aug)</th></tr>
</table></td><td>Hoa Binh Provincial DARD and NIAS-V</td></tr>
</table>

		completion)						
		0	110	110	110	110		

3 Efficiency

Both the project cost and the project period were within the plan (the ratio against the plan: 86% and 100%, respectively). The project canceled the import of a liquid nitrogen generator from Japan and decided to purchase liquid nitrogen from domestic suppliers instead, which resulted in the reduction of the cost of equipment and its operation.

	Project Cost (Japanese side only, yen)	Project Period (months)
Plan (ex-ante)	417 million	60
Actual	357 million	60
Ratio (%)	86	100

Outputs were produced as planned.

In the light above, the efficiency of the project is ④.

4 Sustainability

<Policy Aspect>

The national SEDS (2021-2030) sets forth the tasks of pushing up agricultural restructuring, strongly developing high-tech agriculture, organic agriculture, and bio-agriculture, including developing high-tech livestock farming, and encouraging the development of efficient and environmentally friendly livestock farms and smallholder livestock farming. Improving the capacity of research institutions and pushing up scientific and technological research are also emphasized in the Strategy. The Government of Viet Nam and Hoa Binh Province have issued many other policies/strategies/plans to promote livestock sector development, including developing indigenous pig breeds, developing circular livestock farming as well as ensuring biosafety and disease control, such as the Animal Husbandry Development Strategy in 2021-2030 and Vision for 2045, the Scheme on Sustainable Animal Husbandry Development in Hoa Binh Province for the period of 2017-2025, the Livestock Sector Development Planning to 2020, Vision to 2030 of Hoa Binh Province etc. The policy support is likely to be continued in the future.

<Institutional/Organizational Aspect>

Organizational structure to utilize the research outputs of the project is established. NIAS-V, VNUA, and IBT have been assigning the related units/departments to conduct the related research activities and new research projects. The collaborative relation between these research institutes and the government organizations such as MARD, MOST, and Hoa Binh Provincial DARD has been sustained as shown in “Effectiveness/Impact”. All the implementing agencies have sustained the organizational arrangement for the operation and maintenance (O&M) of the research facilities/equipment established/provided by the project. There are no issues regarding institutional/organizational sustainability.

<Technical Aspect>

Researchers/staff in the implementing agencies have continuously improved their research/ technical capacity by continuing and starting the related research activities /applying the acquired skills and knowledge in the professional works assigned. Their skills and knowledge to properly operate and maintain the established/provided research facilities/equipment have been sustained as well. Scientific literacy of MARD and MOST has been sustained and improved through reports on research results of the related projects shared by NIAS-V, VNUA, and IBT. The scientific literacy of Hoa Binh Provincial DARD has been sustained and improved through utilizing the research outputs of the project in livestock development and prevention of diseases. From the past trend, the technical level established in the implementing agencies is likely to be sustained in the future.

<Financial Aspect>

NIAS-V, VNUA, and IBT have secured the necessary budget to implement the related research activities from internal and external funds such as MARD, MOST, VAST, and FAO, except for the budget for research to continue breeding to produce VNPs with little or free PERV after 2023. The necessary budget to utilize the research outputs of the project in policies/programs has been secured, too. For example, MARD has secured and allocated the budget to NIAS-V for the operation of the gene bank system for three critically endangered VNP species in the period of 2020-2024. Hoa Binh Provincial People’s Committee (PPC) has secured and allocated the provincial budget to Hoa Binh Provincial DARD to implement livestock sector policies/programs, including the dissemination of the technical guidelines for raising management of VNPs and handbooks in the whole province. NIAS-V has also secured the budget to disseminate the key research outputs in Hoa Binh Province and three other provinces. Since the conservation of VNP breeds is one of the tasks of the Vietnamese livestock sector, the necessary budget for the related research activities, including the budget to continue breeding to produce VNPs with little or free PERV, and the utilization in government policies/programs is likely to be secured in the future. All the implementing agencies have secured the budget for O&M of the provided/established equipment/facilities. NIAS-V and Hoa Binh Provincial DARD receive a separate budget for O&M of the provided equipment annually from MARD and Hoa Binh PPC respectively. VNUA and IBT do not have such budgets but have accessed different funds from approved research programs/projects. The necessary budget is likely to be secured in a similar way in the future.

<Environmental and Social Aspect>

No issue on environmental and social aspects has been observed, and it has not been necessary to take any countermeasures.

<Evaluation Result>

In light of the above, slight problems have been observed in terms of the financial aspect of the implementing agency. Therefore, the sustainability of the project effects is ③.

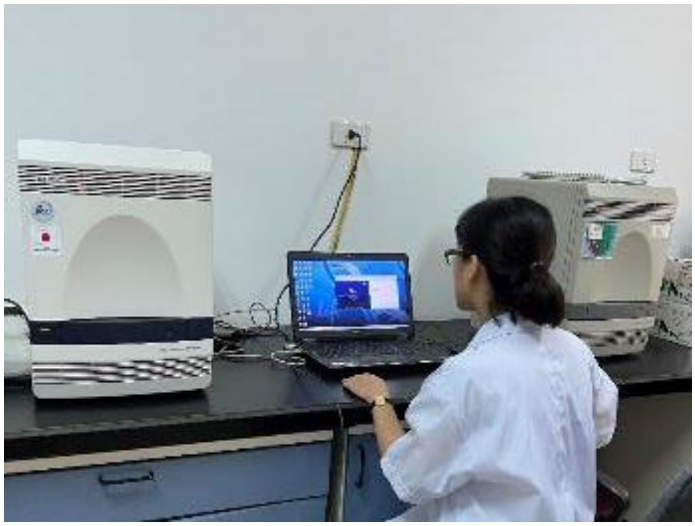
5 Summary of the Evaluation

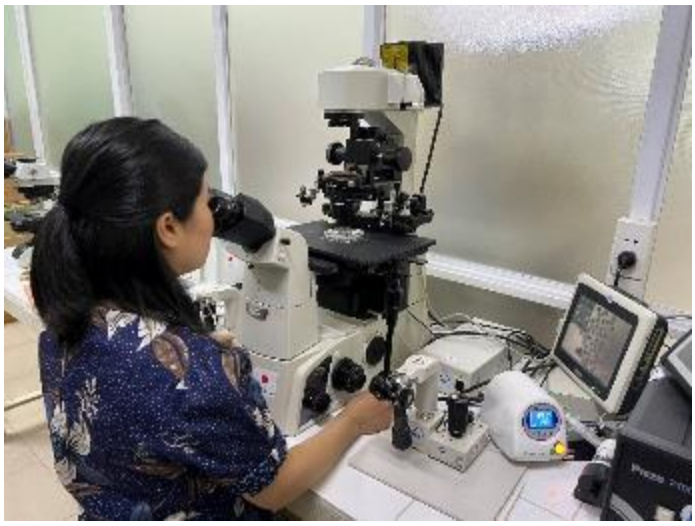
The project mostly achieved as planned the establishment of the conservation system of VNPs for identification, assessment, and utilization (Project Purpose) and mostly achieved as planned the establishment of the biodiversity conservation system of VNPs (Overall Goal). Considering all of the above points, this project is evaluated to be highly satisfactory.

III. Recommendations & Lessons Learned

Recommendations for Implementing Agency:
- It is recommended that NIAS-V continue proposing to the relevant ministries (MARD and MOST) and seeking external financial resources from international development partners and foreign institutions as soon as possible to increase the scale of VNP herd and continue the breeding process to produce VNPs with little or free PERV.
- It is recommended that NIAS-V continue well operating the gene banking system and mobilizing financial sources from government authorities (MARD and MOST) and international development partners, as well as collaborating with other institutions to conserve precious VNP breeds as much as possible, contributing to sustaining and developing the biodiversity conservation system of VNPs.

Lessons learned for JICA:
- In projects handling livestock, if a serious livestock disease outbreak occurs at a project site, it is possible to avoid the cessation of project activities through appropriate risk management to prevent its spread and flexible changes to the project plan.


Realtime PCR system provided by the project is operated in NIAS-V


Researcher using micromanipulator/ inverted microscope with thermal plate, which was provided by the project, in IBT