PROJECT FOR
ESTABLISHMENT OF CRYO-Bank SYSTEM FOR VIETNAMESE NATIVE PIG RESOURCES AND SUSTAINABLE PRODUCTION SYSTEM TO CONSERVE BIO-DIVERSITY

PROJECT COMPLETION REPORT

MAY 2020

JAPAN INTERNATIONAL COOPERATION AGENCY

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NATIONAL AGRICULTURAL FOOD RESEARCH ORGANIZATION

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Project Completion Report

I. Basic Information of the Project

1. Country

Vietnam

2. Title of the Project

Establishment of Cryo-bank System for Vietnamese Native Pig Resources and Sustainable Production System to Conserve Bio-diversity

3. Duration of the Project

5 years (5 May, 2015 ~ 4 May, 2020) in accordance with the plan

4. Background

Vietnam is becoming rapidly industrialized as economy has been growing steadily after Doi Moi. Meanwhile, agriculture still remains one of the most important sectors for Vietnam accounting for 22.0% of GDP in 2011. Although its proportion in GDP decreased from 39% in 1990s in the process of industrialization, the production increased as much as 4 times since 2000.

Livestock sector in Vietnam accounts for about 28% of the total agricultural output, and pork meat production, which occupies 75.4% of total meat production, is considered one of the most important industries in the sector. Vietnam is the world's 4th largest producer of pig meat, and the population of pigs raised in the country reaches 26 million heads in 2013.

However, most of the pig farmers (approximately 70%) are small-scale, and it is pointed out that native or crossbred pigs raised by most of the farmers are small sized and low in productivity.

Under the circumstances, better productivity has been sought through cross breeding with western breeds, such as Landrace, Duroc, Pietrain, and Yorkshire. As a result, in one hand, pig meat productivity has improved in general, however, on the other hand, native pig population has significantly decreased beyond the trend of industrialization of livestock in addition to the lack of appropriate

conservation programs. It is presumed that out of the 26 native pig breeds identified, 5 breeds are considered to have been extinct, according to National Institute of Animal Science, Vietnam (NIAS-V), 20151.

Ethnic minorities in mountainous areas in Vietnam have traditionally raised native pigs, as the pigs are well adapted to harsh environment in mountainous areas and grow on poor quality food, if not with high productivity. Even in these days, native pigs remains one of the limited income sources for the ethnic minorities.

Consequently, conservation of the native pigs has become a matter of urgent necessity from the standpoint of biodiversity conservation as well as maintaining the culture of ethnic minorities. Furthermore, in Vietnam, consumer taste tends to be in favor of local breeds as indigenous pigs and people accept even higher price. Therefore, if more appropriate breeding technique is developed and extended to small-scale farmers including ethnic minorities in remote areas, it will contribute to increase of their income through raising Vietnamese native pigs.

Application of native pigs to xeno-transplantation in human medicine field is another significant aspect of native pig conservation given recent significant progress of iPS (induced pluripotent stem) cell technologies. Native pigs have drawn attention as source of organ transplant due to similar size of their organs to those of human beings. When it comes to xeno-transplantation from pig organs, risks from PERV (Porcine Endogenous Retro-Virus) can't be avoided. However, according to the research conducted on Vietnamese native pigs, it is highly likely that there exist non-PERV (or its low-copy) native pigs in Vietnam. Once such native pigs are identified and appropriate technologies are developed to preserve and reproduce the genetic resources of native pigs for xeno-transplantation, its application is expected to give significant impacts on various fields in the society of Vietnam, Japan and the world.

(1) Vietnamese Agricultural Development Policy and the Project

The Government of Vietnam states, as one of the objectives in the Socio-Economic Development Strategy 2010-2020, that it will improve the productivity of livestock. In line with it, in 2008, the Ministry of Agriculture and Rural Development (MARD) formulated "Livestock Development Strategy 2020" and declared that it would increase the production of pork to 3.5 million tons, which is

[1] https://satreps-vnp.vn/overview-of-project/. Science and Technology Research Partnership for Sustainable Development (SATREPS) Project, Establishment of Cryo-bank System for Vietnamese Native Pig Resources and Sustainable Production System to Conserve Bio-diversity, 2015.

two times as much as in 2006.

However, MARD is faced with problems: majority of the pig raising farmers are small-scale and lacking in proper breeding management including preventive measures against infectious disease, etc.

In addition, although MARD started conservation of indigenous breeds in 2005, National Institute of Animal Science, Vietnam (NIAS-V), an implementing agency has achieved only conservation of limited number of live animals, and has not established a gene bank system.

The Project will contribute to the improvement of livestock productivity in Vietnam, through assistance to MARD/NIAS-V in establishment of a cryo-bank system, extension of suitable raising techniques, and development of raising models in terms of native pigs.

(2)Japan's Assistance Policy in Vietnam's Agricultural Sector

In the Japan's Country-wise Development Policy to Vietnam, Japanese Government expresses through implementation of "Agriculture and Rural Development Program" aiming at improving basic social service in rural areas where majority of the poor lives. The Project will contribute to the rural development and livelihood development in the Program.

5. Overall Goal and Project Purpose

Overall Goal: Biodiversity conservation system of Vietnamese native pigs is established[2].

Project Purpose: The conservation system[3] of Vietnamese native pigs for identification, assessment and utilization is established.

6. Implementing Agency

Vietnamese side: NIAS-V; Institute of Biotechnology belonging to Vietnamese Academy of Science and Technology (IBT-VAST); Vietnam National University of Agriculture (VUNA); and Department of Agriculture and Rural Development (DARD) in the *Hoa Binh* Province.

[2] To be achieved within 3 years after the completion of the Project.
[3] The conservation system is comprised of i) a database and cryo-preservation based on lineage analysis of Vietnamese native pig, 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)

Japanese side: NARO (Institute of Agrobiological Sciences, National Institute of Animal Health, and the Institute of Livestock and Grassland Science), Tokushima University, and Itochu Feed Mills Co., Ltd.

II. Results of the Project

1. Results of the Project

1.1. Input by the Japanese side

The followings are inputs from the Japanese side to the Project as of April 2020. See Annex 1 for more details.

Components	Inputs
Dispatch of Japanese Experts	A total of 20 short-term experts (203 occasions, 1,480 days) were dispatched to the project in the following fields: (1) Cryo-bank, (2) PERV-free or low-copy PERV VNP breeding, (3) Reproductive technics, (4) preventive measures against infectious diseases, (5) Technical guidance. For details, see Annex 1.
Training in Japan	A total of 18 C/Ps were invited to Japan for individual training of cryopreservation, DNA analysis, phylogenetic analysis, reproductive technics, detection of infectious diseases. For details, see Annex 1.
Provision of Equipment	Equipment was provided such as real time PCR system, fluorescence microscope with digital camera system, liquid nitrogen semen container, micromanipulator, etc. The total number is 72 items and the total cost for the procurement of all the equipment is around 94.4 million Japanese yen. For details, see Annex 1.
Local costs	Cost for consumable goods, chemicals, employment of local staffs, transportation, communication, etc. were provided. The total cost for local cost is around 18,754,494,163 VND (about 86,270,673 Japanese yen with the exchange rate VND1= JPY 0.0046 on April 2020). For details, see Annex 1.

1.2. Input by the Vietnamese side

The followings are inputs from the Vietnamese side to the Project as of April 2020. See details on Annex 1.

Components	Inputs
Allocation of Counterpart	A total of 74 counterparts are dispatched for Project Director, Project Manager, national project coordinator, and researchers for each

Researchers	research activity. For details, see Annex 1.
Facilities, Equipment and Materials	Facilities such as project office, storage for Project tools and equipment at *Hoa Binh*, embryo transfer facility, introductory quarantine facility, and AI facility were provided. For details, see Annex 1.
Local Costs	A total amount of around 15,064,807,680 VND (about 71,557,837 Japanese yen with the exchange rate VND1= JPY 0.00475 on March 2020) was provided by NIAS-V, VNUA, IBT, and *Hoa Binh* Province. For details, see Annex 1.

1.3. Activities

Achievements of the Project Activities under Outputs are as indicated below.

Output 1:
A database and cryo-bank system based on lineage analysis of Vietnamese native pigs is established.

Activities	Performances
1-1. Identify and classify Vietnamese native pigs.	Achievement level: 100% ● Following the reviews of existing various data collection tools, field data collection tools was developed and discussed in the workshop on the 14th of October 2015. Pre-testing of the draft tools was also completed in the *Yen Bai* Province from the 15th to 20th of October 2015 and consequently, the draft tools were modified based on the results of the pre-testing. Then, training of data collectors was carried from 28th of October to the 5th of November 2015 before they go out to collect data and ear tissue samples. ● The 1st sampling and data collection activities started in November 2015. By December 2017, a total of 2,033 ear tissue samples covering 32 native pig population with related data were collected from twenty two (22) provinces in various part of Vietnam. A total of 103 samples were collected in *Yen Bai* province in the 2nd sampling activity performed in April 2017, and a total of 96 samples were collected in *Yen Bai* province in the 3rd samples in November 2017. ● One (1) staff of NIAS-V was trained in microsatellites to analyses in Japan in February 2016. ● Phylogenetic analysis using Microsatellite data with 1,136 samples (24 Vietnamese breeds/population in total from 21 Provinces) and 48 samples (3 breeds) of Western breeds (a total of 1,184 samples, 27 breeds/population in total) was completed and a paper has been published.
1-2. Establish a database of Vietnamese native pigs.	Achievement level: 100% ● A short-term training in data arrangement was organized in Japan from the 20th of February to the 18th of March 2017, geared toward the NIAS-V staff. ● A Microsoft Access®-based database was developed with the technical assistance of an external specialist. Currently, all the information gathered from sampling and data collection activities

	is stored in the database at NIAS-V, including the Data Census conducted in the *Hoa Binh* Province. ● Biological information as well as characterization of 2,033 pigs, 32 breeds in total (1,837 from first sampling in 22 Provinces, 100[4] from second sampling of *Yen Bai* Province, and 96 from third sampling of *Yen Bai*) are stored in MS Access-based database, together with 346 provincial and district information sheets and 450 household information sheets. ● Reports from all 22 Provinces were compiled and mapping also had been completed.
1-3. Prepare an operational manual for the database and cryopreservation system.	Achievement level: 10090% ● Operational manual of database and cryo-bank for conservation and distribution of genetic resources of Vietnamese native pigs has been developed. NIAS-V has developed management rules for the semen cryo-banking system established by the Project.
1-4. Install cryopreservation equipment.	Achievement level: 100% ● Cryopreservation equipment (2 "*fixed*" liquid nitrogen tanks and 2 "*transferable*" tanks) from Japan was installed in the Key Laboratory of Animal Cell Technology of NIAS-V. ● Main liquid nitrogen (LN) tank has been filled with LN in the Key Laboratory of NIAS-V since January 2019.
1-5. Maintain the equipment for cryopreservation.	Achievement level: 100% ● Japanese researchers provided a 2-day training at NIAS-V in the methods and techniques for freezing semen in November 2015, followed by the training in Japan from the 21st of February to the 19th of March 2016. In the training in Japan, a NIAS-V staff was trained in the said freezing techniques as well as the collection of sperm from epididymis in accordance with the protocol used in the Japanese research institute. ● Following the training, the methods of boar semen freezing were optimized to meet the environment of NIAS-V. ● A training course of the freezing methods and sperm evaluation was conducted geared to a total of 20 staffs in NIAS-V and other institutions. ● A refrigerated open showcase was delivered in September 2016, and the first test run for semen freezing was performed at NIAS-V with Japanese researchers in October 2016. ● Determination of defects in equipment and techniques in order to fix and gradually improve the skills, manipulation, and techniques for enhancing the effect of freezing method and sperm motility after freezing - thawing process was conducted, resulting in favorable sperm vitality of exotic pig up to 40%. ● Three (3) native boars were selected for sperm exploiting. From the 2nd to 3rd of March 2017, the freezing of epididymal sperm obtained from these boars was conducted, following the protocol developed jointly by Japanese and Vietnamese researchers. The result was good, with 40% sperm survival rate after freezing and a total of 200 epididymal sperm straws have been stored in

[4] Three (3) samples, obtained from piglets, out of a total of 103 samples were excluded for the registration in the database in accordance with its registration criteria.

	cryo-bank. ● Microsatellite results of 20 Provinces had indicated that 7 breeds from 5 provinces are considered of pure without cross breeding with western breeds. Based on the result, 5 provinces of *Lai Chau, Ha Giang, Lao Cai, Binh Thuan,* and *Quang Ngai* have been selected for semen cryopreservation. *Quang Ninh* has been added as it is in MARD list. By October 2019, semen collection and freezing from 6 breeds from 6 provinces have been completed, covering at least 3 lines each breed. A total of 7,121 straws (2,009 straws from Moung Te Breed in Lai Chau, 2,095 straws from Hung breed in ha Giang, 1,225 straws from Muong Khuong breed in Lao Cai, 784 straws from Co Binh Thuan breed in *Bin Thuan*, 471 straws from Kieng Sat breed in *Quang Ngai* and 537 straws from Mong Cai breeds in *Quang Ninh*) are completed. Finally, they are stored in the LN tank at Key Laboratory of NIAS-V. ● Semen cryopreservation of boars from the provinces of *Lai Chau, Ha Giang* and *Lao Cai* were done with ejaculated sperm whereas *Binh Thuan, Quang Ngai and Quang Ninh* from epididymal sperm. This is why the number of straws is less in *Binh Thuan, Quang Ngai* and *Quang Ninh* provinces. ● Straw identification rules were developed for easy tracking of semen straws from different boars, breeds, and provinces.
Output 2: Reproductive techniques from semen and/or embryos are developed.	
Activities	Performances
2-1. Develop *in vitro* embryo production system for native pig breeds.	Achievement level: 100% ● The training in the standardized methodology for *in vitro* embryo production system was organized in IBT on the 25th of January to the 1st of February 2016 and a total of 12 staff from NIAS-V, IBT and VNUA participated. The reproducibility of the *in vitro* maturation (IVM) / *in vitro* fertilization (IVF) system was tested in a 3-replication experiment using a frozen epididymal sperm of a *Ban* boar (TLB007). ● A short-term training was organized in Japan for one staff from IBT in IVM/IVF from the 21st of February to 19th of March 2016. ● The experiment using *Landrace* ovaries and frozen *Ban* boar sperm had started in Jan 2016 and had finished in Feb 2017. ● The optimization of the IVF protocol using *Landrace* ovaries and *Ban* epididymal sperm was finalized. Experiments on IVF using both oocytes and sperm from Ban pigs started in June 2017 and completed in September 2017. ● A total of 526 quality oocytes were obtained from 15 pigs by follicle slicing. The Project tested 2 conditions (TCM+pFF and POM+EGF) for the production of blastocysts; and demonstrated similar blastocyst production rates (17.3% and 22.4%), respectively. Blastocyst hatching was obtained in 1.1-5.0% of the embryos. In conclusion, the Project achieved the target value of over 10% in blastocyst production rate. ● One research paper entitled as "*Optimization of in vitro fertilization parameters for frozen epididymal sperm with low*

	fertilization ability in a Vietnamese indigenous pig" was published. ● Following the return of a researcher to VNUA after her Ph.D. course in Japan and subsequent establishment of laboratory for reproduction studies by installing the equipment provided, the 1st experiment for the production of IVM was carried out in September 2017. ● Stable IVP system was achieved at all three institutions with IVM, IVF of pure Ban oocytes, IVP of Ban embryos. ● Standard protocol (manual) was finalized.
2-2. Develop cryopreservation methods for oocytes and embryos of native pig breeds.	Achievement level: 100% ● Training on vitrification[5] technique was organized from the 10th to 18th of May 2016 at NIAS-V. ● A short-term training in porcine embryo vitrification had been undertaken in Japan from the 20th of February to the 18th of March 2017 geared toward NIAS-V staff members to lead the Activity 2-2. ● The methods of oocyte vitrification and subsequent IVM culture had been adopted at NIAS-V in May 2016. The survival rate of the *Landrace* oocytes following preservation and thawing achieved over 80%, and maturation rate after vitrification demonstrated over 80% as well. ● The method of cryopreservation by vitrification of immature *Ban* oocytes had been determined in November 2016. Practical cryopreservation of *in vitro* produced *Ban* embryos had been started in Jun 2017 at IBT performed by NIAS-V staff. The survival rates after cryopreservation of the native pig oocytes achieved approximately 70%. ● A total of 216 zygotes were vitrified by a Vietnamese researcher and stored in liquid nitrogen at NIAS-V. ● An abstract entitled "*Vitrification of immature oocytes in an indigenous Vietnamese pig breed*" was accepted by the Fourth World Congress on Reproductive Biology in Okinawa, 2017, and a Vietnamese researcher of NIAS-V made a poster presentation. ● The survival rate of the Landrace (a western pig breed) -derived oocytes following cryopreservation and warming achieved over 80%, and maturation rate after vitrification demonstrated over 80% as well. ● Cryopreservation by vitrification of immature *Ban* (a Vietnamese native breed)-derived oocytes has been achieved by IBT and NIAS-V staffs with the survival rate of approx. 70%. ● Oocyte vitrification has been accomplished. 80.4% survival and 9.4% blastocyst development was achieved in Ban pigs by IVF. ● Embryo (zygote) vitrification has been accomplished (201/223=92% survival,11.9% blastocyst dev). ● Standard protocol (manual) was finalized. ● "Comparison of the microdrop and minimum volume cooling methods for the vitrification of porcine in vitro produced zygotes and blastocysts after equilibration in low concentrations of

[5] A cryopreservation method for minimizing the damages to oocytes and embryos by freezing.

	cryoprotectant agents" was published. ● "Cryopreservation of immature oocytes of the indigineous Vietnamese Ban pig" was published for Animal Science journal.
2-3. Develop techniques for cloned embryo production of native pig breeds.	Achievement level: 100% ● As part of preparation, tissue sampling from a hybrid of *I* pigs and *Ha Lang* pigs was carried out by the staff of IBT and NIAS-Vs on the 8th of July 2016. ● A NIAS-V staff and an IBT staff received a short-term training in embryo cloning from somatic cells in Japan from May to September 2016 and December 2016 to Mar 2017, respectively. ● The condition of nuclear transfer using manipulator under the microscope was investigated and discussed among members in NIAS, VNUA, IBT and Japanese researchers. A procedure for the production of cloned embryo from somatic cell of Vietnamese native pigs had been established at each institute. ● Cloned embryo production was experimented in IBT as well. Porcine cloned blastocysts were produced with favorable rates and quality (up to 21%, some has been hatched). ● Practice of manipulation at all three institutions was completed with Landrace and Ban blastocysts. ● Standard protocol (manual) was finalized. ● Experiments on effects of IVM media (VNUA) and IVC media (NIAS-V) on low-PERV cloned embryos have been deployed at VNUA and NIAS-V, and it will continue in Vietnam.
2-4. Develop the embryo transfer methods.	Achievement level: 90% ● Equipment necessary for the embryo was provided to NIAS-V; the upgrading of NIAS-V Conservation Center facility was already completed. ● Three preliminary experiments of ET using landrace embryos were tested three times in 2018 (6 June, 2 Aug, 17 Oct). Zolentil was used as anesthesia, since use of isoflurane and tax exemption of the anesthesia apparatus were not permitted until December 2018. (Anesthesia apparatus was procured in Japan, arrived in Vietnam on 26 Feb 2018, and delivered to NIAS-V on 13 December 2018) ● Six experiments of ET of Ban embryos were carried out on 16 January (2 landrace recipient sows, embryos made by NIAS-V), 13 March (2 landrace sows, embryos made by VNUA), 13 June (2 landrace recipient sows, embryos made by IBT), 6 November (2 landrace recipient sows, embryos made by NIAS-V), 12 November (2 landrace recipient sows, embryos made by VNUA), 12 December (2 landrace recipient sows, embryos made by IBT) in 2019. ● Permission to use isoflurane was granted on 26 Dec 2018 but not informed until 3 March 2019. Therefore, the first of six experiments of ET of Ban embryos was carried out with Zolentil. ● Synchronization in recipient sows remains a challenge. Last 3 experiments have adopted abortion method however there was no pregnancy achieved. ● Two last ET experiments were carried out on 6 and 12 March 2020. As of 18 April 2020, it was confirmed by ultrasound that

	both of the two recipient pigs are not pregnant. ● Standard protocol (manual) was finalized.
Output 3: The methodology of utilizing Vietnamese native pig genetic resources (preventive measures against infectious disease and establishment of production system) are developed.	
Activities	Performances
3-1. Technologies of reproduction and breeding of PERV-free or low copy-PERV Vietnamese native pigs in conformity to international animal health requirements are established	
3-1-1. Establish reproduction/breeding techniques for PERV-free or low copy-PERV Vietnamese native pigs	
3-1-1-1. Develop technologies for detecting PERV and breeding based on DNA analysis	Achievement level: 100% ● A researcher from NIAS-V was dispatched to Japan for short-term trainings in RT-PCR and Fluorescence in situ hybridization (FISH) from the 21st of Feb 2015 to 19th of March 2016 and from the 3rd of October to the 2nd of December 2016, respectively. ● DNA quantitation was performed for a total of 1,735 samples (including 103 samples from 2nd sampling in Yen Bai), using *Quibit*® 3.0 Fluorometer. ● PCR methods for screening PERV genes were optimized and applied for the said 1,635 samples, targeting following genes: $^{Pol\ A/B/C}$; EnvA; *EnvB*; and *EnvC*. ● PERV-copy determination using RT-PCR was performed in Japan for a total of 384 samples collected in *Hoa Binh*, *Phu Tho* and *Yen Bai*, 70 of which were selected from 1st PCR screening native pigs from *Hoa Binh*, *Phu Tho*, *Yen Bai*, *Xao Va, Nghe An*, *Quang Ninh*, *Thanh Hoa*. As a result, a total of 103 native pigs in *Yen Bai* was selected for the 2nd sampling. ● The determination system of PERV copies using RT-PCR was optimized and installed to NIAS-V. PERV copy determination was performed in 28 samples selected from the 1st PCR screening, including *Phu Tho*, *Hoa Bin, Yen Bai, Muong Lao Cai, Quang Binh* and a total of 103 native pigs in Yen Bai collected from 2nd sampling. ● Research activities were searched PERV-free or low copy-PERV Vietnamese native pigs, using various methods such as DNA quantitation, PERV screening by PCR method, as well as PERV copy determination using RT-PCR.
3-1-1-2. Conduct reproduction and breeding of PERV-free or low copy-PERV Vietnamese native pigs	Achievement level: 90% ● The Project selected candidate native pigs for research to reduce the number of PERV copies, and a total of 5 pigs (1 boar and 4 sows) were procured in June 2017. Those pigs were kept in the NIAS Livestock Research & Development Center for Northern Mountainous Region (thereinafter referred to as "*NIAS Thai Nguyen Center*"). ● Research activities regarding the reproduction and breeding for lowering the number of PERV copies were commenced in September 2017. ● Another 5 pigs (4 boars and 1 sow) were introduced in Feb 2018. ● Average number of PERV Original generation (G_0) is 8.8（7.3-

	10.1） ● The copy number of PERV of G0 generation created an individual whose copy number is lower than the lowest copies in the parent generation. The number of lowest copies in the original generation was 7.3 and from this source, one individual was created with 6.47(male).. ● With G1 generation, an individual whose PERV copy number is lower than those of the parents was generated. The copy number of the parents was 7.68 (male) and 8.33 (female) while the lowest copy number of the piglets was at 6.47 (female).
3-1-2. Determine the necessary farming conditions for exporting PERV-free or low copy-PERV Vietnamese native pigs	
3-1-2-1. Improve and standardize the procedures for detection and prevention of serious porcine diseases in Vietnamese native pigs	Achievement level: 100% ● Training geared toward VNUA students was carried out in field activities for disease screening such as sampling, epidemiological data collection and so on. ● Three (3) counterpart researchers were dispatched to Japan for a short-term training in virological, histological and parasitological diagnoses in 2016. ● Equipment for laboratory diagnoses was installed in VNUA, and the Project established the said diagnostic systems based on the abovementioned training. The methods for sample transportation and processing were also optimized in accordance with the circumstances in Vietnam. ● Activities for disease screening, i.e., sampling, collecting epidemiological information and diagnoses were carried out in the *Da Bac* District of the *Hoa Binh* province at a quarterly interval and in quarantine site (Thai Nguyen) at every 6 months in general. ● On the basis of the disease screening, the Project prioritized following four (4) animal diseases: foot and mouse disease, Classical Swine Fever (CSF); Porcine Reproductive and Respiratory Syndrome (PRRS); and Porcine Circovirus type 2 (PCV2). The diagnosis of leptospirosis was outsourced; other 6 diseases can be diagnosed in VNUA. ● Quarterly blood and feces sampling for disease screening was carried out for the pigs at Cao Son commune, Da Bac, as well as for breeding pigs at NIAS Thai Nguyen Center. ● Several workshops and seminars were organized by VNUA. • Joint workshop on Swine diseases on 12 Oct 2018 with NIAH (National Institute of Animal Health) • Mini-workshop was organized on 23 Nov 2018 at NIAS Thai Nguyen Center on “Veterinary Service and Disease Control in Pigs” with 30 participants including pig farmers surrounding the Center. • Seminar on “ASF: Current situation and future plan” on 24 April 2019 in collaboration with ILRI (International Livestock Research Institute) and others.
3-1-2-2. Choose a site for setting up isolation farming facilities in	Achievement level: 100% ● A workshop entitled "*Review on necessary conditions of isolation and quarantine for exporting native pigs to Japan*" was held in

accordance with quarantine requirements.	NIAS-V on the 18th of January 2016 with 28 participants from NIAS-V, VNUA, Hoa Binh Sub-DAH, as well as Japanese researchers. ● The Project selected the NIAS Thai Nguyen Center out of three candidate facilities as a facility for quarantine as well as the reproduction and breeding of PERV-free or low copy-PERV Vietnamese native pigs. ● The Project carried out a survey to grasp actual situation and environment of the NIAS Thai Nguyen Center including livestock breeding, animal diseases, hygienic conditions, and so on in August 2016, targeting farming households around NIAS-V NIAS Thai Nguyen Center for construction of isolated animal quarantine zone. ● The survey results showed that the center is located at the junction of *Ba Xuyen* and *Binh Son* Commune, and there are 224 households around with 105 pig farms. The nearest farm to the center has 50 sows. ● Research activities regarding the reproduction and breeding for lowering the number of copies of PERV in Vietnamese native pigs had started as described in the Activity 3-1-2. ● Meanwhile, the Center is supposed to quarantine activities for Vietnamese native pigs in accordance with the Vietnamese quarantine regulations; simultaneously, the Project is anticipated to investigate antibodies of the pigs to estimate the endemic of animal diseases, since the native pigs are not usually be vaccinated, thus, the existence of antibodies implies the natural exposure of causative pathogens.
3-1-2-3. Introduce and optimize methodologies for operation and maintenance of quarantine facilities and an isolation farming.	Achievement level: 100% ● The standard operation manual for quarantine and breeding facilities is prepared and regularly improved 4 times based on the actual operationalization of the introductory quarantine facility and the breeding facility at NIAS Thai Nguyen Center. The current version1.5 includes a section on ASF.
3-2. A raising management system (hygiene, reproduction, nutrition, housing, etc.) optimum for Vietnamese native pigs is modelized on the basis of the interventions in *Hoa Binh* province	
3-2-1. Set up criteria for selection of model farmers	Achievement level: 100% ● A Data Census for pig production was carried out in December 2015 covering 6 districts and 18 communes in the *Hoa Binh* province and the report compiled and shared among project implementers on the 11th of January 2016. ● Criteria for selection of model farmers was developed and a workshop was held in the *Hoa Binh* province on the 11th of January 2016 in order to agree upon the selection criteria of model farms. With this, *Tam* and *Rang* hamlets of the *Cao Son* Commune, the *Da Bac* District were selected as there are more native pigs than others.
3-2-2. Select model farmers for demonstrating new	Achievement level: 100% ● Rapid assessment was carried out on 8–15 March 2016 in 2

technologies	hamlets of *Da Bac* District to get necessary indicators for selection of model farms. Twenty (20) out of 37 farming households were short-listed, and then from which, 14 (12 sow farms and 2 boar farms) were selected on 15 April 2016 to be the model farms and another one (1) was selected to be a feeding experiment farm. ● Based on the above selection, contracts were signed in May 2016 with the 14 model farming households and 1 experiment household. Two (2) boars and 12 breeding sows have been procured for these 14 model farms in two hamlets, each contains 7 model farms (6 sows and 1 boar). Following a meeting explaining the regulations, model farm activities started. ● Since 2017 Hoa Binh Sub DAH expanded the activities to 5 other communes of Da Bac with their counterpart budget which started in the last quarter of 2017. The Project also supported 75 model farmers of these communes with regular technical and supervisory activities.
3-2-3. Optimize raising methods (hygiene, reproduction, nutrition, housing, etc) for Vietnamese native pigs to meet the farming convention and environment	Achievement level: 100% ● Preliminary feeding experiment was carried out with selected 3 farmers of Cao Son commune during Sept 2015 – June 2016. ● The Project supported to 15 model farmers of Cao Son commune of Da Bac with regular technical and supervisory activities.
3-2-4. Conduct training of trainers (TOT) using training materials to local extension workers, para-vets etc. on the optimized raising methods for Vietnamese native pigs	Achievement level: 100% ● Based on the training needs assessment, NIAS-V, VNUA and Japanese researchers jointly developed training materials for native pig husbandry and veterinary. Major subjects of the training were as follows: disease prevention (medicinal plants, etc.), hygienic environment, production management, reproduction, and nutrition. ● Altogether, 7 trainings were organized for 15 model farmers of Cao Son commune since the beginning. First training was undertaken from the 11th to 15th of October 2016 geared to the model farming households by VNUA. Subsequently, VNUA and Japanese experts carried out 6 trainings jointly. ● 2 trainings were organized for 75 model farmers of 5 communes, 1-4 March 2019 and 7-10 August 2019. ● 3 sessions of training of trainers (TOT) were organized for veterinary staff of all communes in Da Bac District, *Hoa Binh* on 29 Aug–1 Sept 2017, 25-27 June 2018, and 17-19 Oct 2018, facilitated by Hoa Binh Sub-DAH with assistance from VNUA and Japanese experts. ● Supports were provided to the model farms in order to improve pigpens, piglet nursery box and delivery crate, with feeding and drinking water facilities. The model farms also received feed and other support such as vaccines, medicines for the sow and its weaning piglets, as well as technical guidance to improve productivity of healthy pigs through disease prevention and early weaning. *Da Bac* Veterinary staff as well as Japanese experts

	visited the model farms regularly to guide and support them. ● Based on the results and lessons of the feeding experiment carried out from Jan to June 2016 in one (1) experimental farm in the *Da Bac* district of the *Hoa Binh* province, the Project provided technical guidance as well as feedstuff including supplement, vaccine and medicines to the 14 model farms. ● As results of abovementioned intervention, the Project observed following effects: – Significant increase of weight gaining speed by approx. 100g-150g per day in the piglets, creep-fed with commercially-available feedstuff in comparison with that that raised by their conventional stem and leaf-based feedstuff. – Increase of weight gaining speed in breast-fed piglets by sows, which are fed with the project-recommended feedstuff made of self-supplied grains and rice bran mixed with commercially-available supplemented-feedstuff, was equivalent to that received creep feeding. – Significant shortening of the period from farrowing to next mating act as from approx. 4−5 months to approx. 1.5 – 2 months. ● The farmers now raise increased number of sows (0.88 head per farm), which can be the improvement of production efficacy based on the project's intervention. ● Final one-day wrap up meeting with all 90 farmers was held on 10 December 2019.
3-2-5. Improve methods for boar selection and artificial insemination (AI) technologies using fresh semen	Achievement level: 100% ● The criteria and standard of boar selection was developed. Eight (8) boars have been evaluated, 4 of which were procured and introduced to AI Center in the *Hoa Binh* province in August 2017. ● Japanese researchers at AI Center in the Hoa Binh province set up the equipment in October 2017. ● AI workshop was organized at Hoa Binh AI Center on 10-11 October 2018 to select appropriate technology and to check quality of semen. The workshop was attended by AI Center staff, Hoa Binh Agriculture Extension Office and HB Sub DAH. During the workshop, AI was conducted using one of the sows, and it delivered two piglets on 2 Feb 2019, proving efficacy of AI technologies despite the small volume of semen.

3-2-6. Develop technical guidelines for the raising management and AI technology of Vietnamese native pigs based on above 3-2-3, 3-2-4, and 3-2-5	Achievement level: 100% ● The Vietnamese counterpart personnel developed framework and tools for Training Needs Assessment (TNA), and a field test was carried out in the *Phu Tho* Province, followed by the training of NIAS field staff in July 2016. Field data collection was undertaken in the *Tan Lac* and the *Da Bac* Districts of the *Hoa Binh* province from July to August 2016 and the report was compiled. ● Based on the Assessment described above, NIAS-V, VNUA and the Japanese researchers jointly developed training materials for native pig husbandry and veterinary. Major subjects of the training were as follows: disease prevntion (medicinal plants, etc.), hygienic environment, production management, reproduction, and nutrition. ● Technical guidelines were developed with three sections for (a) para-vets (b) farmers (c) AI technology and endorsed by Hoa Binh DARD. 50 copies were printed. ● Two kinds of handbooks were developed: one for para-vets and another for farmers. 500 copies each were printed and handed over to Hoa Binh Sub-DAH. ● 2,000 copies of a poster have been printed for distribution to farmers in *Hoa Binh*.
3-2-7. Develop a model of labeling to indicate the origin for native pigs.	Achievement level: 90% ● The counterpart organizations in the *Hoa Binh* province such as DARD and Sub-DAH were approved for receiving the counterpart budget by the authority in the province in June 2017. ● In addition, they commenced actions for disseminating the project activities in the 15 project model farms to newly-selected a total of 75 farms in 5 communes (15 for each commune). A kick-off meeting was organized on 10 Aug 2017. Two TOT were organized (25-27 June 2018 and 17-19 Oct 2018) in disease prevention, vaccination and production management including nutrition. *Hoa Binh* provided 180 sows and 10 native boars to support 90 model farmers of 6 communes including Cao Son commune in 2018. *Hoa Binh* also provided materials, such as feed, vaccines, and tools. ● A cooperative for Vietnamese native pigs was established in August 2018 with all 90 model farmers of 6 communes of Da Bac, *Hoa Binh* with support from Hoa Binh Sub DAH. Training was organized for 18 founders of the cooperative on 27-28 March 2019 to orient them about market development and product consumption chair. ● In 2019, Hoa Binh sub-DAH conducted a survey and evaluation of the market potential and consumer taste in Hanoi and *Ninh Binh* Province, which will help the cooperative to strategize production and marketing. ● Hoa Binh Sub-DAH constructed two slaughterhouses in Muong Chieng and Cao Son Commune with two deep freezers. ● Also organized an observation tour for 100 people including 90 cooperative members to learn from Van Khuong slaughterhouse, Thuong hamlet, Hong Phone commune, Chuong My district, in Hanoi.

	● In 2020, registration to recognize the trademark of indigenous pig product will be undertaken by *Hoa Binh*. The planned activities include: (1) organization of trademark registration (2) hire product logo design consultants; advertising video design; label design and print product labels; hire website design consultants (3) Printing leaflets (4) Maintaining the website (hiring a server, writing articles, updating information, entering data introducing products, etc.)

2. Achievements of the Project

2.1. Outputs and indicators

【Output 1】 A database and cryo-bank system based on lineage analysis of Vietnamese native pigs is established.	
OVIs	Achievements
1. A database of survey results on identification, classification and characterization of at least 16 native breeds, and a biological information management system are established.	● As of December, 2017, 2,033 individuals (1,837 samples from first sampling, 196 from second (additional) sampling), 32 native population in total from 22 provinces were surveyed. The PDM target was achieved. ● A Microsoft Access-based database was developed at NIAS-V, and all biological information as well as characterization of these pigs gathered from sampling and data collection activities were stored in MS Access-based database including the Data Census conducted in the *Hoa Binh* province. ● There are 2,033 samples entered in MS Access-based database. Thus, the PDM target was achieved.
2. Semen from Vietnamese native pigs (3 lines for 6 breeds each) are cryo-preserved.	● 7,121 straws of semen from 3 lines for 6 breeds each have been cryo-preserved at the LN tank of NIAS-V Key Laboratory. *Lai Chau* (MuongTe breed), *Ha Giang* (Hung breed), *Lao Cai* (Muong Khuong breed) and *Binh Thuan* (Co Binh Thuan breed), *Quang Ninh* and *Quang Ngai*（Kieng Sat and Quang Ngai breed）have been completed. ● By October 2019, all straws of semen have been cryo-preserved.
3. The guidelines (rules for addition and management, etc.) for the gene bank system are prepared.	● Semen cryobanking system has been developed. ● Operational manual of database and cryo-bank for conservation and distribution of genetic resources of Vietnamese native pigs has been developed. NIAS-V developed management rules for operation and management of the semen cryobanking system established by the Project.
Overall achievement level: 100%	
【Output 2】 Reproductive techniques from semen and/or embryos are developed	
OVIs	Achievements

1. *In vitro* embryo production rate reaches about 10% for native pigs	● The optimization of the IVF protocol using *Landrace* ovaries and *Ban* epididymal sperm was finalized. ● Experiments on IVF using both oocytes and sperm from Ban pigs were conducted and demonstrated 17.3% and 22.4% of the blastocyst production rate, higher than the target value of 10% using 2 different media (TCM199 plus follicular fluid and POM, respectively) for IVM.
2. Survival rates after cryopreservation of native pig oocytes and embryos reach over 30% and 50%, respectively	● When immature oocytes from Ban breed were vitrified (cryopreserved) and warmed, the survived ones were collected and subjected to in vitro maturation and fertilization with frozen-thawed Ban epididymal spermatozoa. In these experiments, survival rate of the oocytes after warming was very high (93.1%). ● Fertilized oocytes (1-cell stage embryos) after in vitro maturation and fertilization were vitrified and warmed. Then they were subjected to in vitro culture. The survival rate of the embryos after warming was very high (92.3%).
3. Blastocysts are produced after cloning in native pig breeds	● Establishment of cloning method for native pigs was achieved in all three institutions (IBT, NIAS-V, VNUA) achieving the PDM target. Following the training in Japan, a protocol for the production of cloned embryo from somatic cell of Vietnamese native pigs is optimized and established in both NIAS-V and IBT. IBT and NIAS-V had reported the first cloned embryos produced from native breeds by themselves before the mid-term review.
4. Piglets are produced by embryo transfer	● Nine ET experiments (including six experiments with native pig embryos) were undertaken since FY2018 with no piglets yet. In the last three experiments carried out in Nov – Dec 2019, abortion method was used to obtain better synchronization of the estrus and the condition of the recipient sows is good, but still no pregnancy. As of 18 April 2020, it was confirmed by ultrasound that both of the two recipient pigs are not pregnant.
Overall achievement level: 95%	
【Output 3】 The methodology of utilizing Vietnamese native pig genetic resources (preventive measures against infectious disease and establishment of production system) are developed	
OVIs	Achievements
3-1-1. Technologies for production of PERV-free or low copy-PERV Vietnamese native pigs using the method(s) for identification and quantification of PERV gene copies are established	● Technologies for detecting PERV copy numbers based on DNA analysis of Vietnamese native pigs using the method(s) for identification and quantification of PERV gene copies was developed. ● Breeding experiments are on-going with low copy-PERV VNPs brought at NIAS Thai Nguyen Center. Of 5 piglets born on 4 January 2019, one piglet (1 male) had the lowest copy number of PERV, with 6.47. ● Of 3 piglets born on 20 January 2020, one piglet (1 female) had the lowest copy number of PERV with 6.47.
3-1-2. Quarantine facilities and equipment are introduced and researchers and	● A diagnosis lab is functional in VNUA with needed equipment and trained staff.

technicians are trained	● Introductory quarantine has been operational at NIAS Thai Nguyen Center with proper record keeping done for monitoring purposes.
3-1-3. Isolated farming methods are developed to adapt to international quarantine requirements	● Isolated farming methods were established. ● An operation manual is regularly improved based on the actual operationalization of the introductory quarantine facility and the breeding facility at NIAS Thai Nguyen Center. It has already been improved 5 times and the current version1.5 includes a section on disease occurrences and ASF countermeasures. ● Isolated farming methods and systems had been developed according to the plan. However, it is decided that the export of the low-copy PERV pigs are difficult in the Project period because there was no mentioned about the export of pigs in the documents of Vietnamese Side. Furthermore, direction of activities in NIAS Thai Nguyen Center was changed from quarantine to disease prevention after the occurrence of ASF.
3-2-1. Technical Guidelines for the raising management of Vietnamese native pigs are developed	● Technical guidelines were developed and endorsed by Hoa Binh DARD and printed. ● Handbooks and posters were prepared and printed.
3-2-2. The number of weaned Vietnamese native piglets reared by model farmers increase by one head per sow per year in comparison to that in 2015	● With regard to feeding management, a bamboo delivery frame that can be hand-made by farmers at low cost is also introduced in order to introduce a method that keeps the mother pig within the delivery frame, which is common in Western pigs, to the Vietnamese native pig. ● The Project designed feeds that focus on rice bran, which is most easily available to farmers from commercial supplement feed, as a sustainable system（locally-available grains and rice bran） ● Rearing improvements based on experimental results from a model farm in Cao Son Commune shortened the breeding interval to less than two months and increased the number of annual deliveries from 1.6 to 2.13 (33%). The number of annual weaning piglets per sow was improved from 10.33 to 14.45 (39.9%).
Overall achievement level: 100%	

2.2. Project Purpose and indicators

【Project Purpose】 The conservation system of Vietnamese native pigs for identification, assessment and utilization is established.	
OVIs	Achievements
1. Discussion on national operational plan of the conservation system has begun with MARD.	● NIAS has been discussing with MARD, MOST and other relating agencies regarding conservation of Vietnamese native pig resources. Especially after ASF spread in the country, there is a growing concern on the topic in the

	Government. ● MARD already approved the NIAS proposal to conserve by cryo-banking 15 Vietnamese native pigs breeds (semen, oocytes and embryos), only awaiting for the budget decision. ● Operational manual for the database and cryopreservation system is now developed. NIAS-V developed management rules for operationalization of the semen cryobanking system including addition and management. The management rules will have to be upgraded, as the cryobanking system will expand in near future to cover oocytes and embryos. The manual together with the management rules is expected to serve as a tool and activate further discussion with relevant stakeholders in Vietnam including MARD, MOST and MONRE.
2. At least three (3) male and five (5) female Vietnamese native pigs, of which number of PERV copies is five (5) or less, are produced.	● The lowest copy numbers of PERV as at the end of April 2020 is 6.47 (boar) and 6.47 (sow). It is the lowest number of PERV copies achieved at the end of the Project in May 2020.
3. Technical guidelines for the raising management of Vietnamese native pigs are approved by Hoa Binh Province, DARD.	● Technical guidelines for the raising management of Vietnamese native pigs has been developed and endorsed by Hoa Binh DARD. 50 copies have been made and handed over to Hoa Binh Sub DAH for application for their future activities.
4. Ten (10) or more publications in international journals with citation index are coauthored by Vietnamese and Japanese researchers.	● Publication in international journals is in progress, and so far eight papers have already been published. Two more papers have been submitted, reviewed and both resubmitted after the revision. ● Research results were presented at the Forth World Congress on Reproductive Biology (WCRB) held in Naha, the Okinawa prefecture in September 2017. In addition, other results have been presented at Fifth Fatty Pig International Conference which was held in Okinawa in Nov. 2019. ● The titles of published papers are shown in Annex 2.
Overall achievement level: 95%	

3. History of PDM Modification

During the kickoff workshop held on 23-25 June 2015, PDM ver. 0 and PO ver. 0 were discussed and PDM ver. 1 and PO ver. 1 were agreed. Apart from setting clear numerical targets, only a few modifications were made from ver. 0 to ver. 1. They were:

i) Activity 1-6: Conduct training of cryo-preservation of semen is deleted, as it would be included in Activity 1-5.

ii) Activity 3-3-4: The word “using fresh semen” has been added, now to read

"improve methods for boar selection and AI technologies using fresh semen".

iii) Indicators for 1.1, 1.2 and 2.2 have been fixed with target number.

During the Midterm Review of 23 Oct - 7 Nov, 2017, the Evaluation Team recommended modification of PDM ver. 1 and PO ver. 1. The recommendation was reviewed and discussed intensively in 7th PMU meeting, 23 Jan, 2018. ICD-MARD was also consulted, who advised not to change PDM extensively, as many of the recommended modifications are only the matter of expression for clarify and changes will not affect the results from scientific point of view, and considering the long administrative procedure from Vietnamese side. It was agreed that only OVI and activities will be modified, as it will not have to require MARD approval. Following consultation with JICA HQs, changes have been endorsed in 4th JCC, held on 7 June, 2018, PDM ver. 2 and PO ver. 2 have been endorsed.

III. Results of Joint Review

1. Results of Review based on DAC Evaluation Criteria

1.1. Relevance

Relevance is evaluated as "high[6]".

(1) Consistency with the governmental policy and plan

As had been confirmed in the ex-ante evaluation of the Project, the government places a great significance on the utilization of advanced technologies such as the bioengineering for sustainable development of agricultural industry in a comprehensive way in the Socio-economic Development Strategy 2011-2020.

The government has also been strengthening efforts for conservation of Vietnamese native and rare species of animals. The purpose of the Project is in line with the Law on Biodiversity (20/2008/QH12) for conservation of endangered livestock breeds including Vietnamese native pigs.

The Project involves *Hoa Binh* province as the target site for conservation of

[6] 5 scales are use in evaluation: 1. high, 2. relatively high, 3. moderate, 4. relatively low, 5. low.

the native pigs together with ethnic minority people in mountainous area. In this aspect, the Socio-economic Development Plan 2016-2020 shows the political priority such as the improvement of living standards, poverty reduction to ethnic minorities. The Project is consistent with the governmental policy in this context.

(2) Consistency with the needs of the government and/or counterpart organizations

Before the Project started, specific conservation system of the Vietnamese native pigs did not exist from the viewpoint of genetic resources based on detailed analyses such as phylogenetic characterization. Facilities, equipment as well as related techniques such as long-term sample preservation had not been established. Laboratory environment to perform related technologies such as reproduction as well as breeding had been also insufficient at the time. The Project assists the Vietnamese counterpart organizations to address those needs directly. The Project is evaluated as being consistent with the needs of the counterpart organizations.

Due to outbreak and rapid expansion of ASF since early 2019 in the country, the significance of the Project is now established in the Vietnamese government. In other words, the importance and relevance of the Project implementation is much higher than the beginning of the Project under the current situation.

(3) Consistency of the Project Purpose with Japan’s Country Assistance Policy

The Project is placed in the Japan’s Country Assistance Policy for Vietnam issued in 2017, and the “Agriculture High-Value Added Program” in the Rolling Plan for Vietnam issued in November 2017. The Project is consistent with the policy and the program, describing the importance to promote high-value added farm and marine products as well as the sustainable utilization of natural resources.

1.2. Effectiveness

Effectiveness is evaluated as “high”.

(1) Probability of Achievement of Project Purpose

The project objective will be almost achieved as described in 2. Achievements of

the Project, 2-2 Project purpose and indicators.

(2) The effectiveness of the Project

a. Conservation of genetic resources of Vietnamese native pigs

The Government of Vietnam, MARD has shown a policy of proceeding with the national project to establish the semen cryopreservation system to conserve existing all total 22 breeds of native pigs.

The *"Gene Banking System*" which consists of database and the cryopreservation system has not yet been achieved to exert the banking function, i.e., adding samples with its information and providing them as genetic resources. NIAS has developed an operational manual of database and cryopreservation system including the rules for addition and management. The manual is expected to guide NIAS to operationalize and manage the gene banking.

b. Use of genetic resources

Regarding the use of these genetic resources, it is the world's first attempt to research and develop technologies for production of low copy-PERV Vietnamese native pigs initially assumed to be applied to transplantation medicine, using the method(s) for identification and quantification of PERV gene copies. The PERV copy number of 6.47 reduced by the Project itself has a very high value in view of the fact that it is more than 20 for Western pig breeds and over 10 for native pig breeds.

Some of model farmers in *Hoa Binh* Province revealed that they are now able to sell produced Vietnamese native pigs to the markets through middlemen or cooperatives and actually get cash income. Interviewed farmers, veterinarians in the area, and para veterinarians responsible for technology dissemination all gave reasons for increasing the number of piglets of Vietnamese native pigs produced by one delivery and the number of deliveries from once a year to 2 times a year. This means that the project activities led to the behavior change of the model farmers and improvement of farmers' household income.

Hoa Binh provincial government expanded the number of target communes from one (Cao Son commune) to 6 communes with model farmers from 15 to 90, supporting the establishment of farmers cooperatives by these model farmers and building the slaughterhouses in the communes, etc. The provincial government plans to expand the number of target communes and model farmers to 20 communes in 2020. In the future, there is a possibility that production will

expand throughout Da Bac district and other districts of *Hoa Binh* province. Such production expansion is important in terms of conservation of Vietnamese native pigs.

At present, development of PERV low-copy pigs does not immediately lead to exports, because export of pigs is virtually impossible due to the outbreak of ASF and the spread of infection. However, production of PERV low-copy pigs will contribute to the improvement of added value of Vietnamese native pigs. Since isolation breeding system for export has been established by the Project, continuing this research steadily will increase the possibility of application to medical research in the future.

It is reported that 5 million animals have been killed in Vietnam due to the recent spread of ASF, and the number has been reduced to about half that of domestic pigs. But even if a native breed is extinct, it is possible to regenerate using cryo-preserved semen and reproduction technologies the Project has successfully established.

IBT and VNUA as the executing agencies have shown the idea of diverting cloned embryo production technology to other livestock animals such as cat and cattle, etc. In this way, in the future, the biodiversity conservation system that the Project has initiated may be developed into a system not only for pigs but also for other livestock such as cattle and living organisms in general.

Thus, the results of the project have produced a high effect on the development of a conservation system for Vietnamese native pigs.

(3) Contributing Factors for Effectiveness

Strong leadership of both Vietnamese and Japanese sides is one major contributing factor. The Project Director has a vision that NIAS-V is the key institution in establishing biodiversity conservation system including Vietnamese native pigs. Under her leadership, NIAS-V coordinates with the Government line agencies such as MARD, MOST, DAH, MONRE, MOF, MPI, OOG, among others and succeeded in securing funding for sustaining what had been started with the Project. The Japanese project leader communicated effectively among Japanese researchers and coordinated all research activities to promote the smooth progress of the activities. He visited Vietnam nearly every other month, at which time, usually a meeting is held with Project Director to update each other, discuss any issues of concern and plan for the future activities. Japanese researchers also visited Vietnam to participate in meetings and provide advice and guidance

to the Project and Vietnamese researchers. There was no change in the Japanese Project leader, researchers, and JICA Project Coordinator, thus promoting continuity and consistency.

Second factor is the initiative of the Vietnamese counterpart personnel with great ownership of the Project. Some Vietnamese counterpart researchers of database and cryopreservation systems and reproductive technique such as VNUA and IBT had studied at Japanese research institutes before the start of the project. They became counterparts after the start of the Project. Thus, they were able to introduce and establish various experimental systems by themselves. This greatly contributed to the smooth implementation of the project activities.

Third factor is the rapid development of activities in Hoa Binh Province with great ownership since the budget was approved and allocated in June 2017. The authorities of Hoa Binh Province showed strong leadership to expand the project effect to other communes and provided their support. It contributed to behavior changes of model farmers. The effort of the Japanese researcher on raising of pigs is also an important contributing factor. He visited the model communes and farmers frequently and gave constructive advice to the farmer's challenge in raising pigs through trial and error.

(4) Inhibitory Factors against Effectiveness

Occurrence of ASF and its spread from early 2019 may have had an inhibitory impact on the effectiveness of the Project. However, at present, the impact on model farmers, NIAS Thai Nguyen Center and the project activities have been minimized by preventive measures and efforts by related parties of the Project. This is also one of the effectiveness of the Project.

1.3. Efficiency

Efficiency is evaluated as “high”.

(1) Manpower Input: Human resources

1) Japanese input

Japanese side dispatched short-term experts in the relevant technical fields and a long-term expert stationed in Vietnam as a project coordinator. Short-term experts with rich experiences and knowledge on relevant technical themes have been dispatched from research institutes, universities and private companies.

Manpower input is evaluated appropriate for achievement of the expected outputs and the Project purpose.

2) Vietnamese input

Vietnamese side also made effective manpower inputs towards achievement of the Project purpose. Many of researchers have continuously engaged in the Project activities proactively for entire period of the Project.

(2) Material input: Equipment/Facility

The Project procured a variety of equipment for research and analysis as Japanese side's input. It is evaluated reasonable input for the Project implementation in terms of volume, specification, timing, usability and targeted users such as real-time PCR system, micromanipulator, electro fusion devices and others.

It is noted that the Project cancelled import of liquid nitrogen generator from Japan and decided to purchase liquid nitrogen from domestic suppliers instead, which resulted in reduction of the cost of equipment and its operation. Although there were delays in installation of some equipment such as micromanipulator and anesthesia apparatus due to Vietnamese Government tax exemption procedures, they did not cause negative influence on achievement of the Project's output owing to efforts of both Japanese and Vietnamese side personnel.

(3) Monetary input: Budget

The amount of budget was satisfactory with the Project activities from Japanese side as well as Vietnamese side.

Although there were differences in the timing to disburse counterpart budget and their amount within each organization, they did not cause serious influence on achievement level of their expected outputs. For example, in the case of *Hoa Binh* province, although counterpart funds were not allocated at the beginning of the Project, they started to engage in the Project more actively after the counterpart fund received, and then caught up with their original assignment tasks.

1.4. Impact

Impact is evaluated as "high".

(1) Prospects of achievement of Overall Goal

Overall goal of the Project is likely to be achieved as follows:

Overall goal: Biodiversity conservation system of Vietnamese native pigs is established.	
Indicators	Prospects
1. The gene banking system of Vietnamese native pigs is operated (including the addition and distribution of gene resources) in NIAS.	The indicator is likely to be achieved. MARD has already approved NIAS proposal for conservation of 15 Vietnamese native pig breeds. The operational manual for database and cryopreservation system including distribution of gene resources is expected to guide NIAS for the operation and management.
2. Breeding is continued to produce at least one (1) head of Vietnamese native pig whose PERV number is lower than that at the end of the Project.	The indicator is likely to be achieved. The current lowest copy number is 6.47 as of April 2020. MARD has already approved the NIAS proposal for 500M VND for continuation of breeding of low copy-PERV VNP. According to the research progress under the Project, and with the support by MARD, it is highly possible to produce lower PERV native pigs.
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 6 communes.	The indicator is likely to be achieved. *Hoa Binh* province presented their political priority to promote native pigs production with the budget under the Program "Hoa Binh Sustainable Livestock Production Development Program (2017 – 2025)". The number of communes that can expect the provincial government's supports will increase to 20 communes in total from 6 communes at present.

(2) Ripple effects

1) Socio-economic aspect

Contribution to household income

According to interviews with model farmers of the Project, they normally had kept native pigs for their own domestic consumption purpose such as for new-year festival and other events; they started to sell native pigs in the course of the Project, and it brought additional income to their families.

One example of a model farmer in Muong Chien, her family gained 35 million

VND for the last year by sales of native pigs. Market price of native pig is remained around 120 thousand VND/kg against 60 thousand VND/kg of western pig.

Establishment of farmers' cooperative

A farmers' cooperative was newly established by 90 model farmers of the Project with the support of Hoa Binh sub-DAH. Since the supply volume of native pigs is still limited, joint actions by a cooperative, such as joint sales have not yet materialized. Nevertheless, they have already enjoyed financial and/or material supports from central/provincial government.

2) Organizational and academic aspect

New research for application to other animals

Each counterpart organization applied for new research project funds and already successfully received them, which not only ensures continuation of the Project's output but also expands technical application to other subjects.

VNUA will continue with research projects funded by Vietnamese government including ASF, genome editing of cattle and others based on IVF system. One national project "Production of Myostatin gene-edited cattle by CRISPR/Cas9 technology" has been funded by MOST for 2020-2025, and four others on ASF.

IBT also plans to continue and further develop the cloning technology targeting at native pigs and other animals such as cattle. They have been waiting for final screening process of national projects such as "Application of reproductive biotechnology (sex pre-determination, cloning, transgenic) towards improvement of productivity of some Vietnamese native pig breeds".

Negative impacts are not observed.

1.5. Sustainability

Sustainability is evaluated as "relatively high".

(1) Political Aspect

Under the current situation in which ASF spread nationwide, the Government recognizes the importance to keep and develop the gene bank of native pigs and to continue conservation efforts of native pigs at the field level.

Approval of new research funds for the Project counterpart organizations by MARD and MOST is regarded as one of tangible evidences that the Government has strong political will to back up these researches and field activities for native pigs.

Even when ASF has been controlled in Vietnam, the importance of the researches including gene bank development and field activities will be retained. The national and provincial government strategy/plan such as Socio-economic Development Strategy 2011-2020 at national level, Socio-economic Development Plan 2016-2020 in Hoa Binh, and National Program for Lake Tourism for Hoa Binh for 2020-2025 will be kept as primary policy direction of the country's development, ensuring the importance of biodiversity and poverty alleviation efforts in rural areas.

Project name	Budget *as of proposal	Note
1. Conservation of 15 Vietnamese native pig breeds (semen, oocytes, and embryos)	Budget amount not yet decided.	Already approved.
2. Research on selection and production of PERV-free or low PERV native pig in the gene system	500M VND	Already approved.
3. National Program on Tourism at Song Da Hydroelectric Reservoir (2020-2025)	-	Already approved. One of the components is service to tourists in the area, such as pork meat. Farmers in Hien Luong commune may be included here, but other communes are not likely to be covered.
4. Scheme on Sustainable Animal Husbandry Development in Hoa Binh Province for 2017-2025		This is Hoa Binh's Program. The first phase is ending in 2020 with evaluation to carry out around May 2020. Based on the results of the evaluation the next phase will be developed. Hoa Binh Sub-DAH plans to apply for this scheme for expansion of the Project.

5. “Cryoconservation of local Vietnamese pig breeds as protection against loss from African Swine Fever”, as agreement with FAO	466,580,000VND	Letter of agreement was already signed between FAO and NIAS-V. It will undertake freezing of somatic cells mainly.

(2) Organizational and Technical Aspects

1) Gene bank

The gene bank installed at NIAS-V has been functioning well until now. The technical protocol of collection and preservation of semen in the gene bank was already developed. NIAS-V staff assigned to take care of the gene bank has acquired necessary knowledge and skills for the gene bank operation through technical transfer by Japanese experts and training in Japan.

Technical challenges, however, may be encountered in the near future when the gene bank has many more semen straws of all native pig breeds, with not only semen but also embryos and oocytes. Considering the next stage of the gene bank, NIAS-V needs to strengthen further its technical capacity. For this reason, technical sustainability was evaluated as “almost” satisfactory at the time of Terminal Evaluation.

2) Low copy-PERV native pig production

Necessary techniques to select and produce low copy-PERV pig are already established in the Project, and have been continuously practiced in the Mountainous Animal Research and Development Center in *Thai Nguyen* province. Although it is difficult to foresee how far the number of copy goes lower in the future, the techniques themselves are evaluated as sustainable. The number of staff at the center is also sufficient for necessary activities.

3) Activities related to native pig production in Hoa Binh province

Necessary techniques and procedures to take care of native pigs in terms of prevention from diseases and production were established in the Project with high adaptability to farmers’ condition. The challenges after the Project are how and who will extend support and by whom, not only to model farmers but also many more farmers in other communes. The Project successfully transferred the necessary techniques to the Government officials of *Hoa Binh*, veterinarian and

para veterinarian, though, their number is limited, considering the province is now planning to increase targets to 20 communes from 2020.

In order to promote native pig production and prevention from diseases in line with the extension plan of the province, it is necessary to transfer techniques from personnel who worked together with the Project to other personnel who were not involved in the Project. Considering these situations, the technical sustainability is evaluated “moderate” at the time of Terminal Evaluation, provided that ASF does not seriously spread in the province any more.

If evaluation of sustainability is focused on Cao Son commune alone, it would be high, considering the technical ability of relevant personnel such as veterinarians, para veterinarians and farmers who worked together with the Project.

(3) Financial Aspect

All the activities on “gene bank”, “low copy-PERV native pig breeding” and “activities related to native pig production in *Hoa Binh* province” have acquired or will acquire necessary budget for upcoming 3-5 years after the Project. Considering these, financial sustainability is evaluated high.

2. Key Factors Affecting Implementation and Outcomes

It is evaluated that the Project has been progressing almost satisfactorily towards achievement of the Project purpose and already produced significant impacts. The evaluation results of 5 criteria are all high or relatively high. Overall evaluation of the Project is high.

The points what should be noted in the Project are as follows;

i) Each project activity in CMU1 to CMU4 has produced high outputs, and the Project objective will be almost achieved at the terminal stage.

ii) The concrete outputs produced by the Project have led to the following vigorous action and behavior changes unique to the Vietnamese side.

- NIAS-V submitted MARD and MOST three proposals for continuation of the Project research activities and further add the values to the conservation system for Vietnamese native pigs. MARD and MOST already approved NIAS proposal for conservation of 15 Vietnamese native pig breeds as well as breeding of PERV-free or low copy-PERV VNP.

- NIAS-V and FAO agreed on cryoconservation of local Vietnamese pig breeds as protection against loss from African Swine Fever."
- Researchers are also vigorously engaged in the research activities.
- In Hoa Binh Province, Provincial Government is committed to allocate its own budget to increase the number of communes and model farmers, and it will be further increased to 20 communes.
- Some model farmers are actively engaged in pig production and have already earned cash by themselves.

iii) Thus, the Project is evaluated "high" with all five criteria, such as project validity, effectiveness, impact, and sustainability.

iv) ASF infection of early 2019 made it difficult for implementation of the Project's activities, but the significance of the Project has increased, and thanks to the efforts of all stakeholders, the challenges were turned into successful implementation of the Project.

v) Despite the positive developments described above, the Vietnamese Government, including MARD, needs to formulate an integrated strategy in order to maintain, manage and operate the conservation system for the Vietnamese native pigs.

vi) In addition, the above-mentioned activities on the Vietnamese side, including the efforts of Hoa Binh Province, have just started. In order to make these efforts sustainable, it is desirable that research institutions and researchers in both countries continue to cooperate in the future.

3. Evaluation on the results of the Project Risk Management

Despite the fast spread of ASF, the Project was still able to progress with all the planned activities and meet the targets laid out in the PDM. This owes greatly to the commitment and dedication of both Vietnamese and the Japanese teams, as well as timely effective risk management. From the very first time when ASF was detected in Vietnam early February 2019, the Project immediately took preventive measures. The Project gave detailed instructions how to prevent contamination and spread of the virus to all relevant stakeholders of the Project including Thai Nguyen Center and Hoa Binh, and provided protective tools and materials as well as reallocation of budget to construct necessary protective structures. The Vietnamese team proposed alternative and in often cases challenging ways to overcome the problems. Cryopreservation of semen was then undertaken in three more Provinces by literally transporting all the laboratory

equipment from NIAS by railway and setting up a temporary laboratory renting a room in the target district in the province. Caretakers and staff to take care of the pigs willingly stayed 7 days per week in the experiment breeding facilities in order to reduce the risks of ASF infection to the Project pigs.

As a result, the Project did not cancel any planned activities, but instead dealt with the challenges with ingenuity and by changing ways to implement them.

4. Lessons Learnt

(1) Ownership and sustainability issue:

As JICA technical cooperation, technical transfer and sustainability have been given as an important implementation strategy from the inception of the Project.

Training of counterpart especially young researchers has been given importance. In selection of candidates for training in Japan, consideration was given as much as possible to prioritize those who had not otherwise had opportunities before. On-the-job training was given importance in order to transfer technologies to Vietnamese researchers as well as university students when possible. On-site training has been given wherever and whenever the opportunity exists. The Japanese researchers have worked closely with the Vietnamese researchers especially at the beginning when new technology and new equipment have been introduced. This way, a sense of collaborative research partnership has been fostered and will continue to provide an effective collaborative research environment to both countries.

Cost sharing was encouraged to maximize ownership and sustainability after the Project. Vietnamese counterpart budget covered most of facility development and renovation, utility cost, human resources, and, some but limited operation cost. Procurement of chemicals and tools essential for scientific researches will pause some concern and challenge for sustainability after the Project.

Hoa Binh Sub DAH took leadership role to expand model activities of the Project to 5 other communes of Da Bac district after the counterpart budget has been secured in *Hoa Binh* in June 2017. Hoa Binh intends to expand from the current 6 communes to 20 communes from 2020. Branding / labeling activities will be carried out by *Hoa Binh* in 2020.

(2) ASF prevention and control:

ASF affected implementation of the Project activities in different ways. They include: (1) limited movement of boars from provinces to Hanoi for

cryopreservation of semen (2) difficulty in collection of eggs from Vietnamese native pigs (3) difficulty in collection of blood and feces samples from Vietnamese native pigs (4) increased biosecurity requirement for protection of pig breeding at NIAS Thai Nguyen Center (5) ASF infection and control at model farms of Da Bac, *Hoa Binh* Province.

Under the circumstances, the Project took prompt action for prevention of ASF with good results. In NIAS Thai Nguyen Center, disinfectant pools for vehicles were constructed at entrances of the Center, and regular disinfection were carried out. The Center's staff strictly followed the operation manual developed by the Project. As a result, no ASF in NIAS Thai Nguyen Center so far, despite the surrounding area have seen cases of ASF. In Hoa Binh, model farmers were repeatedly advised in the training how to use disinfectant and lime powder effectively.

Despite the movement restriction of pigs, the Project managed to carry out cryopreservation of semen and embryo transfer as per the Plan. This greatly owes to the flexibility and ingenuity of the stakeholders. For example, cryopreservation of semen was undertaken in the Province, instead of transferring the boars to Hanoi. Oocytes too were collected in the Province.

IV. For the Achievement of Overall Goals after the Project Completion

1. Prospects to achieve Overall Goal

MARD approved NIAS proposal for the national project to conserve 15 Vietnamese native pig breeds (semen, oocytes, embryos). Therefore, NIAS-V will be able to continue with the operation of the gene banking system. The operational manual of database and cryopreservation system, as well as management rules, has been developed by NIAS-V.

In addition, FAO and NIAS-V agreed on "cryoconservation of local Vietnamese pig breeds as protection against loss from African Swine Fever".

NIAS-V also secured budget to continue with the PERV-free or low copy-PERV breeding at Thai Nguyen Center. The lowest PERV copy number as at the end of the Project is 6.47, both for male and female, and with continued breeding, there is a high hope that copy number of PERV will go lower than 6.47.

In 2020, Hoa Binh Sub-DAH will write a report on project implementation results for 5 years from 2015-2020, and organize the 5-year summary meeting of the Project with stakeholders including leaders of 6 communes and 90 model farmers.

Hoa Binh is committed to expand the Project activities from 6 communes to 20 communes, and it plans to apply for the Scheme on Sustainable Animal Husbandry Development in *Hoa Binh* Province for 2017-2025.

2. Plan of Operation and Implementation Structure of the Vietnamese side to achieve Overall Goal

NIAS-V will continue with semen cryopreservation and gene banking system operation with the budget of MARD/MOST. NIAS-V team under Key laboratory who were trained under JICA Project will continue to play the key role in this activity. Embryo transfer will be continued under the leadership of NIAS-V key laboratory.

Breeding of PERV free or low copy-PERV VNP will continue with NIAS-V budget of MARD. The same personnel under Thai Nguyen Center will be in charge of breeding while technical support will be provided by Key laboratory of NIAS-V.

Hoa Binh will continue with the labeling activities in 2020 with their counterpart budget. For expansion, they will apply for the Scheme on Sustainable Animal Husbandry Development in *Hoa Binh* Province for 2017-2025.

3. Recommendations for the Vietnamese side

The followings are a set of recommendations for the Vietnamese side counterpart.

1) Management rules for operationalization of the cryo-bank system and database

Considering the importance and necessity for conservation of native pigs, the cryo-bank system and the database established through the Project are expected to be operational and managed sustainably in the future. The operation manual for database and cryopreservation system, as well as the management rules of the cryo-bank system has now been developed by NIAS-V to guide operationalization of the system. It is strongly recommended that NIAS-V

continue to collaborate and coordinate with relevant Government agencies, such as MARD, MOST, and MONRE, to further strengthen the cryo-bank system developed under the Project and establish it as a national system.

2) Manuals, guidelines and protocols for use after termination of the Project

The Project has developed several manuals, guidelines and protocols and it is strongly recommended that these are utilized after the Project termination. They are:

- Operational manual for database and cryopreservation system
- Manual for Assisted Reproductive Techniques applied for the Gene Banking of Vietnamese Indigenous Pigs: Technical procedures applied for pigs at isolation section and breeding section, MARDC - Mountainous Animal Husbandry Research and Development Center
- Technical guidelines for the raising management of Vietnamese native pigs
- Two kinds of handbooks and poster for the raising management of VNP

3) Protection of native pigs from ASF (African swine fever)

ASF remains a continuing threat throughout whole territory of Vietnam since early 2019, but the Project has been coping well until now against the infection of native pigs and spread of ASF at the research station in NIAS Thai Nguyen Center and native pig farmers of Da Bac district in *Hoa Binh* province. It is strongly recommended that the Vietnamese counterpart will continue to take preventive measures against the disease to set a good example.

4) Publication and presentation of research results of the Project

The research results of the Project are expected to share internationally, so the Project members are strongly requested to continue to make every effort for the international publication and/or presentations at such occasions as international conferences.

5) Effective use of NIAS Thai Nguyen Center for continued research

Isolation and breeding houses of NIAS Thai Nguyen Center established by the Project have valuable and effective functions in research on production of native pigs with low copy-PERV and possible health control facility for pre-export

native pigs. Therefore, it is strongly recommended that those facilities be maintained for continued operation for set experimental purposes with support from MARD. NIAS-V is expected to take a lead for estimation of required budget for continued experimental activities based on the result of the Project.

6) Strengthening activities toward branding of native pigs in Da Bac District, Hoa Binh province

Native pigs are a potential animal property which can make profit for raising farmers in the mountainous regions of Da Bac district, *Hoa Binh* province. Provincial government has a plan to increase raising farmers in 20 communes in total, in addition to 6 communes covered in the Project, in Da Bac district. Thus, there would be a high possibility to establish branding of Da Bac native pigs if their production increases and supply to meet the needs of consumers. Therefore, it is highly recommended to Hoa Binh DARD to promote native pig production by applying the raising management methods developed by the Project with collaborative support of NIAS-V and VNUA. Furthermore, promotion of marketing and continued support of farmers' cooperatives would be effective for promotion of branding.

The followings are a set of recommendation for Vietnamese government authorities (MARD, MOH, MOST, MONRE etc.)

1) Integrated strategy for conservation and full use of native pigs

Vietnamese native pigs could become a valuable organ donor for human medication if copy number of PERV is reduced to the level being acceptable for the medication. It should be noticed that the organ donation could have a potential to make a great advancement in medication in the world and give a profit to Vietnam. Cryopreserved genetic resources such as semen, fertilized oocytes and embryos of native pigs can be utilized for generation of piglets. In addition, needless to say, native pigs can produce quality meat for human consumption both in remote areas and big city like Hanoi. Considering about those valuable and profitable characteristics of native pigs and technologies for generation of piglets, it is advised to the governmental authorities to make integrated strategy for conservation of native pigs combined both gene bank and in situ preservation and for full use of them for future. In addition, the governmental authorities need to support for realizing the strategy.

2) Strategy for production of native pigs having low copy-PERV numbers and their use

It is very sure that the native pigs having low copy-PERV numbers have particular potential for use as organ donors, medical animals, in human medication. If that possibility is realized in the continuation of the Project activities and demonstrated by research regarding human medication in the future, those pigs can produce a great value and benefits for regenerative medicine. Therefore, it is advised to the governmental authorities to make up a careful strategy for production and use in both domestically and internationally so that Vietnam can surely contribute to the world. It would be important to keep collaborative works with Japanese researchers for the development of a medical animal as early as possible.

3) Support to the gene bank system with cryo-preservation and in situ conservation

It is widely and well known that Vietnam has a huge diversity of natural biological resources both of animals and plants. As mentioned above on the native pigs, the gene bank system with cryo-preservation has a huge potential and value in terms of clear understanding of their genetic and phenotypic diversity, conservation and their possible future utilization in research including regeneration of live animals that are under the danger of extinction for instance and so on. Furthermore, the gene bank system established through the Project is not limited to native pigs but can be applied to other agricultural and wild animals. Therefore, it is strongly recommended to the government authorities to support the gene bank system and extend to other agricultural and wild animals and birds etc. under full understanding of its valuable functions.

4. Monitoring Plan from the end of the Project to Ex-post Evaluation

JICA will conduct the Ex-post Evaluation in 3 years after the completion of the Project. It is recommended that the Vietnamese implementation organization to submit the progress report on activities supported under the Project every year until the Evaluation.

5. Future Plan for the Research Collaboration in Related Research Areas

Proposal from Japanese side for the continuous project entitled "Development of endogenous retrovirus (PERV)-free strains utilizing characteristics of Vietnamese native pigs" has been approved at JST. The activity about PERV-free strain can be continued in *NIAS Thai Nguyen Center.*

ANNEX 1: Results of the Project
ANNEX 2: List of Products (Report, Manuals, Handbooks, etc.) Produced by the Project
ANNEX 3: PDM (All versions of PDM)
ANNEX 4: R/D, M/M, Minutes of JCC (copy) (*)
ANNEX 5: Monitoring Sheet (copy) (*)
(* Remarks: ANNEX 4 and 5 are internal reference only.)

1. JICA (Nominated) Experts

(long-term)

No	Name of Expert	Field of Expertise	Duration of Assignment
	Nobuko Yamagishi	Project Coordinator	5/5/2015-4/5/2020

(short-term)

No	Name of Expert	Field of Expertise	Duration of Assignment
1	Kazuhiro Kikuchi	General management / Cryo-bank	206
2	Aisaku Arakawa	Identify and classify Vietnamese native pigs	29
3	Masaaki Taniguchi	Identify and classify Vietnamese native pigs	11-Mar
4	Toshihiro Okamura	Reproduction / breeding techniques of PERF-free or low copy-PERV	14
5	Shinya Ishihara	Cryo-bank system and DNA analysis	190
6	Nguyen Hiep	Reproductive techniqes from semen and/or embryos	7
7	Thang Q. Dang-Nguyen	Cryo-bank system and semen freezing	44
8	Tamas Somfai	Reproductive techniqes from semen and/or embryos	148
9	Takeshige Otoi	Technical guidance / Cloned embryo productioon	144
10	Nguyen Van Thanh	Technical guidance / Cloned embryo productioon	20
11	Makoto Osaki	Preventive measures against infectious disease / technical guidance	161
12	Kenji Kawashima	Preventive measures against infectious disease / technical guidance	77
13	Kohtaroh Miyazawa	Preventive measures against infectious disease / technical guidance	75
14	Mitsutaka Ikezawa	Preventive measures against infectious disease / technical guidance	13
15	Satoshi Hayashi	Technical guidance on animal husbandry and veterinary measures / productioon system	231
16	Hiromi Kashiwazaki	Preventive measures against infectious disease / technical guidance	10
17	Shunsuke Masazumi	Technical guidance on animal husbandry and veterinary measures / productioon system	6
18	Yoshinori Takahashi	Technical guidance on animal husbandry and veterinary measures / productioon system	11
19	Hideki Watanabe	Technical guidance on animal husbandry and veterinary measures / productioon system	14
20	Masamitsu Tomiyama	Technical guidance on artificial insemination	9

2. Counterpart Personnel Assignment

No		Name of Counterpart Personnel	Position / Organizatio	Field of Expertise
				(PMU)
1	O	Ngo Thi Kim Cuc	Vice Director, NIAS-V	Project Director
2		Vacant		Project Manager
3		Ha Minh Tuan	Vice Director, Science Management and International Cooperation	National Project Coordinator
4		Do Van Hien	Chief Accountant, NIAS-V	Financial Project Manager
5		Trinh Dinh Thau	Dean, Faculty of Veterinary Medicine, VNUA	
6		Dong Van Quyen	Deputy Director, Institute of Biotechnology (IBT)	
7		Vuong Dac Hung	Vice Director, Hoa Binh Department of Agriculture and Rural Development	

Annex 1

3. Training in Japan

(1) Counterpart Personnel Training in Japan

No	Name of Counterpart Personnel	Field of Expertise	Name of training Course	Duration of Training		JFY 2015											JFY 2016												JFY 2017											
				From	To	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Phan Le Son	Cryopreservation		2016/2/21	2016/3/19										—	—																							
2	Luu Quang Minh	Detection of PERV and breeding based on DNA analysis	RT-PCR analysis	2016/2/21	2016/3/19										—	—																							
3			FISH analysis	2016/10/3	2016/12/10																		—	—	—	—													
4	Nguyen Van Ba	Phylogenetic analysis	MICROSATELITE analysis	2016/2/21	2016/3/19										—	—																							
5	Nguyen Phuong Nhung	In-vitro embryo production	In-vitro embryo production	2016/2/21	2016/3/19										—	—																							
6	Nguyen Thi Huong	Cloning	Cloning technique	2016/5/9	2016/9/30																																			
7	Bui Thi To Nga	Detection and prevention of serious porcine diseases	Detection of infectious diseases	2016/6/27	2016/7/16															—	—																		
8	Nguyen Phuong Nhung	Detection and prevention of serious porcine diseases	Detection of infectious diseases	2016/6/27	2016/7/23															—	—																		
9	Nguyen Van Phuong	Detection and prevention of serious porcine diseases	Detection of infectious diseases	2016/6/27	2016/7/23															—	—																		
10	Tran Van Tiep	Hoa Binh DARD	Animal husbandry and branding	2016/6/27	2016/7/9															—																			
11	Nguyen Duc Dung	Da Bac PC	Animal husbandry and branding	2016/6/27	2016/7/9															—																			
12	Luong Thanh Hai	Hoa Binh Sub DAH	Animal husbandry and branding	2016/6/27	2016/7/9															—																			
13	Pham Vinh Xuong	Hoa Binh Sub DAH	Animal husbandry and branding	2016/6/27	2016/7/9															—																			
14	Nguyen Thi Phuong Thuy	Hoa Binh Sub DAH	Animal husbandry and branding	2016/6/27	2016/7/9															—																			
15	Pham Van Thuc	Da Bac Veterinary staff	Animal husbandry and branding	2016/6/27	2016/7/9															—																			
16	Nguyen Thi Nhung	Cloning	Cloning technique	2016/12/1	2017/3/20																																			
17	Pham Hai Ninh	Technical guidance on breeding native pigs	Database arrangement	2017/2/20	2017/3/17																						—	—											
18	Nguyen Khanh Van	Cryopreservation	Cryopreservation	2017/2/20	2017/3/17																						—	—											

4. Provision of Equipment (Provided by JICA)

No.	Date of Arrival	Description of Equipment			Amount	Unite Price		S-total		Place of Storage
		Item	Manufacture & Model Number	R/P		Currency		Currency		
		(For NIAS-V)								
1	27/2/2017	Real time PCR system	7500FAST (ABI)	J	1	JPY	7,533,000	JPY	7,533,000	
2		Multigas incubator	APM-50DR (ASTEC)	J	1	JPY	778,500	JPY	778,500	
3		Medical showcase	BMS-351F3 (NIHON FREEZER)	J	1	JPY	345,000	JPY	345,000	
4		Biofreezer	GS-3120HC (NIPPON FREEZER)	J	1	JPY	277,000	JPY	277,000	
5		Bioshaker	BR43FM-MR (TAITEC)	J	1	JPY	759,300	JPY	759,300	
6		DNA/RNA Flurometer	QUBIT 3.0 (LIFE TECHNOLOGIES)	J	1	JPY	175,500	JPY	175,500	
7		Cooled centrifuge	5424R (EPPENDORF)	J	1	JPY	494,100	JPY	494,100	
8		Hot plate	SP-45D (HIRASAWA)	J	1	JPY	213,500	JPY	213,500	
9		Frozen storage container	DR-3 (TAIYO NIPPON SANSO)	J	2	JPY	189,000	JPY	378,000	
10		Fluorescence microscope with digital camera system	(missing from Dr. Kikuchi list of JST)	J	1	JPY	4,300,850	JPY	4,300,850	
11		Multichannel pipetter	4661010, 4661030 (FINNPIPETTE)	J	4	JPY	102,850	JPY	411,400	15,666,150
12	28/2/2017	Liquid nitrogen semen container	DR-245L, DLS-120B (SS)	J	2	JPY	7,038,000	JPY	14,076,000	
13		Tabletop centrifuge	LCX-100	J	1	JPY	489,600	JPY	489,600	
14		Microcooling centrifuge	5424R, FA-45-24-11	J	1	JPY	498,600	JPY	498,600	
15		MilliQ system	SIMSV01JP, SIMSSTRTJ, PAL-1500EP	J	1	JPY	407,400	JPY	407,400	
16		Stereomicroscope	SMZ1270, P2-TERG50, LV-TV, C-2, P-DSL32, C-FMCN, TPX-SMZ25	J	1	JPY	**1,199,375**	JPY	1,199,375	
17		Piezo micro manipulator	PIEZO-PMM4GDJ WITH ACCESSORIES	J	1	JPY	1,617,000	JPY	1,617,000	
18		Operation table	HLF-S150, HLF-E500L	J	1	JPY	1,760,000	JPY	1,760,000	
19		Anaesthesic (mask only)	AN-0150, AN-0120	J	1	JPY	19,000	JPY	19,000	
20		Ultrasound diagnostic system	SONOSCAPE S6V	J	1	JPY	1,700,000	JPY	1,700,000	21,766,975
21	20/2/2018	Aesthesia apparatus with accessories	Anesthesia appratus frame (FO-20A), Carburetor, Presssure pipe, vacuum ppump	J	1	JPY	820,800	JPY	820,800	820,800
22	27/9/2018	Pick-up vehicle	TOYOTA HILUX	J	1	JPY	4,434,760	JPY	4,434,760	4,434,760
23	4/4/2019	Micro manipulator and Injector set	MN-4,MMO-4,IM-11-2, NZ-19-2, NARISHIGE	J	1	JPY	1,671,840	JPY	1,671,840	1,671,840
		(For VNUA)								
24	27/2/2017	PCR system with gel documentation system	2720 THERMAL, UVP BIODOC IT (THERMO FISHER TECHNOLOGIES)	J	1	JPY	1,692,800	JPY	1,692,800	
25		Stereo microscope with thermal plate	SMZ1270TER G-DSL32, TPX-SMZ25 (NIKON)	J	1	JPY	1,199,375	JPY	1,199,375	
26		Polishing machine	EG-44(NARISHIGE JAPAN)	J	1	JPY	161,500	JPY	161,500	
27		Microforge	MF-900 (NARISHIGE JAPAN)	J	1	JPY	475,000	JPY	475,000	
28		Multigas incubator	APM-50DR (ASTEC)	J	1	JPY	778,500	JPY	778,500	
29		Micromanipulator/inverted microscope with thermal plate	TI-U, TPX-108R (NIKON)	J	1	JPY	5,601,850	JPY	5,601,850	
30		Biofreezer	GS-3120HC (NIPPON FREEZER)	J	1	JPY	277,000	JPY	277,000	
31		Biofreezer	CLN-32UD2 (NIPPON FREEZER)	J	1	JPY	1,003,000	JPY	1,003,000	
32		Autoclave	SX-500 (TOMY DIGITAL BIOLOGY CO.LTD)	J	1	JPY	607,000	JPY	607,000	
33		Autoclave	ES-215 (TOMY DIGITAL BIOLOGY CO.LTD)	J	1	JPY	441,250	JPY	441,250	
34		Hot plate	SP-45D (HIRASAWA)	J	1	JPY	213,500	JPY	213,500	
35		pH meter	SG23-ELK (METTLER TOLEDO)	J	1	JPY	152,100	JPY	152,100	
36		Dry heat sterlizer	NDS-520 (EYELA)	J	1	JPY	214,200	JPY	214,200	
37		Electric dual range analytical balance	XS205DUV (METTLER TOLEDO)	J	1	JPY	419,400	JPY	419,400	
38		Frozen storage container	DR-10N, SR-31, TAIYO NIPPON SANSO	J	2	JPY	357,300	JPY	714,600	
39		Ultra low temperature freezer	VT-78 (NIHON FREEZER)	J	1	JPY	464,000	JPY	464,000	
40		Electro cell fusion device	LF101HB, LF5100-100 (BEX CO.LTD)	J	1	JPY	2,392,200	JPY	2,392,200	16,807,275
41	28/2/2017	Tabletop centrifuge	LCX-100	J	1	JPY	489,600	JPY	489,600	

4. Provision of Equipment (Provided by JICA)

No	Date of	Description of Equipment			Amount	Unite Price		S-total		Place of Storage
42		MilliQ system	SIMSV01JP, SIMSSTRTJ, PAL-1500EP	J	1	JPY	407,400	JPY	407,400	
43		Clean bench	AH-160 (Astec)	J	1	JPY	1,215,000	JPY	1,215,000	
44		Piezo micro manipulator	PIEZO-PMM4GDJ WITH ACCESSORIES	J	1	JPY	1,617,000	JPY	1,617,000	
45		Micro cooling centrifuge	MX307 (TOMY)	J	1	JPY	1,121,150	JPY	1,121,150	
46		Embedding machine	Tissue Tec Tec5 (Tec Plus)	J	1	JPY	1,950,000	JPY	1,950,000	
47		Safety Cabinet	BHC-T700 II A1S	J	1	JPY	1,035,000	JPY	1,035,000	
48		ELISA system Multiskan FC basic	(Thermal cycler in Dr. Kikuchi list of JST)	J	1	JPY	1,019,500	JPY	1,019,500	
49		Lens for microscope		J	1	JPY	519,175	JPY	519,175	9,373,825
		(For IBT)								
50	27/2/2017	Polishing machine	EG-44 (NARISHIGE JAPAN)	J	1	JPY	161,500	JPY	161,500	
51		Multigas incubator	APM-50DR (ASTEC)	J	1	JPY	778,500	JPY	778,500	
52		Micromanipulator/inverted microscope with thermal plate	TI-U, TPX-108R (NIKON)	J	1	JPY	5,601,850	JPY	5,601,850	
53		Biofreezer	GS-3120HC (NIPPON FREEZER)	J	1	JPY	277,000	JPY	277,000	
54		Biofreezer	CLN-32UD2 (NIPPON FREEZER)	J	1	JPY	1,003,000	JPY	1,003,000	
55		Micropipette puller	P-10001VF (SUTTER INSTRUMENT COMPANY)	J	1	JPY	1,615,000	JPY	1,615,000	
56		Hot plate	SP-45D (HIRASAWA)	J	1	JPY	213,500	JPY	213,500	
57		pH meter	SG23-ELK (METTLER TOLEDO)	J	1	JPY	152,100	JPY	152,100	
58		Electric dual range analytical balance	XS205DUV (METTLER TOLEDO)	J	1	JPY	419,400	JPY	419,400	
59		Frozen storage container	SR-31 (TAIYO NIPPON SANSO)	J	1	JPY	243,900	JPY	243,900	
60		Electro cell fusion device	LF101HB, LF5100-100 (BEX CO.LTD)	J	1	JPY	2,392,200	JPY	2,392,200	12,857,950
61	28/2/2017	Tabletop centrifuge	LCX-100	J	1	JPY	489,600	JPY	489,600	
62		MilliQ system	SIMSV01JP, SIMSSTRTJ, PAL-1500EP	J	1	JPY	407,400	JPY	407,400	
63		Clean bench	AH-160 (Astec)	J	1	JPY	1,215,000	JPY	1,215,000	
64		CO2 incubator	APC-50DR (Astec)	J	1	JPY	720,000	JPY	720,000	
65		Piezo micro manipulator	PIEZO-PMM4GDJ WITH ACCESSORIES	J	1	JPY	1,617,000	JPY	1,617,000	
66		Lense for microscope		J	1	JPY	519,175	JPY	519,175	4,968,175
		(For Hoa Binh)								
67	27/2/2017	Biomedical cooler	UKS-3610DHC (NIHON FREEZER)	J	1	JPY	302,500	JPY	302,500	
68		Constant temperature dryer	NDD-420 (EYELA)	J	1	JPY	193,500	JPY	193,500	
69		Distilled water manufacturing equipment	SA-2100A (EYELA)	J	1	JPY	366,300	JPY	366,300	
70		Biological microscope	CX31 (OLYMPUS)	J	1	JPY	325,280	JPY	325,280	
71		Electric dual range analytical balance	XS205DUV (METTLER TOLEDO)	J	1	JPY	419,400	JPY	419,400	1,606,980
72	27/9/2018	Pick-up vehicle	TOYOTA HILUX	J	1	JPY	4,434,760	JPY	4,434,760	4,434,760
									94,409,490	83,047,330

Note: The listed equipment should be the unit price of 50,000yen or more and be usable for one year or more, according to manual for JICA coordinator.

5. Facilities, Equipment and Materials Provided by Vietnamese Government

No.	Item	Place	Component
	JFY2015 until now		
1	Project Office Space with Furniture	NIAS-V, Thuy Phuong, Hanoi	Project Office
2	Storage (Till FY2018)	Hoa Binh Veterinary Office	Storage of materials for Japanese team
3	Introductory Quarantine Facility and Breeding Faci	Northern Mountainous Livestock Research and Development Center, Thai Nguyen	Introductory quarantine facility for PERV free or low-copy native pigs and breeding facility
4	AI Facility	AI Center, Hoa Binh Province	AI activities
5	Embryo Transfer Facility	Animal Experiments and Domestic Animal Conservation Center, Thuy Phuong, Hanoi	Embryo transfer and cryopreservation of semen

Annex 1

6. Local Costs by the Japanese side

Unit: VND

Budget Item	Activity	Budgetary Year						Total Amount
		JFY2015	JFY2016	JFY2017	JFY2018	JFY2019	JFY2020 (End	
Cryo-bank and breeding	Ear tissue sampling	385,519,176	766,396,600	444,615,000	65,056,000	-	-	1,661,586,776
	Cryopreservation of semen	1,250,000	12,170,000	7,750,000	627,522,826	612,468,000		1,261,160,826
	Database establishment			21,829,000	33,300,000	-	-	55,129,000
	Breeding PERV-free or low coy-PERV VNP at Thai Nguyen		19,891,384	262,420,070	400,642,546	482,130,871	40,007,625	1,205,092,496
Reprouctive techniques	Reproductive techniques		28,124,000	60,155,000	293,979,600	217,205,250	3,450,000	602,913,850
Disease Prevention	Disease monitoring in HB	45,680,000	120,754,500	17,642,500	3,254,000	46,790,600		234,121,600
	Survey related to export quarantine	4,324,757		5,417,000	19,560,000		-	29,301,757
Establishment of effective production system	Hoa Binh Data Census	417,653,877					-	417,653,877
	Rapid Assessment for selection of model farms	40,590,000					-	40,590,000
	Model farm activities (incl. training)	83,826,000	338,689,358	305,876,780	180,157,800	464,263,980		1,372,813,918
	Hoa Binh Training needs assessment survey and others		279,618,673				-	279,618,673
	AI activity in HB			83,265,000	162,072,148	24,000,000		269,337,148
Local procurement of equipment	CMU1	37,040,000	237,645,000	34,495,000	50,157,500		-	359,337,500
	CMU2		271,100,000	159,365,400	76,652,500			507,117,900
	CMU3		148,657,368			279,770,000		428,427,368
	Thai Nguyen		132,050,000	188,932,461	190,645,000	10,850,000	-	522,477,461
	NIAS Conservation Center			154,850,500				154,850,500
	AI Center		10,900,000		68,290,000		-	79,190,000
Tools and chemicals for lab work	CMU1	94,063,760	547,811,458	158,339,000	116,421,000	210,051,000		1,126,686,218
	CMU2	133,554,235	74,972,824	191,941,000	151,919,000	593,606,000		1,145,993,059
	CMU3	106,375,000	184,307,300	228,447,000	258,398,000	159,718,000		937,245,300
Rent-a-car	Rent-a-car	141,221,300	191,691,517	171,207,182	170,055,084	67,459,600	-	741,634,683
	Rent-a-car (Sample)	153,557,663	455,141,962	86,488,675			-	695,188,300
	Rent-a-car (HB Census)	98,986,250					-	98,986,250
Project Management	Project Management (JCC, PMU, Seminar, Symposium, International Conference, etc.)	53,612,000	77,368,673	106,124,136	98,115,800	936,880,976		1,272,101,585
Project Operation	Operation cost (translate, interprete, secretary, local transport, communication, stationery/office equipment, income tax, field trip, etc)	596,221,585	760,626,716	469,119,905	635,799,071	751,873,781	42,297,060	3,255,938,118
	Total	##########	##########	##########	##########	##########	85,754,685	18,754,494,163

18,754,494,163

Annex 2: List of Products (Report, Manuals, Handbooks, etc.) Produced by the Project

Output 1:

- Operational manual for the database and cryopreservation system
- Results of Vietnamese native pig bio-survey and cryopreservation of semen
- Access-based database, reports and mapping for 22 provinces

Output 2:

- Manual for Assisted Reproductive Techniques applied for the Gene Banking of Vietnamese Indigenous Pigs

Output 3:

- Operational Manual "TECHNICAL PROCEDURES APPLIED FOR PIGS AT ISOLATION AREA and BREEDING AREA" ver 1.5
- Technical guidelines for the raising management of VNP
- Handbook for Raising Hoa Binh Native Pigs for Paravets
- Handbook for Raising Hoa BInh Native Pigs for Farmers
- Poster

List of Publications:

2015

1. Bui Xuan Nguyen, Kazuhiro Kikuchi, Nguyen Thi Uoc, Thanh Quang Dangnguyen, Nguyen Viet Linh, Nguyen Thi Men, Trung Thanh Nguyen, Takashi Nagai. **Production of Ban miniature pig embryos by in vitro fertilization: A comparative study with Landrace.** Animal Science Journal, 86, 487–493

2017

2. S. Ishihara, A. Arakawa, M. Taniguchi, Q. M. Luu, D. L. Pham, B. V. Nguyen, S. Mikawa, and K. Kikuchi. **Genetic relationships among Vietnamese local pigs investigated using genome-wide SNP markers.** Reprod. Anim. Gen., 49, 86-89

2018

3. Nguyen VK, Vu HTT, Nguyen HT, Quan HX, Pham LD, Kikuchi K, Nguyen ST, Somfai T. **Comparison of the microdrop and minimum volume cooling methods for vitrification of porcine in vitro-produced zygotes and blastocysts after equilibration in low concentrations of cryoprotectant agents**. Journal of Reproduction and Development. 64(5):457-462
4. Linh NV, Somfai T, Nguyen TH, Nhung NT, Hong NT, Dat NT, Thinh NH, Van NK, Quyen DV, Chu HH, Son NT, Kikuchi K. **Optimization of the in vitro fertilization protocol for frozen epididymal sperm with low fertilization ability in Ban-A native Vietnamese pigs**. Animal Science Jouranl. 89(8):1079-1084.

5. Nhung NT, Hong NT, Dat NT, Thinh NH, Somfai T, Kikuchi K, Cuc NTK, Son NT, Quyen DV, Ha CH,Nguyen BX, Linh NV. **Effect of culture medium on the development of pig embryos obtained by somatic cell nuclear transfer**. Academia Journal of Biology. 40, 101-105.

2019

6. Somfai T, Nguyen VK, Vu HTT, Nguyen HLT, Quan HX, Viet Linh N, Phan SL, Pham LD, Cuc NTK, Kikuchi K. **Cryopreservation of immature oocytes of the indigeneous Vietnamese Ban Pig**. Animmal Science Jouranl. 2019 Jul;90(7):840-848.
7. Ishihara S, Dang-Nguyen TQ, Kikuchi K, Arakawa A, Mikawa S, Osaki M, Otoi T, Luu QM, Nguyen TS, Taniguchi M. **Characteristic Features of Porcine Endogenous Retroviruses in Vietnamese Native Pigs**. Animal Science Journal
8. Ba NV, Arakawa A, Ishihara S, Nam LQ, Thuy TTT, Dinh NC, Ninh PH, Cuc NTK, Kikuchi K, Lan PD, Taniguchi M. **Evaluation of Genetic Richness among Vietnamese Native Pig Breeds using Microsatellite Markers.** Animal Science Journal.
9. Ishihara S, Yamasaki F, Ninh PH, Dinh NC, Arakawa A, Taniguchi M, Cuc NTK, Mikawa S, Takeya M, Kikuchi K. **The phenotypic characteristics and relational database for Vietnamese native pig populations.** Animal Science Journal (Resubmitted after revision)
10. Nhung NT, Nguyen BX, Viet Linh N, Khanh Van N, Kikuchi K, Hipe NT, Hong NT, Hoang Thinh N, Quyen DV, Chu HH, Kim Cuc NT, Somfai T. **Optimization of in vitro embryo production and zygote vitrification for the indigenous Vietnamese Ban pig: the effects of different in vitro oocyte maturation systems .** Animal Science Journal (Resubmitted after revision)

Project Design Matrix

Version 0

Project Title: Establishment of cryo-bank system for Vietnamese native pig resources and of sustainable production system to conserve bio-diversity

Dated August 15, 2014

Implementing Agency (Vietnamese Side): The National Institute of Animal Science,Institute of Biotechnology belonging to Vietnamese Academy of Science and Technology, Vietnam National University of Agriculture and Hoa Binh Province

Implementing Agency (Japanese Side): National Institute of Agrobiological Sciences, Yamaguchi University, National Institute of Animal Health, Institute of Livestock and Grassland Science, Itochu Feed Mills Co., Ltd.

Target Group: Researchers/Technicians of The National Institute of Animal Science, Institute of Biotechnology belonging to Vietnamese Academy of Science and Technology, Vietnam National University of Agriculture and Hoa Binh Province

Beneficiaries: Researchers/Technicians of The National Institute of Animal Science, Institute of Biotechnology belonging to Vietnamese Academy of Science and Technology, Vietnam National University of Agriculture, Hoa Binh Province and model farmers

Period of Project: 5 Years (2015-2020) Project Site: Hanoi City and Hoa Binh Province Model Site: Hoa Binh Province

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption
Overall Goal Biodiversity conservation system of Vietnamese native pigs is established.	1. Income of local farmers is increased through rearing native pig breeds. 2. Gene banks are operated at NIAS with the income from utilization of genetic resources. 3. A database of rare and native pig breeds in Vietnam is established.		
Project Purpose The conservation system *1 of Vietnamese native pigs for identification, assessment and utilization is established.	1. Strategy on how to apply the conservation system to other provinces than Hoa Binh is prepared. 2. Production of Vietnamese native pigs is continued by the model farmers. 3. The number of international publications with citation index.	· Site Inspection · Monitoring record/Progress report by the Project · Hearings from stakeholders	·There is no serious troubles with liquid nitrogen tanks for cryo-preservation due to long lasting blackout. ·There is no significant turnover of trained researchers/technicians.
Outputs 1. A database and cryo-bank system based on lineage analysis of Vietnamese native pigs is established.	1-1. A database of survey results on identification, classification and characterization of at least xx native breeds, and a biological information management system are established. 1-2. Semen from Vietnamese native pigs (3 lines for xx breeds each) are cryo-preserved. 1-3. Regulations for distribution and utilization of genetic resources/information are enacted.		·Serious disease does not spread all over Vietnam.
2. Reproductive techniques from semen and/or embryos are developed.	2-1. In vitro embryo production rate reaches about 10% for native pigs 2-2. Survival rates after cryopreservation of native pig oocytes and embryos reach about 50% and 30%, respectively. 2-3. Blastocysts are produced after cloning in native pig breeds. 2-4. Piglets are produced by embryo transfer.		
3.The methodology of utilizing Vietnamese native pig genetic resources (preventive measures against infectious disease and establishment of production system) are developed.	3-1.PERV-free or low copy-PERV<*2 Vietnamese native pigs are identified and produced by the Vietnamese CPs. 3-2. Quarantine facilities and equipment are introduced and researchers and technicians are trained. 3-3. Isolated farming method is developed to adapt the standard of Japanese quarantine requirements. 3-4. Trainings are conducted by Vietnamese CPs to the model farmers (subject and the number of trainings) 3-5. Piglet production efficacy of Vietnamese native pigs reared by the model farmers is about one-head increase per sow in a year.		

Activities	Inputs		Pre-Conditions
	The Japanese Side	The Vietnam Side	
1-1. Identify and classify Vietnamese native pigs. 1-2. Establish a database of Vietnamese native pigs. 1-3. Set up rules of database and cryo-bank system management. 1-4. Install cryo-preservation equipment. 1-5. Conduct trainings on cryo-preservation of semen. 1-6. Maintain the equipment for cryopreservation. 2-1. Develop in vitro embryo production system for native pig breeds. 2-2. Develop cryopreservation methods for oocytes and embryos of native pig breeds. 2-3. Develop techniques for cloned embryo production of native pig breeds. 2-4. Develop the embryo transfer methods. 3-1. Strengthen reproduction/breeding techniques of PERV-free or low copy-PERV 3-1-1. Enhance capacities for detecting PERV and breeding based on DNA analysis (RT-PCR, FISH and etc). 3-1-2. Conduct reproduction and breeding of PERV-free or low copy-PERV Vietnamese native pigs. 3-2. Facilitate the necessary quarantine conditions for exporting PERV-free or low copy-PERV Vietnamese native pigs. 3-2-1. Improve and standardize the technology for detection and prevention of serious porcine diseases. 3-2-2. Choose a site for setting up farming facilities in accordance with quarantine requirements. 3-2-3. Introduce methodologies for operation and maintenance of quarantine facilities and an isolation farming. 3-3. Conduct technical guidance to local technicians, para-vets etc. for improvement of income of model farmers for breeding Vietnamese native pigs. 3-3-1. Set up criteria for selection of model farmers. 3-3-2. Select model farmers for demonstrating new technologies. 3-3-3. Conduct technical guidance on animal husbandry and veterinary measures to local extention workers, para-vets etc. to train model farmers. 3-3-4. Improve methods for boar selection and AI technologies. 3-3-5. Develop a model of labeling to indicate the origin for native pigs.	1. Dispatch of Japanese researchers as experts in specific fields 2. Dispatch of a Japanese project coordinator 3. Receiving Vietnamese researchers in Japan 4. Provision of equipment and materials necessary for the Project 5. Necessary expenses, except for the running cost, for the collaborative research activities	1. Services of counterpart researchers and administrative personnel 2. Provision of facilities necessary for the implementation of the Project: e.g. office space for researchers; laboratory for cryo-preservation of gene cells, etc. 3. Arrangement of the existing equipment utilized for research activities of the Project 4. Replacement of machinery, equipment, instruments, vehicles, tools, spare parts and any other materials necessary for the implementation of the Project other than the equipment provided by JICA 5.C/P fund	**Preconditions** ・Provincial livestock farmers agree to participate in the trainings for native pig breeding ・Candidate model farmers agree to participate in the Project activates.

<*1:The conservation system is comprised of i) a database and cryo-preservation system based on lineage analysis of Vietnamese native pig, 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)

<*2:PERV Porcine Endogenous Retrovirus

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Project Design Matrix

Version 1

Project Title: Establishment of cryo-bank system for Vietnamese native pig resources and ~~of~~ sustainable production system to conserve bio-diversity

Dated 23 OCT, 2015

Implementing Agency (Vietnamese Side): The National Institute of Animal Science,Institute of Biotechnology belonging to Vietnamese Academy of Science and Technology, Vietnam National University of Agriculture and Hoa Binh Province

Implementing Agency (Japanese Side): National Institute of Agrobiological Sciences, Tokushima University, National Institute of Animal Health, Institute of Livestock and Grassland Science, Itochu Feed Mills Co., Ltd.

Target Group: Researchers/Technicians of The National Institute of Animal Science, Institute of Biotechnology belonging to Vietnamese Academy of Science and Technology, Vietnam National University of Agriculture and Hoa Binh Province

Beneficiaries: Researchers/Technicians of The National Institute of Animal Science, Institute of Biotechnology belonging to Vietnamese Academy of Science and Technology, Vietnam National University of Agriculture, Hoa Binh Province and model farmers

Period of Project: 5 Years (2015-2020) Project Site: Hanoi City and Hoa Binh Province Model Site: Hoa Binh Province

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption
Overall Goal Biodiversity conservation system of Vietnamese native pigs is established.	1. Income of local farmers is increased through rearing native pig breeds. 2. Gene banks are operated at NIAS with the income from utilization of genetic resources. 3. A database of rare and native pig breeds in Vietnam is established.		
Project Purpose The conservation system <*1 of Vietnamese native pigs for identification, assessment and utilization is established.	1. Strategy on how to apply the conservation system to other provinces than Hoa Binh is prepared. 2. Production of Vietnamese native pigs is continued by the model farmers. 3. The number of international publications with citation index.	・Site Inspection ・Monitoring record/Progress report by the Project ・Hearings from stakeholders	・There is no serious troubles with liquid nitrogen tanks for cryo-preservation due to long lasting blackout. ・There is no significant turnover of trained researchers/technicians.
Outputs 1. A database and cryo-bank system based on lineage analysis of Vietnamese native pigs is established.	1-1. A database of survey results on identification, classification and characterization of at least 16 native breeds, and a biological information management system are established. 1-2. Semen from Vietnamese native pigs (3 lines for 6 breeds each) are cryo-preserved. 1-3. Regulations for distribution and utilization of genetic resources/information are enacted.		・Serious disease does not spread all over Vietnam.
2. Reproductive techniques from semen and/or embryos are developed.	2-1. In vitro embryo production rate reaches about 10% for native pigs 2-2. Survival rates after cryopreservation of native pig oocytes and embryos reach about 30% and 50%, respectively. 2-3. Blastocysts are produced after cloning in native pig breeds. 2-4. Piglets are produced by embryo transfer.		
3.The methodology of utilizing Vietnamese native pig genetic resources (preventive measures against infectious disease and establishment of production system) are developed.	3-1.PERV-free or low copy-PERV<*2 Vietnamese native pigs are identified and produced by the Vietnamese CPs. 3-2. Quarantine facilities and equipment are introduced and researchers and technicians are trained. 3-3. Isolated farming method is developed to adapt the standard of Japanese quarantine requirements. 3-4. Trainings are conducted by Vietnamese CPs to the model farmers (subject and the number of trainings) 3-5. Piglet production efficacy of Vietnamese native pigs reared by the model farmers is about one-head increase per sow in a year.		

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Activities	Inputs		Pre-Conditions
	The Japanese Side	The Vietnam Side	
1-1. Identify and classify Vietnamese native pigs. 1-2. Establish a database of Vietnamese native pigs. 1-3. Set up rules of database and cryo-bank system management. 1-4. Install cryo-preservation equipment. ~~1-5. Conduct trainings on cryo-preservation of semen.~~ 1-5. Maintain the equipment for cryopreservation. 2-1. Develop in vitro embryo production system for native pig breeds. 2-2. Develop cryopreservation methods for oocytes and embryos of native pig breeds. 2-3. Develop techniques for cloned embryo production of native pig breeds. 2-4. Develop the embryo transfer methods. 3-1. Strengthen reproduction/breeding techniques of PERV-free or low copy-PERV 3-1-1. Enhance capacities for detecting PERV and breeding based on DNA analysis (RT-PCR, FISH and etc). 3-1-2. Conduct reproduction and breeding of PERV-free or low copy-PERV Vietnamese native pigs. 3-2. Facilitate the necessary quarantine conditions for exporting PERV-free or low copy-PERV Vietnamese native pigs. 3-2-1. Improve and standardize the technology for detection and prevention of serious porcine diseases. 3-2-2. Choose a site for setting up farming facilities in accordance with quarantine requirements. 3-2-3. Introduce methodologies for operation and maintenance of quarantine facilities and an isolation farming. 3-3. Conduct technical guidance to local technicians, para-vets etc. for improvement of income of model farmers for breeding Vietnamese native pigs. 3-3-1. Set up criteria for selection of model farmers. 3-3-2. Select model farmers for demonstrating new technologies. 3-3-3. Conduct technical guidance on animal husbandry and veterinary measures to local extention workers, para-vets etc. to train model farmers. 3-3-4. Improve methods for boar selection and AI technologies using fresh semen. 3-3-5. Develop a model of labeling to indicate the origin for native pigs.	1. Dispatch of Japanese researchers as experts in specific fields 2. Dispatch of a Japanese project coordinator 3. Receiving Vietnamese researchers in Japan 4. Provision of equipment and materials necessary for the Project 5. Necessary expenses, except for the running cost, for the collaborative research activities	1. Services of counterpart researchers and administrative personnel 2. Provision of facilities necessary for the implementation of the Project: e.g. office space for researchers; laboratory for cryo-preservation of gene cells, etc. 3. Arrangement of the existing equipment utilized for research activities of the Project 4. Replacement of machinery, equipment, instruments, vehicles, tools, spare parts and any other materials necessary for the implementation of the Project other than the equipment provided by JICA 5.C/P fund	**Preconditions** ・Provincial livestock farmers agree to participate in the trainings for native pig breeding ▪Candidate model farmers agree to participate in the Project activates.

<*1:The conservation system is comprised of i) a database and cryo-preservation system based on lineage analysis of Vietnamese native pig, 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)

<*2：PERV Porcine Endogenous Retrovirus

PDM (version 2) Date: 7/6/2018

Project Title: Establishment of cryo-bank system for Vietnamese native pig resources and sustainable production system to conserve bio-diversity

Implementing Agency (Vietnamese Side): The National Institute of Animal Science,Institute of Biotechnology belonging to Vietnamese Academy of Science and Technology, Vietnam National University of Agriculture and Department of Agriculture and Rural Development, Hoa Binh Province

Implementing Agency (Japanese Side): Institute of Agrobiological Sciences, NARO, National Institute of Animal Health, NARO, Institute of Livestock and Glassland Science, NARO, Tokushima University, Itochu Feed Mills Co., Ltd.

Target Group: Researchers/Technicians of the National Institute of Animal Science (NIAS), Institute of Biotechnology belonging to Vietnamese Academy of Science and Technology (IBT-VAST), Vietnam National University of Agriculture (VNUA) and Hoa Binh Province

Beneficiaries: Researchers/Technicians of NIAS, IBT-VAST, VNUA, Hoa Binh Province and model farmers

Period of Project: 5 Years (2015-2020)

Project Site: Hanoi City and Hoa Binh Province

Model Site: Hoa Binh Province

Narrative Summary		Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal				
Biodiversity conservation system of Vietnamese native pigs is established. *3*6		1.The gene banking system of Vietnamese native pigs is operated (including the addition and distribution of gene resources) in NIAS. 2. Breeding is continued to produce at least one (1) head of Vietnamese native pig whose PERV *2 number is lower than that at the end of the Project. 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 6 communes.		2. Budget is secured for continued breeding.
Project Purpose				
The conservation system*1 of Vietnamese native pigs for identification, assessment and utilization is established.		1.Discussion on national operational plan of the conservation system has begun with MARD. 2. At least three (3) male and five (5) female Vietnamese native pigs, of which number of PERV copies is five (5) or less, are produced. 3. Technical guidelines for the raising management of Vietnamese native pigs are approved by Hoa Binh Province, DARD. 4.Ten (10) or more publications in international journals with citation index are coauthored by Vietnamese and Japanese researchers.		1. There is no serious troubles with liquid nitrogen tranks for cryo-preservation due to long lasting blackout. 2. There is no significant turnover of trained researchers/technicians.
Outputs				
1	**A database and cryo-bank system based on lineage analysis of Vietnamese native pigs is established.**	1-1. A database of survey results on identification, classification and characterization of at least 16 native breeds, and a biological information management system are established. 1-2.Semen from Vietnamese native pigs (3 lines for 6 breeds each) are cryopreserved. 1-3. The guidelines (rules for addition and management, etc) for the gene bank system are prepared.	(1) XX	Serious diseases do not spread all over Vietnam.
2	**Reproductive techniques from semen and/or embryos are developed.**	2-1. In vitro embryo production rate reaches about 10% for native pigs 2-2. Survival rates after cryopreservation of native pig oocytes and embryos reach over 30% and 50%, respectively. 2-3.Blastocysts are produced after cloning in native pig breeds. 2-4. Piglets are produced by embryo transfer.		
3	**The methodology of utilizing Vietnamese native pig genetic resources (preventive measures against infectious disease and establishment of production system) are developed. *4**	3-1-1. Technologies for production of PERV-free or low copy-PERV Vietnamese native pigs using the method(s) for identification and quantification of PERV gene copies are established. 3-1-2.Quarantine facilities and equipment are introduced and researchers and technicians are trained. 3-1-3. Isolation farming methods are developed to adapt to international quarantine requirements. 3-2-1. Technical Guidelines for the raising management of Vietnamese native pigs are developed. ~~3-2-2. Training materials are compiled.~~ 3-2-2~~3~~ The number of weaned Vietnamese native piglets reared by model farmers increase by one head per sow per year in comparison to that in 2015.	3-2: Research papers published in scientific journals	
Activities		**Inputs**		Issues and Countermeasures

Activities			Japan	Vietnam	
1-1.	Identify and classify Vietnamese native pigs.		1. Dispatch of Japanese researchers as experts in specific fields 2. Dispatch of a Japanese project coordinator 3. Receiving Vietnamese researchers in Japan 4. Provision of equipment and materials necessary for the Project 5. Necessary expenses, except for the running cost, for the collaborative research activities	1. Services of counterpart researchers and administrative personnel 2. Provision of facilities necessary for the implementation of the Project: e.g. office space for researchers; laboratory for cryo-preservation of gene cells, etc. 3. Arrangement of the existing equipment utilized for research activities of the Project 4. Replacement of machinery, equipment, instruments, vehicles, tools, spare parts and any other materials necessary for the implementation of the Project other than the equipment provided by JICA 5.C/P fund	
1-2.	Establish a database of Vietnamese native pigs.				
1-3.	Prepare an operational manual for the database and cryopreservation system.				
1-4.	Install cryopreservation equipment.				
1-5.	Maintain the equipment for cryopreservation.				
2-1.	Develop in vitro embryo production system for native pig breeds.				
2-2.	Develop cryopreservation methods for oocytes and embryos of native pig breeds.				
2-3.	Develop techniques for cloned embryo production of native pig breeds.				
2-4.	Develop the embryo transfer methods.				
3-1.	Technologies of reproduction and breeding of PERV-free or low copy-PERV Vietnamese native pigs in conformity to international animal health requirements are established.				
3-1-1.	Establish reproduction/breeding techniques for PERV-free or low copy-PERV Vietnamese native pigs				
	3-1-1-1	Develop technologies for detecting PERV and breeding based on DNA analyses.			
	3-1-1-2	Conduct reproduction and breeding of PERV-free or low copy-PERV Vietnamese native pigs.			
3-1-2.	Determine the necessary farming conditions for exporting PERV-free or low copy-PERV Vietnamese native pigs.				
	3-1-2-1	Improve and standardize the procedures for detection and prevention of serious porcine diseases in Vietnamese native pigs.			
	3-1-2-2	Choose a site for setting up isolation farming facilities in accordance with quarantine requirements.			
	3-1-2-3	Introduce and optimize methodologies for operation and maintenance of quarantine facilities and isolation farming.			
3-2.	A raising management system (hygiene, reproduction, nutrition, housing, etc.) optimum for Vietnamese native pigs is modelized on the basis of the interventions in Hoa Binh province.				
3-2-1	Set up criteria for selection of model farmers.				
3-2-2	Select model farmers for demonstrating new technologies.				
3-2-3	Optimize raising methods (hygiene, reproduction, nutrition, housing, etc) for Vietnamese native pigs to meet the farming convention and environment.				
3-2-4	Conduct training of trainers (TOT) using training materials to local extention workers, para-vets etc. on the optimized raising methods for Vietnamese native pigs .				
3-2-5	Improve methods for boar selection and artificial insemination (AI) technology using fresh semen.				
3-2-6	Develop ~~manuals~~ technical guidelines for ~~of~~ the raising management and AI technology of Vietnamese native pigs based on above 3-2-3, 3-2-4, and 3-2-5.				
3-2-7	Develop a model of labeling to indicate the origin for native pigs *5.				

Pre-conditions

1. Provincial livestock farmers agree to participate in the trainings for native pig breeding

2. Candidate model farmers agree to participate in the Project activates.

*1: The conservation system is comprised of i) a database and cryo-preservation system based on lineage analysis of Vietnamese native pig, 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)

*2: PERV Porcine Endogenous Retrovirus

*3, 4: The 3rd JCC, held on 7th November, 2017, agreed the Overall Goal can be recognized as "Biodiversity of Vietnamese native pigs is maintained by operating/based on the conservation system", and Output 3 can be divided to 2 parts as "Technologies of reproduction and breeding of PERV-
free or low copy-PERV Vietnamese native pigs in conformity to international animal health requirements are established"(Objectively Verifiable Indicators (OVIs): 3-1-1 ~ 3-1-3) and "A raising management system (hygiene, reproduction, nutrition, housing, etc.) optimum for Vietnamese native pigs is modelized on the basis of the interventions in the Hoa Binh province" (OVIs): 3-2-1 ~ 3-2-3), according to the recommendation by the Mid-term review team. OVIs for overall goal, project purpose and outputs, and also activities were reviewed and modified
as per the recommendation of the Mid-term review team.

Minutes of the 1st Joint Coordinating Committee Meeting

For the Project for Establishment of Cryo-Bank System for Vietnamese Native Pig Resources and Sustainable Production System to Conserve Bio-Diversity

The 1st Joint Coordinating Committee (hereinafter referred to as "JCC") Meeting for the Japan International Cooperation Agency (hereinafter referred to as "JICA") technical cooperation projects entitled "the Project for Establishment of Cryo-Bank System for Vietnamese Native Pig Resources and Sustainable Production System to Conserve Bio-Diversity" (hereinafter referred to as the Project) was held on 24 November 2015 at the National Institute of Animal Science (hereinafter referred to as "NIAS-V"), Hanoi, Vietnam. Through a series of discussions made during the meeting, JCC members represented by the Chief Representative of JICA Vietnam Office, and the Director General of NIAS-V, the Ministry of Agriculture and Rural Development (hereinafter referred to as "MARD"), agreed to the matters referred to in the document attached hereto.

Hanoi, 24 November 2015

for Mr. Mutsuya Mori
Chief Representative
JICA Vietnam Office

Dr. Nguyen Thanh Son
Director-General
National Institute of Animal Science,
Ministry of Agriculture and Rural Development

Attached Document

THE 1ST JCC MEETING MINUTES

ON 24 NOVEMBER 2015
AT NIAS-V, HANOI

Opening:

1. The 1st JCC meeting for the Project was held on 24 November at NIAS-V, Hanoi. The meeting was opened at 13:40 chaired by Dr. Nguyen Thanh Son, the Director General of NIAS-V, MARD. The meeting was attended by a total of 22 participants and the list of participants is attached hereto.
2. Project Director, Dr. Nguyen Thanh Son of NIAS-V gave opening remarks, referring to the objectives of the 1st JCC meeting, i.e., (1) review the progress (2) discuss issues (3) plan for the next year's activities.

Revisions of PDM and PO:

3. Dr. Kazuhiro Kikuchi, Project Leader, gave a presentation on PDM ver.1 and PO ver.1. Major different points between PDM ver.0 and ver.1 are as follows:
   (See annex I & II for PDM ver.1 and PO ver 1)

   (1) Activity 1-6: Conduct trainings of cryo-preservation of semen is deleted, as it would be included in Activity 1-5.
   (2) Activity 3-3-4: The word "using fresh semen" has been added, now to read "Improve methods for boar selection and AI technologies using fresh semen".
   (3) Indicators for 1.1, 1.2 and 2.2 have been fixed with target number.
4. Modification of PDM and PO was discussed and agreed upon by stakeholders during the kick-off workshop held in June 2015. The Project will be monitored and evaluated based on these indicators.
5. It was agreed that counting of the pig breeds ought to be done with flexibility, based on the DNA analysis. In Vietnam, no comprehensive study has been undertaken so far. It happens that pigs may look different but DNA may be the same, pigs may be registered as different, but the difference may be region only. As finding of breeds and DNA analysis are part of the project activities, we may change the number as the Project goes on, although the current target is 16 breeds.
6. It was also agreed that advocacy is very important. Most effective ways will be explored in consultation with NIAS-V, as it requires manpower. Exhibition to present project outcome (such as photo exhibition), seminar for general public, use of NIAS-V website with FAQ, reports from short-term training participants in Japan are some examples.

Overview of the Project, Current Status and Management, Monitoring and Reporting Mechanism:
(See annex III & IV for Project Organization Chart)

7. Project Manager, Prof. Vu Chi Cuong of NIAS-V gave a presentation on the Project overview, current status and management, monitoring and reporting mechanism.
8. As the feeding experiment progresses in Hoa Binh, one important point was raised in relation to the feed of the pigs, and that is the feed must be locally available and affordable by farmers.
9. Regarding management, monitoring and reporting mechanism. JCC is to be co-chaired by Project Director and Japanese Leader, under R/D. However, according to the Vietnamese Government Decree (No.38-2013) on *management and utilization of official development assistance (ODA) and concessional loans from donors*, it is to be chaired by Vice Minister of MARD. Therefore, it was agreed that the chairmanship would be changed to Vice Minister of MARD.
10. It was also agreed that JCC include representatives from VAST, which is a Governing agency of IBT, and Hoa Binh Province. For VAST, NIAS-V will follow by writing a letter to VAST requesting for their membership in JCC and submit it to MARD approval.
11. Discussion was held as to if MOF should be included in JCC. While it is good to have MOF in JCC, the past experiences indicate that MOF will practically not attend JCC meeting. Hence, MOF will not be added in JCC but instead, JCC Minutes will be shared with MOF with support from MPI.
12. PMU (Project Management Unit) will be formed with CMU (Component Management Unit) 1, CMU 2, CMU 3, and CMU 4. In the R/D, they are called as PMU 1, PMU 2, PMU 3 and PMU 4 under PMU. However, it is more appropriate to call it CMU 1, CMU 2, CMU 3, and CMU 4, as per each output of PDM.
13. PMU will be headed by the Project Director and the Japanese Leader. There main responsibilities are to:
    - Examine detailed activity plans of each research subject.
    - Monitor the progress of project activities.
    - Discuss any other issues ensuring the smooth implementation of the Project.
14. PMU is expected to meet quarterly, at the beginning of each quarter, and submit a report to JCC at the end of each quarter. Membership of PMU was agreed as below, based on R/D, but with new additions in Vietnamese side.
    - Project Manager (namely Project Deputy Director as in the Vietnamese regulation)
    - National Project Coordinator (new addition)
    - Financial Project Manager (new addition, as needed for C/P budget monitoring and execution)
    - Representative from VNUA
    - Representative from IBT
    - Representative from Hoa Binh DARD (new addition)
    - Representative each from 5 Japanese institutions
    - Project coordinator of JICA
15. CMU is responsible to implement activities and provide technical support.

    CMU 1 deals with activities 1 and 3-1 in PDM and its members include:
    - Researcher(s) representative of NIAS-J
    - Researcher(s) representative of NIAS-V

CMU 2 deals with activities 2 in PDM and its members include:

- Researcher(s) representative of NILGS
- Researcher(s) representative of TU
- Researcher(s) representative of NIAS-V
- Researcher(s) representative of IBT-VAST
- Researcher(s) representative of VNUA

CMU 3 deals with activities 3-2 in PDM and its members include:

- Researcher(s) representative of NIAH
- Researcher(s) representative of IFM
- Researcher(s) representative of NIAS-V
- Researcher(s) representative of VNUA

CMU 4 deals with activities 3-3 in PDM and its members include:

- Researcher(s) representative of TU
- Researcher(s) representative of NIAH
- Researcher(s) representative of IFM
- Researcher(s) representative of NIAS-J
- Researcher(s) representative of NIAS-V
- Researcher(s) representative of VNUA
- Researcher(s) representative of Hoa Binh DARD

16. Each CMU (1-4) is expected to meet once at the beginning of the month to share update and information, and discuss issues if any and come up with solutions. Representative of each CMU will be appointed and submit a monthly report to PMU on the last day of the month.
17. JICA will write a letter to MARD with cc to NIAS-V that 5 Japanese institutions will be represented both in PMU and CMU in accordance to R/D. Based on the letter, NIAS-V will write to MARD to inform the changes for approval.
18. Monitoring sheet, which is a standard reporting format of JICA, will be submitted to JICA bi-annually. National Project Coordinator in cooperation with PMU members will coordinate preparation of the monitoring sheet based on the report from each CMU for submission to JICA.
19. All reports will be submitted both in English and Vietnamese and in hard copy and electronic copy.

Counterpart Budget of IBT/VAST and Hoa Binh :

20. Regarding the C/P Budget of IBT, the situation is very complex. VAST is the supervising agency of IBT, hence the C/P budget for IBT is expected come from VAST. However, VAST can't give IBT C/P budget due to late submission, as the Project C/P budget is already approved under MARD and VAST can't request MOF to give a separate C/P budget for IBT under the same Project name. The only way for VAST to give C/P budget is either MOF approves it, OR, if not, IBT applies for VAST as a research project.
21. IBT will write a report to VAST including the counterpart budget request. Then, VAST will request MOF to decide either through Project (MARD) or VAST. If MOF can't give C/P budget to Project, then VAST will approve it as IBT research project. In such case, IBT is expected to get C/P from FY2017.

22. Dr. Quyen, Vice Director of IBT affirms that IBT Management aware of the situation and has been giving support to the project since the kickoff meeting held in June, 2015 and that it is using its own budget to implement the project so far and that it will continue to do so. However, given that VAST C/P budget, if proved, starts only in FY2017, a question was asked if JICA can support IBT.
23. JICA will not be in the position to help IBT to solve the problem of C/P budget. If IBT can't get C/P budget from VAST, it should be discussed in JCC and/or PMU again. If IBT requires support from JICA in FY2016, it should write to JICA with clear indication of IBT commitment and the gap.
24. NIAS-V and IBT reaffirm that two institutions agree with technical research areas of cooperation between them and that the issue of C/P budget will not affect implementation and both will work under CMU2 for report to PMU. The C/P budget that NIAS-V applied is just for NIAS-V and VNUA activities, NIAS-V can send a letter to help IBT-VAST apply the C/P budget for IBT activities
25. It was affirmed by the Chairman that the C/P Budget for Hoa Binh Province will not be difficult, as it will be allocated from FY2016, once the amount of equipment and chemicals becomes clear, as it forms the basis for C/P budget.
26. According to Mr. Nguyen Anh Long, the Representative from Planning Department of MARD, in the new Public Investment Law (2015), any ODA project approved by the Prime Minister's Office can get C/P budget. There are many institutions unaware of the new regulation and therefore not getting C/P budget. IBT should submit the requirements through VAST in 2016 in order to get C/P budget for FY2017 and the following years.

Presentation on Equipment and Training:

27. Equipment and training plan was presented by Dr. Kikuchi and agreed (See Annex V for equipment list).
28. When the equipment has landed at Hai Phong Port around 20th February, 2016, it will be handed over to the Vietnamese C/P. Quality of the equipment during transport up to the Port is ensured by monitoring shock watch installed in the package. In case the equipment was found not functioning, despite no unusual signs by shock watch, we will discuss the case at that time. Some equipment has warranty while some not. For NIKON, installation support may be arranged in the next FY.
29. According to the Vietnamese Government Decree (No.38-2013) on *management and utilization of official development assistance (ODA) and concessional loans from donors,* approval must be obtained from the Government for any additional equipment. NIAS-V has already requested to the Government for the equipment. As the same rule will apply for the chemicals, NIAS-V will require a packing list for processing of tax exemption.
30. Timely processing of tax exemption is requested to Vietnamese side in order to avoid demurrage at Port. All agencies are requested to be present in Hai Phong Port for checking and receiving the equipment. NIAS-V will transport the equipment to NIAS Hanoi from where each agency is responsible to transport to the final destination.
31. Additional equipment for next year will be discussed later.

32. For short-term training during this fiscal year (21 Feb – 19 March 2016), four trainees are invited; three from NIAS-V and one from IBT (See Annex VI for training list). NIAS-V and IBT will reply officially to JICA Vietnam. For long-term training, two candidates; one from IBT and another from VNUA were agreed.

Plan for Fiscal Year 2016:

33. Plan for the remaining activities of Fiscal Year 2015 (December 2015 – March 2015) and Fiscal Year 2016 (April 2016 – March 2017) was presented by Project Manager in accordance with PO ver 1.
34. While JCC is to meet once a year, it is recommended to meet twice a year. The next schedule will be in May – June 2016. PMU will meet quarterly via skype to enable Japanese members to participate. While CMU will meet monthly, it will endeavor to meet more frequently in the beginning, i.e. twice monthly. It may be difficult for Hoa Binh DARD to attend bi-weekly due to distance. However, other means of communication such as email will maximize regular communication.

Any Other Issues :

35. Dr. Kikuchi, Project Leader said as a technical cooperation project of the Japanese Government, technical transfer is an important element of the Project. The Project will focus on the following areas of technical transfer in order to develop human resources in Vietnam.
    - DNA analysis
    - Lineage analysis
    - Sperm freezing
    - In vitro embryo production
    - Oocyte/embryo vitrification
    - Zygote/embryo transfer to recipients
    - Diagnosis techniques of major porcine diseases for quarantine
    - Risk analysis of hygiene condition for pig production
36. Dr. Kikuchi further said that the Project also undertakes advanced research activities, some of which are quite challenging, i.e., cloning (somatic cell nuclear transfer), finding or breeding of PERV-free pigs, establishment of quarantine procedure for exporting pigs to Japan, and AI in Hoa Binh. Successful achievements of these depend on various factors.
37. Referring to the selection of model farmers in Hoa Binh Province, Dr. Otoi recommends to select a few farmers from three districts of Hoa Binh Province (Hoa Binh, Da Bac and Lac Son), based on the Hoa Binh data.
38. Dr. Otoi further said that labeling and branding activities will be carried out by Hoa Binh Province. He requested for more collaboration from Hoa Binh DARD in overall Project activities.

CLOSING REMARKS:

39. On behalf of Chief Representative of JICA Vietnam Office, Ms. Akiko Fujita, Representative of JICA Vietnam gave closing remarks. Thanking for productive discussions, she said from experiences of other SATREPS Projects, success of the Project largely depends on effective coordination among the various stakeholders. The Project stakeholders are already engaged in much discussion, more will need to be done especially with Hoa Binh Province. 6 months have passed since the beginning of the Project, which is equal to one tenth of the Project. JICA will look forward to hear progress in the next JCC Meeting.
40. Dr. Son, chairing the 1st JCC Meeting, concluded the meeting, highlighting the major points agreed upon. This is a new kind of project and it is challenging. In the beginning we did not know how to solve the issue, but now we are coming to understand the Project and understand each other. Major points are:
    - PDM ver 1 and PO ver 1 endorsed with indicators
    - JCC with modification and addition will take effect from the next JCC. JICA should send a letter to MARD for additional of members as in the RD and NIAS-V will undertake necessary procedures.
    - C/P budget for IBT to be worked out under PMU. IBT should prepare a budget plan and submit to VAST. IBT should also send a letter to JICA to ask for support.
    - Tax exemption of equipment procedures and transport to Hanoi by NIAS-V while transport from NIAS-V by each agency. Any risk that might occur from the Port to Hanoi will be handled jointly by the Vietnamese agencies. List of chemicals planned for purchase during this fiscal year is needed urgently for approval for tax free.
    - FY2016 activities and equipment including liquid nitrogen with generator and vehicles.
    - Short-term training and long-term training, time, duration and number agreed
    - Areas of technical transfer and challenging research areas will be considered when making action plan for next year.
    - Management, monitoring and reporting mechanism and scheduling
41. At closing, Dr. Son said that we will work together to implement the Project effectively. Not only the members but also leaders of institutions will always communicate so that in case any problems we can solve the problems very quickly.
42. The meeting was adjourned at 17:30.

END

ANNEX:

i. PDM Version 1
ii. PO Version 1
iii. Project Organization Chart
iv. PMU and CMU Structure
v. Equipment List
vi. Training List
vii. Agenda
viii. Participant List

Project Design Matrix

Version 1

Project Title: Establishment of cryo-bank system for Vietnamese native pig resources and sustainable production system to conserve bio-diversity

Dated 24 NOV, 2015

Implementing Agency (Vietnamese Side): The National Institute of Animal Science,Institute of Biotechnology belonging to Vietnamese Academy of Science and Technology, Vietnam National University of Agriculture and Hoa Binh Province

Implementing Agency (Japanese Side): National Institute of Agrobiological Sciences, Tokushima University, National Institute of Animal Health, Institute of Livestock and Grassland Science, Itochu Feed Mills Co., Ltd.

Target Group: Researchers/Technicians of The National Institute of Animal Science, Institute of Biotechnology belonging to Vietnamese Academy of Science and Technology, Vietnam National University of Agriculture and Hoa Binh Province

Beneficiaries: Researchers/Technicians of The National Institute of Animal Science, Institute of Biotechnology belonging to Vietnamese Academy of Science and Technology, Vietnam National University of Agriculture, Hoa Binh Province and model farmers

Period of Project: 5 Years (2015-2020) Project Site: Hanoi City and Hoa Binh Province Model Site: Hoa Binh Province

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption
Overall Goal Biodiversity conservation system of Vietnamese native pigs is established.	1. Income of local farmers is increased through rearing native pig breeds. 2. Gene banks are operated at NIAS with the income from utilization of genetic resources. 3. A database of rare and native pig breeds in Vietnam is established.		
Project Purpose The conservation system <*1 of Vietnamese native pigs for identification, assessment and utilization is established.	1. Strategy on how to apply the conservation system to other provinces than Hoa Binh is prepared. 2. Production of Vietnamese native pigs is continued by the model farmers. 3. The number of international publications with citation index.	・Site Inspection ・Monitoring record/Progress report by the Project ・Hearings from stakeholders	・There is no serious troubles with liquid nitrogen tanks for cryo-preservation due to long lasting blackout. ・There is no significant turnover of trained researchers/technicians.
Outputs 1. A database and cryo-bank system based on lineage analysis of Vietnamese native pigs is established.	1-1. A database of survey results on identification, classification and characterization of at least 16 native breeds, and a biological information management system are established. 1-2. Semen from Vietnamese native pigs (3 lines for 6 breeds each) are cryo-preserved. 1-3. Regulations for distribution and utilization of genetic resources/information are enacted.		・Serious disease does not spread all over Vietnam.
2. Reproductive techniques from semen and/or embryos are developed.	2-1. In vitro embryo production rate reaches about 10% for native pigs 2-2. Survival rates after cryopreservation of native pig oocytes and embryos reach about 30% and 50%, respectively. 2-3. Blastocysts are produced after cloning in native pig breeds. 2-4. Piglets are produced by embryo transfer.		
3.The methodology of utilizing Vietnamese native pig genetic resources (preventive measures against infectious disease and establishment of production system) are developed.	3-1.PERV-free or low copy-PERV<*2 Vietnamese native pigs are identified and produced by the Vietnamese CPs. 3-2. Quarantine facilities and equipment are introduced and researchers and technicians are trained. 3-3. Isolated farming method is developed to adapt the standard of Japanese quarantine requirements. 3-4. Trainings are conducted by Vietnamese CPs to the model farmers (subject and the number of trainings) 3-5. Piglet production efficacy of Vietnamese native pigs reared by the model farmers is about one-head increase per sow in a year.		

Activities	Inputs		Pre-Conditions
	The Japanese Side	**The Vietnam Side**	
1-1. Identify and classify Vietnamese native pigs. 1-2. Establish a database of Vietnamese native pigs. 1-3. Set up rules of database and cryo-bank system management. 1-4. Install cryo-preservation equipment. 1-5. Maintain the equipment for cryopreservation. 2-1. Develop in vitro embryo production system for native pig breeds. 2-2. Develop cryopreservation methods for oocytes and embryos of native pig breeds. 2-3. Develop techniques for cloned embryo production of native pig breeds. 2-4. Develop the embryo transfer methods. 3-1. Strengthen reproduction/breeding techniques of PERV-free or low copy-PERV 3-1-1. Enhance capacities for detecting PERV and breeding based on DNA analysis (RT-PCR, FISH and etc). 3-1-2. Conduct reproduction and breeding of PERV-free or low copy-PERV Vietnamese native pigs. 3-2. Facilitate the necessary quarantine conditions for exporting PERV-free or low copy-PERV Vietnamese native pigs. 3-2-1. Improve and standardize the technology for detection and prevention of serious porcine diseases. 3-2-2. Choose a site for setting up farming facilities in accordance with quarantine requirements. 3-2-3. Introduce methodologies for operation and maintenance of quarantine facilities and an isolation farming. 3-3. Conduct technical guidance to local technicians, para-vets etc. for improvement of income of model farmers for breeding Vietnamese native pigs. 3-3-1. Set up criteria for selection of model farmers. 3-3-2. Select model farmers for demonstrating new technologies. 3-3-3. Conduct technical guidance on animal husbandry and veterinary measures to local extention workers, para-vets etc. to train model farmers. 3-3-4. Improve methods for boar selection and AI technologies using fresh semen. 3-3-5. Develop a model of labeling to indicate the origin for native pigs.	1. Dispatch of Japanese researchers as experts in specific fields 2. Dispatch of a Japanese project coordinator 3. Receiving Vietnamese researchers in Japan 4. Provision of equipment and materials necessary for the Project 5. Necessary expenses, except for the running cost, for the collaborative research activities	1. Services of counterpart researchers and administrative personnel 2. Provision of facilities necessary for the implementation of the Project: e.g. office space for researchers; laboratory for cryo-preservation of gene cells, etc. 3. Arrangement of the existing equipment utilized for research activities of the Project 4. Replacement of machinery, equipment, instruments, vehicles, tools, spare parts and any other materials necessary for the implementation of the Project other than the equipment provided by JICA 5.C/P fund	**Preconditions** ・Provincial livestock farmers agree to participate in the trainings for native pig breeding ・Candidate model farmers agree to participate in the Project activates.

<*1:The conservation system is comprised of i) a database and cryo-preservation system based on lineage analysis of Vietnamese native pig, 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)

<*2：PERV Porcine Endogenous Retrovirus

Annex II

Plan of Operation

Version 1
Dated Novembr 24, 2015

Project Title: Establishment of cryo-bank system for Vietnamese native pig resources and sustainable production system to conserve bio-diversity

Inputs		Plan / Actual	1st Year I–IV	2nd Year I–IV	3rd Year I–IV	4th Year I–IV	5th Year I–IV	8th Year I–IV	Remarks	Monitoring: Issue	Monitoring: Solution
Expert											
Kazuhiro KIKUCHI	General management/Cryo-bank system and semen freezing	Plan							NIAS-J(National Institute of Agrobiological Sciences)		
		Actual									
Satoshi MIKAWA	Identify and classify Vietnamese native pigs								NIAS-J(National Institute of Agrobiological Sciences)		
Aisaku ARAKAWA	Identify and classify Vietnamese native pigs	Plan							NIAS-J(National Institute of Agrobiological Sciences)		
		Actual									
Masaaki TANIGUCHI	Identify and classify Vietnamese native pigs	Plan							NIAS-J(National Institute of Agrobiological Sciences)		
		Actual									
Shinya ISHIHARA	Cryo-bank system, semen freezing and DNA analysis	Plan							NIAS-J(National Institute of Agrobiological Sciences)		
		Actual									
Thanh Q. DANG-NGUYEN	Cryo-bank system and semen freezing	Plan							NIAS-J(National Institute of Agrobiological Sciences)		
		Actual									
Tamas SOMFAI	Reproductive techniques from semen and/or embryos	Plan							NILGS(NARO Institute of Livestock and Grassland Science)		
		Actual									
Toshihiro OKAMURA	Breeding of PERV-free pigs	Plan							NILGS(NARO Institute of Livestock and Grassland Science)		
		Actual									
Takeshige OTOI	Technical guidance/ Cloned embryo production	Plan							TU(Tokushima University)		
		Actual									
Thanh Van Thanh	Selection of model farmers	Plan							TU(Tokushima University)		
		Actual									
Makoto OSAKI	Preventive measures against infectious disease /Technical guidance	Plan							NIAH(National Institute of Animal Health)		
		Actual									
Kenji KAWASHIMA	Preventive measures against infectious disease /Technical guidance	Plan							NIAH(National Institute of Animal Health)		
		Actual									
Satoshi HAYASHI	Technical guidance on animal husbandry and veterinary measures /production system	Plan							IFM(ITOCHU FEED MILLS CO., LTD.)		
		Actual									
Hideki WATANABE	Technical guidance on animal husbandry and veterinary measures /production system	Plan							IFM(ITOCHU FEED MILLS CO., LTD.)		
		Actual									
Shunsuke MASAZUMI	Technical guidance on animal husbandry and veterinary measures /production system	Plan							IFM(ITOCHU FEED MILLS CO., LTD.)		
		Actual									
Naoki KASHIWAZAKI	Technical guidance on embryo transfer	Plan							NIAH(National Institute of Animal Health)		
		Actual									
Equipment											
	Liquid nitrogen container	Plan							Activity 1.4		
		Actual									
	Liquid nitrogen generator	Plan							Activity 1.4		
		Actual									
	Multi-gas incubator	Plan							Activity 2.1 & 2.3		
		Actual									
	ELISA system	Plan							Activity 3.2		
		Actual									
	Real Time-PCR system	Plan							Activity 3.1		
		Actual									
	Manipulator/Inverted microscope	Plan							Activity 2.3		
		Actual									
	Fluorescence microscopy	Plan							Activity 2.3		
		Actual									
	Generator	Plan							Activity 1.4		
		Actual									
	Vehicle	Plan									
		Actual									
	Others necessary for Project	Plan									
		Actual									
Training in Japan											
	Short-term training (Diagnosis of Infectious disease) (1 from VNUA to NIAH)	Plan							Activity 3.2		
		Actual									
	Short-term training (Semen freezing) (1 from NIAS-V to NIAS-J)	Plan							Activity 1.1 - 1.3		
		Actual									
	Short-term training (data base arrangement) (1 from NIAS-V to NIAS-J) 2 month	Plan							Activity 1.1 - 1.3, 3.1		
		Actual									
	Short-term training (RT-PCR) (1 from NIAS-V to NIAS-J)	Plan							Activity 1.1 - 1.3, 3.1		
		Actual									
	Short-term training (microsatellite) (1 from NIAS-V to NIAS-J)	Plan							Activity 1.1 - 1.3, 3.1		
		Actual									
	Short-term training (FISH) (1 from NIAS-V to NIAS-J) 4 month	Plan							Activity 1.1 - 1.3, 3.1		
		Actual									
	Short-term training (In Vitro Embryo Production) (1 from IBT to NILGS)	Plan							Activity 2.2		
		Actual									
	Short-term training (cloning) (1 each from IBT and NIAS-V to Tokushima Univ)	Plan							Activity 2.3		
		Actual									
	Graduate students	Plan							Activity 1.1 - 1.3 & 2.1 - 4		
		Actual									
	Inspection (animal husbandry and branding) (ITOCHU/5HB)	Plan							Activity 3.2 & 3.3		
		Actual									
In-country/Third country Training											
	Technical guidance in Hoa Binh	Plan									

Activities / Sub-Activities		1st Year				2nd Year				3rd Year				4th Year				5th Year				8th Year				Responsible Organization		Achievements	Issue & Countermeasures
		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	Japan	GOV		
Technical guidance in Hoa Binh	Actual																												
Output 1: A database and cryo-bank system based on lineage analysis of Vietnamese native pigs is established.																													
1.1 Identify and classify Vietnamese native pigs.	Plan																									NIAS-J (Arakawa, Taniguchi, Ishihara)	NIAS-V		
	Actual																												
1.1.1 Primary sampling and data collection	Plan																												
	Actual																												
1.1.1.1 Develop data collection tools, data entry and management	Plan																												
	Actual																												
1.1.1.2 Sampling and field data collection	Plan																												
	Actual																												
1.1.2 Phylogenetic analysis	Plan																												
	Actual																												
1.1.3 Verification of Vietnamese native pig population	Plan																												
	Actual																												
1.1.3.1 Supporting of analyzing pedigree data from microsatellite, combining with data analysis of characteristics, distribution, drawing phylogenic tree (use neighbor joining or UPGMA methods)	Plan																												
	Actual																												
1.1.3.2 Training for data analysis in Vietnam (10 people/course/7 days)	Plan																												
	Actual																												
1.2 Establish a database of Vietnamese native pigs.	Plan																									NIAS-J (Arakawa, Taniguchi, Ishihara)	NIAS-V		
	Actual																												
1.2.1 Preparation of database construction	Plan																												
	Actual																												
1.2.2 Practical database construction	Plan																												
	Actual																												
1.2.2.1 Training on inputting data, direction for use, management, exploitation of database (2 courses * 5 days * 20 people) in NIAS	Plan																												
	Actual																												
1.2.2.2 Data input and data analysis	Plan																												
	Actual																												
1.3 Set up rules of database and cryo-bank system management.	Plan																									NIAS-J (Kikuchi, Ishihara)	NIAS-V		
	Actual																												
1.3.1 Set up manuals for conservation	Plan																												
	Actual																												
1.3.1.1 Supporting of developing regulating manuscript of operation and using, penetrating and exploiting decentralization of data combine with Japanese experts	Plan																												
	Actual																												
1.3.1.2 Workshop on introducing and development of operational manual in NIAS (20 people x 1 day)	Plan																												
	Actual																												
1.3.2 Establishment/distribution of manuals for conservation and distribution (Research Institutes, Univ, Nat'l/Prov Offices)	Plan																												
	Actual																												
1.3.2.1 Application manual of conservation and use of cryo-bank (20 people x 1 day)	Plan																												
	Actual																												
1.4 Install cryopreservation equipment.	Plan																									NIAS-J (Kikuchi)	NIAS-V		
	Actual																												
1.4.1. Selection of equipment	Plan																												
	Actual																												
1.4.2 Preparation of a cryo-bank room	Plan																												
	Actual																												
1.4.3 Purchase of equipment	Plan																												
	Actual																												
1.4.4 Set up of equipment	Plan																												
	Actual																												
1.5 Maintain the equipment for cryopreservation.	Plan																									NIAS-J (Kikuchi)	NIAS-V		
	Actual																												
1.5.1 Implementing protocols of collection, exploitation, preservation and testing semen	Plan																												
	Actual																												
1.5.2 Collection and freezing of semen	Plan																												
	Actual																												
1.5.3 Operation and maintenance of the equipment for-cryopreservation of the collected semen	Plan																												
	Actual																												

Annex II

Output 2: Reproductive techniques from semen and/or embryos are developed.					
2.1 Develop in vitro embryo production system for native pig breeds.	Plan	NILGS (Tamas)	IBT-VAST/VNUA		
	Actual				
2.1.1 Establishment of laboratory works (IBT-VAST laboratory)	Plan				
	Actual				
2.1.2 Improvement of in vitro embryo production system	Plan				
	Actual				
2.1.2.1 Optimization of IVF conditions for each frozen native sperm lots using landrace oocytes	Plan				
	Actual				
2.1.2.2 Applying protocols of IVM and IVF in the Lab for native pig breeds	Plan				
	Actual				
2.1.2.3 Production of blastocysts by IVM/IVF/IVC of native pig breeds	Plan				
	Actual				
2.1.3 Finalization of a standard protocol (manual)	Plan				
	Actual				
2.2 Develop cryopreservation methods for oocytes and embryos of native pig breeds.	Plan	NILGS (Tamas)	NIAS-V/VNUA		
	Actual				
2.2.1 Establishment of laboratory works	Plan				
	Actual				
2.2.2 Establishment of cryopreservation methods	Plan				
	Actual				
2.2.2.1 Practising vitrification technique using oocytes of slaugheterd landrace pigs	Plan				
	Actual				
2.2.2.2. Applying the procedure of vitrification on oocytes from native pigs	Plan				
	Actual				
2.2.2.3 Applying the procedure of vitrification for embryos from native pigs	Plan				
	Actual				
2.2.3 Finalization of a standard protocol (manual)	Plan				
	Actual				
2.3 Develop techniques for cloned embryo production of native pig breeds.	Plan	TU (Otoi)	IBT-VAST/VNUA/NIAS-V		
	Actual				
2.3.1 Establishment of laboratory works (VNUA/IBT-VAST/NIAS-V laboratory)	Plan				
	Actual				
2.3.2 Establishment of cloning method for native pigs	Plan				
	Actual				
2.3.2.1 Establishment of donor cell lines	Plan				
	Actual				
2.3.2.2 Establishment of nuclear transfer methods	Plan				
	Actual				
2.3.2.3 Establishment of culture for cloned embryos	Plan				
	Actual				
2.3.3 Finalization of a standard protocol (manual)	Plan				
	Actual				
2.4 Develop the embryo transfer methods.	Plan	TU (Otoi)	NIAS-V/VNUA		
	Actual				
2.4.1 Establishment of laboratory works (NIAS-V laboratory)	Plan				
	Actual				
2.4.2 Establishment of embryo transfer methods	Plan				
	Actual				
2.4.2.1 Practising oviductal transfer of 1-cell stage F1 embryos by surgery	Plan				
	Actual				
2.4.2.2 Oviductal transfer of 1-cell stage native pig embryos obtained by IVM/IVF	Plan				
	Actual				
2.4.2.3 Uterine trasfer by surgery of in-vivo derived native pig embryos	Plan				
	Actual				
2.4.3 Finalization of a standard protocol (manual)	Plan				
	Actual				

Output 3: The methodology of utilizing Vietnamese native pig genetic resources (preventive measures against infectious disease and establishment of production system) are developed					
3.1 Strengthen reproduction/breeding techniques of PERV-free or low copy-PERV.	Plan				
	Actual				
3.1.1 Enhance capacities for detecting PERV and breeding based on DNA analysis.(RT-PCR, FISH and etc).	Plan	NIAS-J (Taniguchi and Arakawa)	NIAS-V		
	Actual				
3.1.1.1 Primary and secondary sampling and data collection	Plan				
	Actual				
3.1.1.2 Identification of PERV loci in swine genome	Plan				
	Actual				
3.1.1.3 Make a list of the free or low PERV pigs	Plan				
	Actual				
3.1.2 Conduct reproduction and breeding of PERV-free or low copy-PERV Vietnamese native pigs .	Plan	NIAS-J/NILGS	NIAS-V		
	Actual				
3.1.2.1 Construction and investigation of DNA marker-assisted mating system	Plan	(Taniguchi, Arakawa, Okamura)			
	Actual				
3.1.2.1.1 Support for contact, select, marker (2 people + local staffs)	Plan				
	Actual				
3.1.2.1.2 Train for boar to exploit semen for hybriding	Plan				
	Actual				
3.1.2.1.3 Perform and monitor the hybrid, couple, mating to create pig line having free or low copy-PERV	Plan				
	Actual				
3.1.2.1.4 Support for caring, nurturing, monitoring pigs during breeding, reproduction(2 people x 3 years)	Plan				
	Actual				
3.1.2.2 Validation of PERV copy number	Plan	(Okamura)			
	Actual				
3.2 Facilitate the necessary quarantine conditions for exporting PERV-free or low copy-PERV Vietnamese native pigs.	Plan				
	Actual				
3.2.1 Improve and standardize the methods for detection and prevention of serious porcine diseases.	Plan	NIAH/IFM (Osaki, Kawashima, Hayashi)	VNUA		
	Actual				
3.2.1.1 Establishiment of the methods for sampling process and detection of porcine diseases	Plan				
	Actual				
3.2.1.2 Application of the methods at quarantine facillities and farming sites	Plan				
	Actual				
3.2.2 Choose a site for setting up farming facilities in accordance with quarantine requirements.	Plan	NIAH/IFM (Osaki, Kawashima, Hayashi)	NIAS-V/VNUA		
	Actual				
3.2.2.1 Set up criteria for selection	Plan				
	Actual				
3.2.2.2 Selection of candidative sites	Plan				
	Actual				
3.2.2.3 Examine the surrounding circumstance in detail	Plan				
	Actual				
3.2.3 Introduce methodologies for operation and maintenance of quarantine facilities and an isolation farming.	Plan	NIAH/IFM (Osaki, Kawashima, Hayashi)	NIAS-V/VNUA		
	Actual				
3.2.3.1 Develop operation manuals	Plan				
	Actual				
3.2.3.2 Pre training for personnels	Plan				
	Actual				
3.2.3.3 Design the quarantine facilities	Plan				
	Actual				

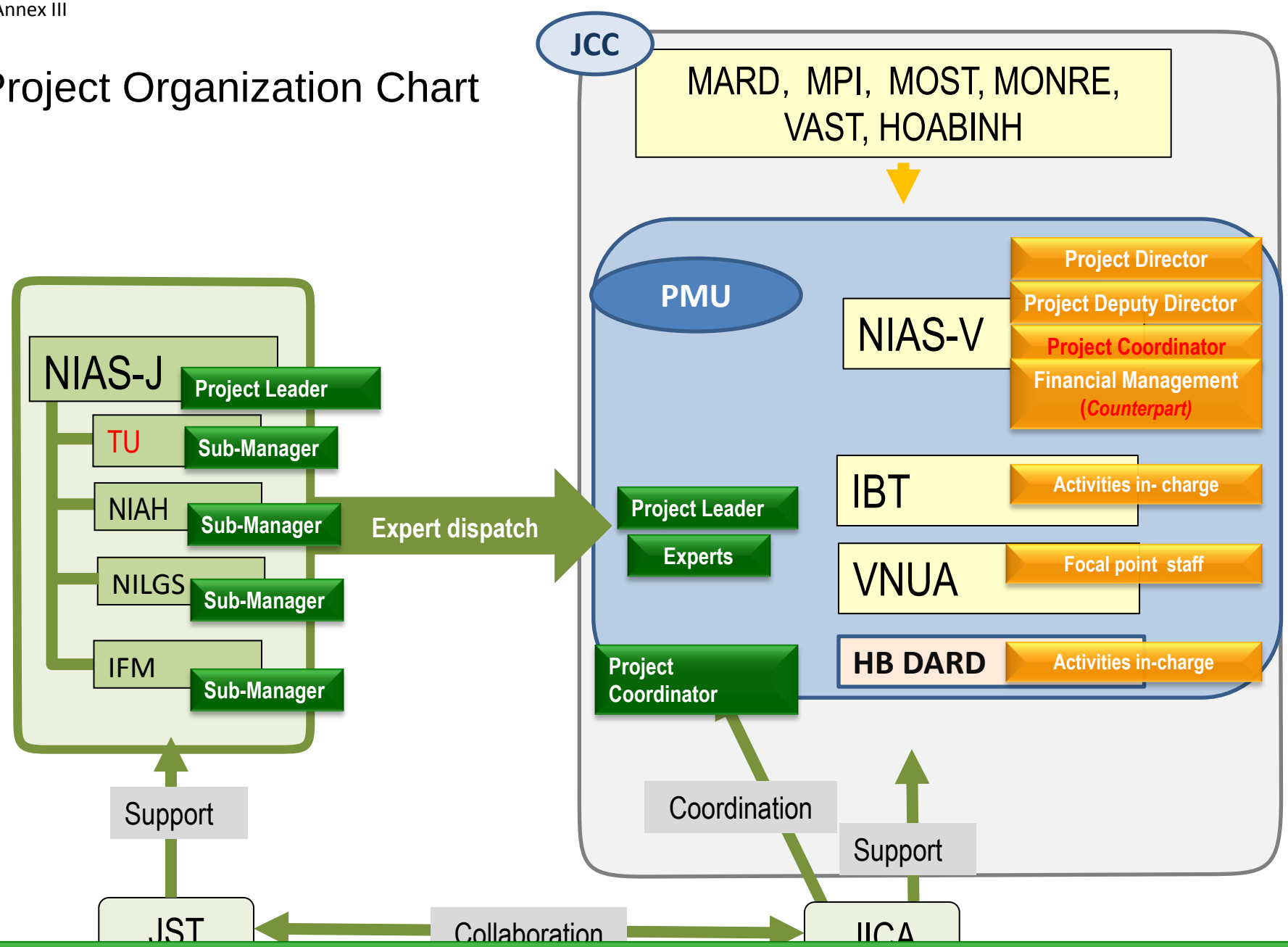
3.3 Conduct technical guidance to local technicians, para-vets etc. for improvement of income of model farmers for breeding Vietnamese native pigs	Plan			
	Actual			
3.3.1 Set up criteria for selection of model farmers	Plan	TU/NIAH/IFM (Otoi, Osaki, Kawashima, Hayashi)	NIAS-V/VNUA /HoaBinhDARD	
	Actual			
3.3.1.1 Data census for pig production in Hoa Binh	Plan		NIAS	
	Actual			
3.3.1.2 Develop criteria for selection of model farmers	Plan		NIAS	
	Actual			
3.3.1.3 The workshop on unifing selection criteria of model farmers, livestock husbandry models, requirements for participation, commitments of support, contribution of stakeholders in Hoa Binh	Plan		NIAS	
	Actual			
3.3.2 Select model farmers for demonstrating new technologies	**Plan**	TU/IFM/NIAH(Otoi, Hayashi, Osaki)	NIAS-V/VNUA /HoaBinhDARD	
	Actual			
3.3.2.1 Check the condition of the farmers who volunteer to participate and meet the requirements of becoming model farmers	**Plan**		NIAS	
	Actual			
3.3.2.2 Selection of model farmers in accordance with conditions and criteria	**Plan**		Committee	
	Actual			
3.3.2.2.1 Develop contracts with model farmers	**Plan**		NIAS / HB DARD	
	Actual			
3.3.2.2.2 Support for participations, discussion with participative farmers in the coordination of activities	**Plan**		Committee	
	Actual			
3.3.3 Conduct technical guidance on animal husbandry and veterinary measures to local extension workers, veterinarian, and para-vets etc. to train model farmers	**Plan**	TU/NIAH/IFM (Otoi, Osaki, Kawashima, Hayashi)	NIAS-V/VNUA /HoaBinhDARD	
	Actual			
3.3.3.1 Develop technical materials, handouts, etc. for vet, staff, extension staff, model farmers	**Plan**		NIAS	
	Actual			
3.3.3.2 Implementation of technical guidance on animal husbandry and veterinary measures to model farmers	**Plan**		VNUA	
	Actual			
3.3.3.3 Investigation of actual conditions of model farmers	**Plan**		NIAS	
	Actual			
3.3.3.3.1 Monitoring epidemic status and livestock production in pig	**Plan**		NIAS	
	Actual			
3.3.3.3.2 Risk assessment for the development of native pigs in Hoa Binh	**Plan**		NIAS	
	Actual			
3.3.3.4 Preliminary experiment of feeding on piglets	**Plan**		NIAS/HoaBinh DARD	
	Actual			
3.3.4 Improve methods for boar selection and AI technologies using fresh semen.	**Plan**	**TU**/NIAS-J/IFM (Otoi, Hayashi, Kikuchi)	NIAS-V/VNUA/HoaBinhDARD	
	Actual			
3.3.4.1 Selection and purchase of superior candidate boars	**Plan**		NIAS	
	Actual			
3.3.4.2 Collection and freezing of semen from superior candidate boars	**Plan**		NIAS	
	Actual			
3.3.4.3 Implementation of technical guidance on artificial insemination to veterinarians/para-vets in DARD using Hoa Binh breeding center	**Plan**		NIAS	
	Actual			
3.3.4.4 Development of manuals for artificial insemination	**Plan**		NIAS + VNUA	
	Actual			
3.3.5 Develop a model of labeling to indicate the origin for native pigs	**Plan**		NIAS-V /HoaBinhDARD	
	Actual			
3.3.5.1 set-up for cooperative network and operation of nucleus herd, comercial herds (pure and cross)	**Plan**			
	Actual			
3.3.5.2 Support for set up market chains	**Plan**			
	Actual			
3.3.5.3 develop collective branding	**Plan**			
	Actual			

Annex II

Duration / Phasing	Plan	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■							
	Actual																											
Monitoring Plan	Plan	1st Year				2nd Year				3rd Year				4th Year				5th Year				8th Year				Remarks	Issue	Solution
	Actual	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV			
Monitoring																												
Joint Coordinating Committee	Plan	●					●				●				●				●									
	Actual																											
Set-up the Detailed Plan of Operation	Plan	▲																										
	Actual																											
Submission of Monitoring Sheet	Plan		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲							
	Actual																											
Monitoring Mission from Japan	Plan	■										■								■								
	Actual																											
Post Monitoring	Plan																					■						
	Actual																											
Reports/Documents																												
Inception Report	Plan	▲																										
	Actual																											
Progress Report	Plan			▲				▲				▲				▲												
	Actual																											
Training Materials	Plan		▲					▲							▲													
	Actual																											
Project Completion Report	Plan																			▲								
	Actual																											
Public Relations																												
Establishment and Operation of web Site	Plan		▲																									
	Actual																											
Materials for public relations related the pig reproduction education	Plan			▲				▲				▲				▲												
	Actual																											
Symposium	Plan			▲																▲								
	Actual																											

Annex III

Project Organization Chart



NIAS-J: Viện Sinh học NN Nhật Bản, TU: Đại học Tukushima; NIAH: Viện Thú Y; NILGS: viện chăn nuôi đại gia súc và đồng cỏ; IFM: Công ty thức ăn chăn nuôi ITOCHU

VCN: NIAS-V ; VNCSH: IBT – VAST; HVNN: VNUA; HB-DARD: Hoa Binh Department of Agriculture and Rural Development.

Annex IV: Structural chart of PMU &CMU

JCC

Project Management Unit (PMU)

- Managers: **PD**(N.T.Son), **PDD**(V.C.Cuong), **NPC** (N.V.Thu), **FPM**(for CP budget. D.V Hien), **VNUA FP** (Long); to be added(Quyen-IBT); VD.Hung (Hoa Binh DARD)
- Japanese: **PL** (K.Kikuchi), **IPD** (N.Yamagishi) & other as in the RD
- Supportive (**PA**; **PO**, **AS**)

CMU 1: (Act.1 &3.1)

FPs: (J) Dr. Kikuchi
(V) Dr. Minh

- RR(s)NIAS-J*:*
- NIAS-V: *Ninh (field), Binh (data), Lan(Lab), Ba (Lab), Minh (lab); Son (lab), Tiep, Hai*

CMU 2: (Act 2)

FPs: (J) Dr. Tamas (V):Dr. Lan(NIAS)*, Dr. Linh (IBT), Dr. Long (VNUA)

- RR(s)of NILGS
- RR(s)of TU
- NIAS-V: *Van, 3Huong, Huu, Son, Muoi, Hai*
- IBT: Linh, Nguyen, Uoc, Hanh, Men
- VNUA: Long

CMU 3: (Act. 3.2)

FPs: (J) Dr. Osaki (V) Dr. Long (VNUA), Dr. Thu(NIAS-V)*.

- RR(s) of NIAH
- RR(s)of IFM
- NIAS-V: Msc.*Hanh*
- VNUA: *Dr. Nga, Dr.Linh, Dr. Hung,*

CMU 4: (Act. 3.3)

FPs: (J) Dr. Otoi (V) Dr. Huyen-NIAS*. Dr. Long-VNUA. LT. Hai (S-DAH)

- RR (s) of TU; NIAH;NIAS-J; IFM;
- NIAS-V: Thieu, Ngoc, Hanh, Hai, Tiep.
- VNUA: Linh, Nga, Nam, Thanh
- HB: Xuong, Thuy, Truong

MANAGEMENT

TECHNICAL

IMPLEMENTORS

**: in charge of reporting. PD: Project Director; PDD: Project Deputy Director; NPC: National project coordinator, FPM: Financial Project Manager, PL: Project Leader; IPC: International Project Coordinator; PA: Project accountant; PO: Program officer, AS: Administrative Secretary).*
CMU: Component management unit; FP: Focal point person; RR: Researcher representative

Annex V

LIST OF EQUIPMENT (FY2015)

S/N	NAME OF EQUIPMENT	DELIVERY SITE	UNIT
1	MULTIGAS INCUBATOR	NIAS, IBT, VUNA	3
2	ELISA SYSTEM	VUNA	1
3	REAL TIME PCR	NIAS	1
4	MICROMANIPULATOR/INVERTED MICROSCOPE	IBT, VNUA	2
5	FLUORESCENCE MICROSCOPE	NIAS	1
6	DNA/RNA FLUROMETER	NIAS	1
7	COOLED CENTRIFUGE	NIAS	1
8	MEDICAL SHOWCASE (REFREGERATOR)	NIAS	1
9	BIO SHAKER	NIAS	1
10	TABLETOP CENTRIFUGE	IBT, VUNA, HOA	3
11	BIO FREEZER	NIAS, IBT, VNUA	3
12	BIO FREEZER	IBT, VNUA	2
13	HOT PLATE	NIAS, IBT, VUNA	3
14	PH METER	IBT, VNUA	2

S/N	NAME OF EQUIPMENT	DELIVERY SITE	UNIT
15	AUTOCLAVE	VNUA	1
16	DRY HEAT STERILIZER	VNUA	1
17	ELECTRIC DUAL RANGE ANALYTICAL BALANCE	HOA, IBT, VNUA	3
18	CELL FUSION DEVICE	IBT, VNUA	2
19	MICROPIPETTE PULLER	IBT	1
20	MICRO COOLED CENTRIFUGE	VUNA	1
21	ULTRA-LOW TEMPERATURE FREEZER	VUNA	1
22	SAFETY CABINET	VUNA	1
23	AUTOCLAVE	VUNA	1
24	BIOMEDICAL COOLER	HOA	1
25	CONSTANT TEMPERATURE DRYER	HOA	1
26	BIOLOGICAL MICROSCOPE	HOA	1
27	DISTILLED WATER MANUFACTURING EQUIPMENT	HOA	1
28	MICROFORGE	IBT, VNUA	2

S/N	NAME OF EQUIPMENT	DELIVERY SITE	UNIT
29	POLISHING MACHINE	IBT, VNUA	2
30	FROZEN STORAGE CONTAINER	VNUA, IBT, NIAS	5
31	SHOWCASE (OPEN CASE)	NIAS	1
32	MULTI CHANNEL PIPETTER	NIAS	4
33	STEREOMICROSCOPE	VNUA	1
34	ULTRAPURE WATER MAKING APPARATUS (INCLUDING START-UP KIT)	NIAS,IBT, VUNA	3
35	PCR SYSTEM	VUNA	1
36	DESICCATOR	NIAS,IBT, VUNA	3

Annex VI

SHORT TERM TRAINING IN JAPAN

S/N	AREA OF TRAINING	Allotment	RECEIVING INSTITUTE/ORGANIZATION	SENDING INSTITUTE/ORGANIZATION	NUMBER	PERIOD	SCHEDULE	REMARKS
1	Diagnosis of Infectious disease		NIAH	VNUA	1	1 month	FY2016	
2	Semen freezing	1	NIAS-J	NIAS-V	1	1 month	21 Feb 2016 - 19 March 2016	
3	Data base arrangement		NIAS-J	NIAS-V	1	2 month	FY2016	
4	RT-PCR	1	NIAS-J	NIAS-V	1	1 month	21 Feb 2016 - 19 March 2016	RT-PCR AND MICROSATELLITE SAME TIME, but specific date yet to be fixed.
5	Microsatellite	1	NIAS-J	NIAS-V	1	1 month	21 Feb 2016 - 19 March 2016	
6	FISH		NIAS-J	NIAS-V	1	4 month	FY2016	
7	In Vitro Embryo Production	1	NILGS	IBT	1	1 month	21 Feb 2016 - 19 March 2016	
8	Cloning		Tokushima Univ	IBT, NIAS-V	2	4-6 month	FY2016	
9	Inspection (animal husbandry and branding)	5	Itochu	Hoa Binh	5	2 weeks	FY2016	

Annex VII

First Joint Coordinating Committee (JCC) Meeting

SATREPS Project "Establishment of Cryo-Bank System for Vietnamese Native Pig Resources and Sustainable Production System to Conserve Bio-Diversity"

Agenda

Date: 24 November, 2015
Time: 13:30 to 17:10
Venue: NIAS-V
Chairpersons: Project Director, NIAS-V
Project Leader, NIAS-J

Time	Agenda	Person in Charge
13:30-13:40	Registration	All
13:40-13:50	Self-Introduction	All
13:50-14:00	Opening Remarks	PD, NIAS-V
14:00-14:10	Presentation and endorsement of PDM ver.1 and PO ver.1	PL, NIAS-J PC, JICA
14:10-14:30	Overview of the Project and Current Status	PM, NIAS-V
14:30-14:50	Management, Monitoring and Reporting Mechanism (JCC, PMU, CMU)	PM, NIAS-V
14.50 15.10	Counterpart Budget of IBT/VAST; Hoa Binh	IBT, HB
15:10-15:40	Open Discussion	All
15:40-15:50	Tea Break	All
15:50-16:05	Presentation on Equipment and Training	PL, NIAS-J
16:05-16:20	Plans for Fiscal Year 2016	PM, NIAS-V
16:20-16:50	Any other Issues	All
16:50-17:10	Closing Remarks	CR, JICA Vietnam MARD

		Representative

SATREPS Project
Establishment of Cryo-Bank System for Vietnamese Native Pig Resources and Sustainable Production System to Conserve Bio-Diversity

1ST Joint Coordinating Committee Meeting
24th November 2015

Registration

No	Name	Title	Department/ Organization
Vietnamese Side			
1.	Project Director, Dr. Nguyen Thanh Son	Director-General	NIAS-V
2.	Project Manager, Vu Chi Cuong	Vice Director	NIAS-V
3.	Project Coordinator, Dr. Nhu Van Thu	Vice Head of SMIC	NIAS-V
4.	Dr. Dong Van Quyen	Vice Director	IBT-VAST
5.	Dr. Nguyen Viet Linh		IBT-VAST
6.	Dr. Nguyen Xuan Trach	Vice Dean	VNUA
7.	Dr. Su Thanh Long		VNUA
8.	Dr. Bui Khanh Linh		VNUA
9.	Mr. Nguyen Anh Long	Department of Planning (DOP)	MARD
10.	Mr. Trinh Thanh Hung		Ministry of Science and Technology (MOST)
11.	Ms. Nguyen Thi Hong Hanh	Program Officer- SMIC	NIAS-V
Japanese Side			
12.	Dr. Kazuhiro Kikuchi		National Institute of Agrobiological Sciences (NIAS)
13.	Dr. Aisaku Arakawa		National Institute of Agrobiological Sciences (NIAS)

14.	Dr. Masaaki Taniguchi		National Institute of Agrobiological Sciences (NIAS)
15.	Dr. Thang Q. Dang-Nguyen		National Institute of Agrobiological Sciences (NIAS)
16.	Dr. Takeshige Otoi		Tokushima University (TU)
17.	Dr. Makoto Osaki		National Institute of Animal Health (NIAH)
18.	Dr. Shunsuke Masazumi		Itochu Feed Mills Co., Ltd. (IFM)
19.	Dr. Satoshi Hayashi		Itochu Feed Mills Co., Ltd. (IFM)
20.	Nobuko Yamagishi	Project Coordinator	JICA/NIAS-V
21.	Ms. Akiko Fujita	Representative	JICA Vietnam
22.	Ms. Pham Thuy Trang		JICA Vietnam
Observers			
23.	Mr. Susumu Uchiumi	Advisor	JICA - MARD

Minutes of the 2nd Joint Coordinating Committee Meeting

For the Project for Establishment of Cryo-Bank System for Vietnamese Native Pig Resources and Sustainable Production System to Conserve Bio-Diversity

The 2nd Joint Coordinating Committee (hereinafter referred to as "JCC") Meeting for the Japan International Cooperation Agency (hereinafter referred to as "JICA") technical cooperation projects entitled "the Project for Establishment of Cryo-Bank System for Vietnamese Native Pig Resources and Sustainable Production System to Conserve Bio-Diversity" (hereinafter referred to as the Project) was held on 3 June 2016 at the National Institute of Animal Science (hereinafter referred to as "NIAS-V"), Hanoi, Vietnam. Through a series of discussions made during the meeting, JCC members represented by the Senior Representative of JICA Vietnam Office, and the Director General of NIAS-V, the Ministry of Agriculture and Rural Development (hereinafter referred to as "MARD"), agreed to the matters referred to in the document attached hereto.

Hanoi, 3 June 2016

Mr. Naoki Kakioka
Senior Representative
JICA Vietnam Office

Dr. Nguyen Thanh Son
Director-General
National Institute of Animal Science,
Ministry of Agriculture and Rural Development

2nd JCC MEETING MINUTES

3 JUNE 2016
NIAS-V, HANOI

Opening:

1. The 2nd JCC meeting for the Project was held on 3 June at NIAS-V, Hanoi. The meeting was opened at 08:45 chaired by Dr. Nguyen Thanh Son, the Director General of NIAS-V, MARD and Dr. Kazuhiro Kikuchi, the Japanese Project Leader. The meeting was attended by a total of 30 participants and the list of participants is attached hereto (annex 1).
2. Project Director, Dr. Son of NIAS-V and the Japanese Project Leader, Dr. Kikuchi, gave opening remarks followed by self-introduction.

Presentation:

3. Prof. Cuong, the Project Manager gave a presentation on (1) Overall Progress (2) Plan for FY2016, (3) challenges in implementation and (4) and request for endorsement. The following are the major updates since 1st JCC (attached in annex 2).
4. Following the presentation was open discussion, as per the main points below.

Open discussion:

5. (IBT/VAST- Dr. Ha) For CP budget, only one (1) institution can request for CP budget per one (1) project. Therefore, getting CP budget under VAST is difficult, as NIAS-V is the recipient of the Project and not IBT/VAST. However, about 500M VND is used from the IBT/VAST budget for 6 personnel and lab upgrading last year (2015). Financially, there is not much IBT/VAST can do, but technically IBT is fully involved. IBT regular budget will continue to support the Project in future. NIAS-V as a representative institution requested for CP budget to MARD, if, at that time, VAST was included, it could have been possible for IBT to get CP budget, but since it was not done so, it is not possible at this stage.
6. (Dr.Kikuchi) Thai Nguyen (MARDC) facility is selected for quarantines for (1) introduction and (2) separation for breeding. For introduction purpose, pig will be kept in Thai Nguyen first before sending to the Ani. Exp. & Farmed Animal Conservation Centre in NIAS for the cryo-bank and other experimental purposes. PERV free pig reproduction for several generations will be done in separation area in Thai Nguyen facility. Renovation of facility and equipment should be provided during this fiscal year.
7. (Dr. Kikuchi) FY2016 equipment will be procured pending project approval procedures. The proposed list of the equipment for FY2016 is basically the remaining from FY2015. Any other additional requirement may be considered; especially cryo-bank related equipment such as DNA analysis will be prioritized as LN2 has been cancelled.
8. (Dr. Son) MARDC-Thai Nguyen facility is under NIAS and therefore NIAS can take charge. While Thai Nguyen facility meets all requirements, it was designed for horses and cattle and it is the first time to keep pigs, therefore, repair and renovation is needed, for which, endorsement by MARD is required. Technical staff and worker

having no experiences in rearing pig. Training, guidance and other support is necessary.

9. (Dr. Son) The document for Project approval is now at the Prime Minister's Office and hopefully within June it will be approved.
10. (MARD Finance. Mr. Thai) Last year and up to this year, MARD was able to provide sufficient CP budget. MARD can't provide CP budget for IBT and HB according to the Government law despite request from IBT and HB. Therefore, JICA's consideration would be good.
11. (HB DARD-Mr. Hai) Approval of CP budget of 8.6B VND for implementation of 5 year activities under PO 3.3.4 is in progress and soon the endorsement will come, as HB requested MARD Vice Minister to send official letter, the PPC Deputy Chairman also committed and soon endorse it. Hoa Binh also waiting for the budget for livestock sector restructuring, the total budget will much bigger than 8.6 billion.
12. (Dr. OTOI) CMU4 model farm activities will last four years in the Project but NIAS CP budget is only for 2 years. Can it be modified? Appropriate travel allowance should be paid for VNUA staff. The budget for consumables is not given from NIAS to VNUA, so need to consult each other.
13. (VNUA-Dr. Trach) need to make clear of the budget and activities to VNUA, budget should transfer to VNUA partners.
14. (Dr. Son) IBT staff needs training for cryo-preservation. For continuity of CMU2 activity, IBT staff should be included in 2.4 activities. NIAS also needs additional training for analysis. Additional training requirement will be considered in PMU. For CP budget, it is based on activities, budget allocation for partners are on the process 2016.
15. (MONRE- Dr. Vinh) Another project on database for Bio-diversity management is also undertaken in MONRE with assistance from JICA. It is already finished and now without JICA support to maintain website is difficult. Therefore it is suggested to integrate this project website into part of NIAS website. Due consideration and consultation should be given to Nagoya protocol on ABS (Access to Genetic Resources and the Fair and Equitable Sharing of Benefits), in relation to the export samples and/or native pigs as in the list of protection. Pigs are the property of farmers and therefore Nagoya protocol needs to be respected concerning sharing of the benefits.
16. (Dr. Kikuchi) As we are studying Nagoya Protocol in the context of genetic resources preservation, sharing of information is welcome and encouraged, given that the information related to pigs is very limited.
17. (Embassy- Mr. Shimose) As the "Japan-Vietnam Medium-long Term Vision on Agricultural Cooperation" adopted in September last year includes this Project, the Japanese Government gives importance to this Project and tangible impact is expected. Implementation of many components with various stakeholders may pose challenges, but we can work together.

Summary and conclusion:

18. Matters as discussed the presentation and open discussion are endorsed as below:
    - Management structure with JCC, PMU and CMU are finalized as proposed;
    - Approve for the modification of activities (focus on pig sampling, no household data collection); using cost from purchase liquid nitrogen (LN2) generator to other equipment, using cost for cryo-bank maintenance (cost of electric) to buy LN2;

- Approve activities planning for Y2 (2016) as proposed with considering additional necessary equipment especially for cryo-bank, all institutions check and send request to PMU for consideration;
- CP budget for FY2017 should be prepared and submitted early (planning workshop), unlike FY2016;
- IBT will continue to seek CP budget;
- Basic chemicals and consumables will be managed by IBT, NIAS and VNUA from counterpart budget, while JICA is requested to procure the expensive and specific chemicals;
- Additional ST Training may be consolidated by PMU for submission to Japan;
- Thai Nguyen MARDC will serve as quarantine facility and renovation will start now; PMU work with Thai Nguyen and CMU3 to prepare facility upgrade; request MARD support for further facilities upgrade and quarantine activities;
- PMU study the Nagoya protocol and other legislation documents to be sure the project activities in line with regulations;
- Fast-tract with Government project approval.

Closing Remarks:

19. (JICA- Mr. Kakioka) While JICA appreciates hard work of everyone for the endorsement of the Project, JICA can't do everything, therefore expects to work with CP. Any Project must have appropriate budget allocation and distribution. Issues concerning CP budget are beyond JICA, therefore request Vietnam to help solve these problems. Sharing of information and knowing what the next unit doing in Japan and Vietnam are very crucial for any Project and therefore encouraged. Social implementation (shakai jissou) should be given due importance from early stage of the Project implementation. JCC should be utilized as a forum to discuss issues and find solution.

END

Minutes of the 3rd Joint Coordinating Committee Meeting

For the Project for Establishment of Cryo-Bank System for Vietnamese Native Pig Resources and Sustainable Production System to Conserve Bio-Diversity

The 3rd Joint Coordinating Committee (hereinafter referred to as "JCC") Meeting for the Japan International Cooperation Agency (hereinafter referred to as "JICA") technical cooperation projects entitled "the Project for Establishment of Cryo-Bank System for Vietnamese Native Pig Resources and Sustainable Production System to Conserve Bio-Diversity" (hereinafter referred to as the Project) was held on 7th November 2017 at the National Institute of Animal Science (hereinafter referred to as "NIAS-V"), Hanoi, Vietnam. Through a series of discussions made during the meeting, JCC members represented by the Senior Representative of JICA Vietnam Office, and the Director General of NIAS-V, the Ministry of Agriculture and Rural Development (hereinafter referred to as "MARD"), agreed to the matters referred to in the document attached hereto.

Hanoi, 7th November 2017

Mr. Naoki Kakioka
Senior Representative
JICA Vietnam Office

Dr. Nguyen Thanh Son
Director-General
National Institute of Animal Science (NIAS),
Ministry of Agriculture, Rural Development

3rd JCC MEETING MINUTES

Tuesday 7 November 2017
NIAS-V, HANOI

Opening:

1. The 3rd JCC meeting for the Project was held on 7 November 2017 at NIAS-V, Hanoi, following the agenda attached (annex 1). The meeting was opened at 08:40 chaired by Dr. Nguyen Thanh Son, the Director General of NIAS-V. The meeting was attended by a total of 27 participants and the list of participants is attached hereto (annex 2).
2. Mr. Naoki Kakioka, Senior Representative of JICA Vietnam gave opening remarks, highlighting the importance of sustainability. He suggested that one way to ensure sustainability of cryopreservation system established by the Project is to engage the private sector.

Presentation:

3. Dr. Luu Quang Minh, Vietnamese Project Coordinator presented achievements of the Project, focusing on the achievement of the outputs, according to the Objectively Verifiable Indicators (OVI) of PDM ver 1, as per the attached presentation (annex 3).
4. The Midterm review team reported the main findings, evaluation and recommendation based on their survey during 23 October – 6 November, as per the attached Midterm review report presentation. The main points are summarized as below:
   - Relevance, efficiency and effectiveness of the Project are high and impact and sustainability are also anticipated to a certain extent.
   - Key recommendation are:
   - According to the Decree No.59, both Japanese and Vietnamese project implementing organizations, in close coordination with each other, shall take immediate actions to request and obtain a license issued by competent national authorities such as MARD and/or MONRE, which allow the Project to access and utilize genetic resources necessary for the project activities
   - The Project should investigate the cost-effectiveness of the intervention in consideration of the feedstuff, the costs and efforts for dissemination, preparation of the manual, etc.
   - PDM shall be modified to make clear the definition and relation of the two, "biodiversity conservation system for Vietnamese native pigs" and "conservation system of Vietnamese native pigs", in the Overall Goal and Project Purpose, respectively, so that all project-related persons and stakeholders can share the common understanding of the perspective of the Project.

- The Project will also reconsider carefully the Outputs and their relation in the Project and revise the present PDM version 1, accordingly.
- Vietnamese implementation organizations of the Project shall make a strategy for the preservation and use of native animals of Vietnam in consultation with the authorities, MARD and MONRE, by the end of the project period and the Project provides the necessary measures of maintenance and running of the banking system with estimated costs required for collection, genome analysis, cryopreservation and so on and rules for the use of the banking system.
- The Vietnamese side should prepare for the change of the Project leadership in order to assure the continuation of management and any activities of the Project.

5. Dr. Luu Quang Minh, presented Highlights of activities in next one year.
6. Following the presentation was open discussion, as per the main points below.

Open discussion:

7. JCC members should evaluate how the cooperation is among the stakeholders in this project and find out solutions if there is any problem. Also, trainings of the Vietnamese researchers in Japan should be evaluated and results to be shared.
8. Presentations on outputs should be prepared in a more understandable and precise manner regarding indexes, especially output 2, which involves achievements of many difficult techniques.
9. Adherence to ABS is very important and the Project will have to follow. Japanese side is not sure if the Project has to follow all the steps mentioned in the Decree No. 59, which recently came into effect and very new. In relation to this matter, Dr. Vinh of MONRE commented that only in case of benefit sharing after utilization of genetic resources, contracts with farmers with endorsement by Communal People's Committee is necessary in accordance with Article 45 of Law for Biodiversity. However, such certification of contracts is not necessary in this Project, as we only access to the resources for academic non-commercial research purposes.
10. There are two competent agencies for Decree No. 59, i.e. MARD is the focal point for all genetic resources of valuable animals, plants and forest; but for the other ~~rest~~ genetic resources, it is the responsibility of MONRE. In case this project needs to export native pig genetic resources to Japan, you need to get the license from Department of Science and Technology of MARD. In future, if monetary benefit sharing becomes an issue, then it is necessary to have contracts with farmers or providers. But for non-monetary benefits, no contract is needed.
11. Revisions of PDM and procedures for getting approval from MARD are recommended. Changes are about relations among outputs and wording so that it is practically and logically explainable, including the overall goal and project objective. The endorsement process will be as follows:
    - PMU members review and discuss revisions in next PMU meeting
    - JICA HQ can send a mission to facilitate if needed
    - NIAS-V to consult MARD with all revisions

- Endorsement by JCC in next meeting.

12. NIAS-V will ensure to follow ABS procedures. In terms of management of the Project, the successor of the current Vietnamese Project Coordinator is already involved. Change of leadership of NIAS-V and PMU will be undertaken smoothly in the end of 2018.
13. Mr. Minh of ICD, MARD: already received the proposal on PDM revisions by Midterm Review team and his comments were integrated in the presentation report. This is an important project of biodiversity, as it enhances Vietnamese capacity for biodiversity and resources as a comprehensive technical assistance from Japanese side. The Project should have started much earlier, as in 2007 MARD submitted a similar project but for plant gene bank, and it is not yet approved. Despite that ODA project management procedures delayed the Project to start, achievements are good so far. Change of PDM is not complicated, because the contents are the same, with only changes of the wording, and therefore there is no need to submit to MPI, only MARD can handle the changes. Refering to change of personnel of Management Unit, NIAS should prepare documents at the end of FY2018 to send to MARD, as relevant departments of MARD need to be informed. ICD is assigned by MARD to be in charge of all ODA projects including this JICA-SATREPS Project, we will try our best to give favorable conditions to project implementation.
14. It is noted that Prof. Trach of VNUA will retire also next year. One of the leadership of VNUA may replace his position in JCC.
15. Dr. Hung of MOST, as JCC member, supports revision of PDM as proposed by Midterm review team, since they are not serious changes. To ensure the sustainability of the Project, involvement of private sector and enterprises is encouraged for maintaining project facilities (for example: how they can involve in management of isolation/quarantine system). Project members should consider integrating this matter of private sector involvement by the end of the Project.
16. Sustainability is to be given consideration in the 2nd part of the Project in relation to setting up branding for native pig of Hoa Binh. This will be mostly undertaken at the initiative of Vietnamese side in order to improve it as a commodity.

SUMMARY:

- Midterm review findings, evaluation and recommendation are all agreeable.
- Certain difficulties and challenges were experienced at the beginning, but with support from 7 stakeholders from JP and VN, MOST, MONRE, MARD, and the Government Office, the Project was able to overcome these challenges.
- At the last meeting in 2016, three problems were listed: (1) Delay of approval of the Project Funding List by the Government (2) CP budgets from Hoa Binh and IBT were not available (3) Procurement of vehicles. Now these issues are all solved.
- The Project made certain achievements for all four components of the Project, with some achieving very high relating to research results done by Japanese and

Vietnamese counterparts which were shown in the scientific research report meeting on 6th Nov. Also, the project had Presentation at 4th World Congress on Reproductive Biology (WCRB) 2017 held in Okinawa, Japan on 27-29 September.

- Collaboration among different stakeholders especially members of JCC is good for administrative procedures.
- Totally agreeing with report presented by Midterm review team, PMU will be assigned for modification of PDM for endorsement in the next JCC including overall goal, project purposes, outputs, and submit to MARD before April next year.
- JCC agrees to assign PMU for making the plan for future management personnel, also, for reviewing the overall project activities taking into consideration of the Midterm Review report for submission to MARD for approval.
- Timely implementation of the remaining FY2017 activities and FY2018 activities will be expected.
- JCC members are expected to keep supporting the Project in applying for ABS procedures, to support transfer of some samples to Japan for research purposes.

Closing Remarks: by Dr. Nguyen Thanh Son, the Director General of NIAS-V, MARD.

Signing of Meeting Minutes of Midterm Review Team.

END

Annex:
1-Agenda
2-Participants List
3-PP Presentation of Achievement of Project
4-MM of Midterm Review Report

Third Joint Coordinating Committee (JCC) Meeting

SATREPS Project "Establishment of Cryo-Bank System for Vietnamese Native Pig Resources and Sustainable Production System to Conserve Bio-Diversity"

Agenda

Date: 7 Nov, 2017
Time: 08:00 to 12:30
Venue: NIAS-V
Chairpersons: Project Director, NIAS-V
Project Leader, NIAS-J

Time	Agenda	Person in Charge
08:00-08:30	Registration	All
08:30-08:40	Self-introduction	All
08:40-08:50	Opening Remarks	Mr. Naoki Kakioka, Senior Representative, JICA Vietnam
08:50-09:20	Presentation on Achievement of Output to date	Dr. Luu Quang Minh, VN Project Coordinator, NIAS-V
09:20-09:40	Q&A and Clarification	All
09:40–09:50	*Tea break*	All
09:50-11:50	- Results of the Mid-term review - Proposals of PDM modification - Discussion	Dr. Asanuma, Leader of the Mid-term review team and other team members
11:50–12:00	Highlights of activities in next one year	Dr. Luu Quang Minh, VN Project Coordinator, NIAS-V
12:00-12:20	Conclusion	Dr. Nguyen Thanh Son, Project Director, NIAS-V
12:20-12:30	Closing Remarks	Dr. Nguyen Thanh Son, Project Director, NIAS-V Dr. Kazuhiro Kikuchi, Project Leader, NIAS-J
12:30-	Lunch	All

MC: Dr. Luu Quang Minh, VN Project Coordinator, NIAS-V

There will be an interpreter between English – Vietnamese.

"Establishment of Cryo-bank System for Vietnamese Native Pig Resources and Sustainable Production System to Conserve Bio-diversity"

List of Participants of 3rd JCC, 7 November 2017

S/N	Name	Designation	Organization
1	Nguyen Thanh Son	Director	NIAS-V
2	Chu Hoang Ha	Director	IBT-VAST
3	Nguyen Xuan Trach	Vice Director	VNUA
4	Vuong Dac Hung	Deputy Director	Hoa Binh DARD
5	Nguyen Anh Minh	Vice Head, International Cooperation Department (ICD)	MARD
6	Luu Quang Minh	Vietnamese Project Coordinator	NIAS-V
7	Nguyen Van Ly	Head of Sub Department, Department of Science, Technology and Environment (DOSTE)	MARD
8	Trinh Thanh Hung	Vice Head, Division of Science and Technology for Economic-Technical Sector	MOST
9	Nguyen Thanh Vinh	Vice Head, Department of Biodiversity Conservation	MONRE
10	Nguyen Anh Hieu	Official	MOST
11	Nguyen Thi Phuong Thuy	Vice Director,	Hoa Binh Sub DAH
12	Nguyen Viet Linh	Researcher	IBT-VAST
13	Le Thi Thu Ha	Project Administrator	NIAS-V
JAPANESE SIDE:			
14	Kazuhiro KIKUCHI	Project Leader	NARO, Japan
15	Suichi ASANUMA	Midterm Review Team Leader	JICA-HQ
16	Naoko NAGAI	Midterm Review team	JICA-HQ
17	Kensuke KODAIRA	Midterm Review team	JST-Japan
18	Yoichi INOUE	Midterm Review team, Consultant	JDS – Japan
19	Makoto Osaki	Researcher	NIAH-Japan
20	Satoshi Hayashi	Researcher	ITOCHU Feeds Mill
21	Takeshige OTOI	Researcher	Tokushima University
22	Masaaki Taniguchi	Researcher	NARO, Japan
23	Yoshinori Takahashi	Researcher	ITOCHU Feeds Mill
24	Hideki Watanabe	Researcher	ITOCHU Feeds Mill
25	Naoki KAKIOKA	Senior Representative	JICA Vietnam
26	Satoshi YAMAMOTO	Representative	JICA Vietnam
27	Nobuko Yamagishi	Project Coordinator	JICA-NIAS
28	Nguyen Thu Hien	Project Secretary	JICA-NIAS

Biên bản cuộc họp Ban Chỉ đạo lần thứ 3

Dự án "Thành lập ngân hàng gen đông lạnh cho các giống lợn bản địa Việt Nam và phát triển hệ thống chăn nuôi bền vững để bảo vệ đa dạng sinh học"

Cuộc họp Ban Chỉ đạo lần thứ 3 (dưới đây gọi là "JCC") của dự án hợp tác kỹ thuật hỗ trợ bởi Cơ quan Hợp tác quốc tế Nhật Bản (dưới đây gọi là "JICA") có tên "Thành lập Ngân hàng gen đông lạnh cho các giống lợn bản địa Việt Nam và phát triển hệ thống chăn nuôi bền vững để bảo vệ đa dạng sinh học" (dưới đây gọi là "Dự án") đã được tổ chức vào ngày 07 tháng 11 năm 2017 tại Viện Chăn nuôi, Hà Nội, Việt Nam. Thông qua một loạt các nội dung thảo luận trong cuộc họp, đại diện cho các thành viên Ban chỉ đạo, Phó trưởng đại diện JICA Việt Nam và Viện trưởng Viện Chăn nuôi, Bộ NNPTNT, đã thống nhất các vấn đề được đề cập trong văn bản đính kèm dưới đây.

Hà nội, ngày 07 tháng 11 năm 2017

Ông Naoki Kakioka
Phó trưởng đại diện
Văn phòng JICA VN

TS. Nguyễn Thanh Sơn
Viện trưởng
Viện Chăn nuôi quốc gia,
Bộ Nông nghiệp & Phát triển nông thôn

BIÊN BẢN CUỘC HỌP BAN ĐIỀU PHỐI LẦN THỨ 3
7 THÁNG 11 NĂM 2017
TẠI VIỆN CHĂN NUÔI, HÀ NỘI

Phần mở đầu:

1. Cuộc họp Ban điều phối dự án lần thứ 3 được tổ chức ngày 7 tháng 11 năm 2017 tại Viện Chăn nuôi, Hà Nội (chương trình cuộc họp đính kèm, Phụ lục 1). Cuộc họp bắt đầu vào lúc 08:40 do TS. Nguyễn Thanh Sơn, Viện trưởng Viện Chăn nuôi - Bộ NN&PTNT làm chủ trì. Tổng số người tham dự là 27 người có danh sách đính kèm (phụ lục 2).
2. Ông Naoki Kakioka – Phó trưởng đại diện Văn phòng JICA Việt Nam đã có bài phát biểu khai mạc cuộc họp, nêu bật tầm quan trọng của sự bền vững. Ông đề xuất một trong những cách để đảm bảo sự bền vững của hệ thống bảo tồn mà dự án thiết lập nên là có sự tham gia của khối tư nhân.

Phần trình bày:

3. TS. Lưu Quang Minh, Điều phối viên dự án VN trình bày những thành quả đạt được của dự án, tập trung vào kết qủa của các đầu ra theo như Các chỉ số có thể đánh giá khách quan (OVI) của Ma trận thiết kế dự án (PDM) phiên bản 1. (Bài trình bày đính kèm, phụ lục 3).
4. Đoàn đánh giá giữa kỳ báo cáo kết quả đánh giá bao gồm các đánh giá và kiến nghị dựa trên các cuộc gặp khảo sát diễn ra từ 23/10- 6/11 (bài trình bày báo cáo giữa kỳ kèm theo). Các điểm chính trong báo cáo được tóm tắt dưới đây:
    - Sự phù hợp, hiệu lực và hiệu quả của dự án được đánh giá là cao; tác động và sự bền vững cũng được mong đợi ở một mức độ nhất định.
    - Các điểm kiến nghị chính bao gồm:
    - Theo như Nghị định số 59, cả hai tổ chức thực hiện dự án của VN và NB sẽ phối hợp chặt chẽ với nhau để tiến hành ngay các bước cần thiết nhằm được cấp Giấy phép từ bộ ngành có thẩm quyền như Bộ NNPTNN và/hoặc Bộ TNMT cho phép Dự án tiếp cận và sử dụng nguồn gen cần thiết cho các hoạt động dự án.
    - Dự án sẽ nghiên cứu hiệu quả chi phí của việc can thiệp chăn nuôi liên quan đến thức ăn, chi phí và hiệu quả của việc phổ biến và chuẩn bị sổ tay hướng dẫn chăn nuôi,…
    - Ma trận thiết kế dự án (PDM) cần được sửa đổi để làm rõ định nghĩa và mối quan hệ của hai phần, "hệ thống bảo tồn đa dạng sinh học cho các giống lợn bản địa VN" và "hệ thống bảo tồn cho các giống lợn bản địa VN" tương ứng trong Mục tiêu tổng thể và Mục tiêu dự án để tất cả mọi cán bộ và các bên liên quan trong dự án có thể chia sẻ sự hiểu biết chung về viễn cảnh của Dự án.
    - Dự án cũng sẽ cân nhắc lại một cách cẩn thận các Đầu ra và mối quan hệ của chúng trong dự án và sẽ sửa lại phiên bản 1 của PDM hiện tại sau đó.
    - Các đơn vị thực hiện dự án phía Việt Nam sẽ lập một chiến lược để bảo tồn và sử dụng các động vật bản địa của VN với sự tham vấn của Bộ NNPTNT và Bộ TNMT vào giai đoạn cuối của dự án; và Dự án cung cấp các biện pháp cần thiết để duy trì và vận hành hệ thống ngân hàng gen với các chi phí dự trù cần có cho việc thu thập mẫu, phân tích gen, bảo quản đông lạnh… và các quy tắc về sử dụng hệ thống ngân hàng gen.
    - Phía VN cần chuẩn bị cho sự thay đổi nhân sự lãnh đạo của Dự án nhằm đảm bảo việc quản lý và bất cứ hoạt động nào của dự án không bị gián đoạn.

5. TS. Lưu Quang Minh trình bày Các hoạt động nổi bật sẽ thực hiện trong năm sau.
6. Sau bài trình bày là phần thảo luận mở với các điểm chính như dưới đây.

Thảo luận mở:

7. (Ông Minh, Vụ HTQT, Bộ NN) Các thành viên Ban chỉ đạo cần biết về đánh giá sự hợp tác giữa các bên trong dự án để tìm giải pháp nếu như có vấn đề gì. Ngoài ra, cũng cần đánh giá và chia sẻ kết quả các đợt đào tạo cho cán bộ VN tại Nhật Bản.
8. (Ông Lý, Bộ NN)Cần chuẩn bị phần trình bày các Đầu ra với các chỉ số theo cách dễ hiểu và chính xác hơn, đặc biệt là Đầu ra 2 có liên quan đến nhiều kết quả kỹ thuật khó.
9. Quy định về việc tiếp cận và chia sẻ lợi ích từ nguồn gen là rất quan trọng và Dự án cần phải tuân thủ. Phía NB hiện nay không chắc chắn rằng liệu Dự án có phải làm theo tất cả các bước được nêu trong Nghị định 59 hay không? Liên quan đến vấn đề này, TS. Vĩnh của Bộ TNMT bình luận rằng chỉ trong trường hợp có chia sẻ lợi ích sau khi sử dụng nguồn gen thì mới cần có hợp đồng với hộ chăn nuôi và cần UBND xã đó xác nhận, theo như quy định tại điều 45 của Luật Đa dạng sinh học. Tuy nhiên, trong trường hợp dự án của chúng ta chỉ mục đích tiếp cận nguồn gen để nghiên cứu và phi thương mại thì chưa cần đến bước làm hợp đồng này.
10. (Ts. Vĩnh, Bộ TNMT) Trong Nghị định 59 có quy định rõ hai cơ quan nhà nước có thẩm quyền cấp phép tiếp cận nguồn gen là Bộ NNPTNT cho các nguồn gen cây trồng, vật nuôi, thủy sản và lâm nghiệp. Với các nguồn gen còn lại thuộc trách nhiệm thẩm quyền của Bộ TNMT. Trường hợp dự án của chúng ta cần xuất khẩu nguồn gen lợn bản địa sang Nhật Bản thì phải xin cấp giấy phép qua Vụ Khoa Học công nghệ của Bộ NNPTNT. Và trong tương lai nếu có chia sẻ lợi ích từ việc sử dụng nguồn gen và là lợi ích tiền tệ thì sẽ cần có hợp đồng với hộ chăn nuôi hoặc bên cung cấp. Còn với lợi ích phi tiền tề thì không cần hợp đồng.
11. Đoàn đánh giá giữa kỳ kiến nghị sửa đổi Ma trận thiết kế dự án cũng như thủ tục để xin phê duyệt sửa đổi của Bộ NNPTNT. Những thay đổi chủ yếu là mối liên quan giữa các đầu ra và câu chữ để dễ hiểu và logic hơn, bao gồm sửa đổi cả Mục tiêu chung và mục tiêu dự án. Quy trình phê duyệt sửa đổi đề xuất như sau:
    - Các thành viên Ban QLDA xem xét và thảo luận về đề xuất sửa đổi trong cuộc họp Ban QLDA tới.
    - Văn phòng JICA trụ sở chính có thể cử một đoàn chuyên gia sang hỗ trợ nếu cần thiết.
    - Viện Chăn nuôi sẽ tham vấn Bộ NNPTNT liên quan đến việc sửa đổi.
    - Ban Chỉ đạo dự án phê duyệt sửa đổi vào cuộc họp lần sau.
12. (Ts. Sơn) Viện Chăn nuôi đảm bảo sẽ tuân thủ theo quy định về Tiếp cận và chia sẻ ích từ sử dụng nguồn gen. Liên quan đến nhân sự quản lý dự án, hiện nay đã có cán bộ được lựa chọn thay thế cho vị trí Điều phối viên phía VN. Còn các vị trí quản lý của Viện và Ban QLDA cũng đã có phương án thay thế để không ảnh hưởng đến dự án, các vị trí này sẽ được dần dần chuyển giao một cách nhịp nhàng vào cuối năm 2018.
13. (Ông Minh, Vụ HTQT, Bộ NN)
    - Đã nhận được dự thảo báo cáo đánh giá giữa kỳ và đề xuất sửa đổi bản Ma trận thiết kế dự án (PDM) của đoàn đánh giá giữa kỳ và trong bài trình bày của đoàn hôm nay đã đưa vào đầy đủ các ý kiến góp ý của riêng cá nhân ông.
    - Đây là một dự án quan trọng về đa dạng sinh học và là dự án kỹ thuật rất sâu do phía Nhật hỗ trợ vì nó giúp cho VN tăng cường năng lực trong bảo tồn đa dạng sinh học, đặc biệt là nguồn gen. Cho tới nay những kết quả dự án đạt được so với mục tiêu đề

ra được đánh giá rất cao. Theo quan điểm cá nhân thì đáng lẽ dự án này phải được phía NB giúp cho VN thời gian dài trước đây vì khoảng năm 2007-2008, Bộ NN đã yêu cầu JICA hỗ trợ một dự án tương tự về bảo tồn nguồn gen thực vật nhưng không được phía NB phê duyệt. Dự án này khi bắt đầu gặp một số khó khăn do thủ tục quản lý dự án ODA có sự thay đổi nên bị chậm phê duyệt, tuy nhiên, tới nay đã giải quyết xong và kết quả tới nay là tốt.

- Việc đề xuất thay đổi PDM thì không quá phức tạp do chỉ là thay đổi về câu chữ, không ảnh hưởng đến nội dung dự án nên Bộ NN hoàn toàn có thể điều chỉnh được.
- Về vấn đề thay đổi nhân sự Ban QL của dự án, Viện Chăn nuôi cần có công văn thông báo nhân sự thay thế vào cuối năm sau vì các Vụ liên quan trong Bộ cần được biết.
- Vụ HTQT được Bộ NN giao phụ trách các dự án ODA bao gồm cả dự án JICA-SATREPS này nên Vụ sẽ cố gắng hết sức để tạo điều kiện cho dự án thực hiện thành công.

14. (GS. Trạch, HVNNVN) GS cũng sẽ nghỉ hưu vào năm sau nên có thể một lãnh đạo khác của Học viện NN sẽ thay thế vị trí của GS trong Ban chỉ đạo.
15. (Ts. Hùng, Bộ KHCN) Với tư cách thành viên của Ban chỉ đạo, Ông ủng hộ đề xuất sửa đổi PDM của đoàn đánh giá giữa kỳ vì không phải thay đổi quá lớn. Tuy nhiên, như phía NB cũng đề cập đến tính bền vững, sau khi kết thúc dự án nên cân nhắc điều chỉnh trong khung dự án để đối tác tham gia có thể bao gồm khối tư nhân, ví dụ như khối tư nhân có thể tham gia vào khu nuôi cách ly của dự án như thế nào… để đảm bảo tính bền vững của dự án.
16. (Ts. Sơn) Sự bền vững là vế thứ hai của dự án và liên quan nhiều đến tỉnh HB và một số địa phương khác sau khi dự án kết thúc, mong chờ của dự án là xây dựng được thương hiệu lợn bản địa của HB và phát triển thành hàng hóa. Nội dung này thuộc trách nhiệm của phía VN là chính.

Tổng kết và Kết luận:

- Hội nghị đã nghe và thảo luận 3 báo cáo chính;
- Mặc dù ban đầu gặp một số khó khăn, nhưng với nỗ lực của Ban QLDA cùng với 7 đối tác từ VN và NB, đặc biệt là sự hỗ trợ tích cực của Bộ NN, Bộ KHCN và Bộ TNMT, VP CP, thì những khó khăn ban đầu của dự án đã được giải quyết;
- Tại cuộc họp năm 2016, đã nêu ra 3 vấn đề tồn đọng trước Ban chỉ đạo là (1) Phê duyệt danh mục của dự án; (2) Vốn đối ứng của tỉnh Hòa Bình và Viện CNSH; (3) Mua sắm xe cộ cho dự án. Tới nay các vấn đề này đề đã được giải quyết.
- Dự án đã đạt được những kết quả nhất định đối với cả bốn hợp phần, một số hoạt động liên quan đến nghiên cứu do các chuyên gia NB và VN thực hiện đạt rất cao như trong các báo cáo khoa học được trình bày tại Hội thảo Báo Cáo khoa học tổ chức ngày 6/11 tại Viện Chăn nuôi. Dự án cũng đã có bài trình bày tại Hội nghị sinh học sinh sản thế giới tổ chức tại Okinawa, NB vào tháng 9/2017.
- Đánh giá cao sự phối hợp của các Bộ ngành trong quá trình thực hiện, đặc biệt là một số cán bộ trong Ban chỉ đạo dự án đã hỗ trợ rất nhiều trong việc giải quyết các vấn đề về thủ tục hành chính cho dự án.
- Ban chỉ đạo thống nhất cao với bản báo cáo đánh giá của Đoàn đánh giá giữa kỳ đến từ NB, theo đó Ban chỉ đạo thống nhất giao cho Ban QLDA tiếp thu những ý kiến của đoàn đánh giá về điều chỉnh một số nội dung liên quan các mục tiêu chung, mục tiêu

của dự án cũng như kết quả đầu ra của dự án để phù hợp với thực tiễn. Đồng thời có điều chỉnh PDM dự án để trình Bộ NN phê duyệt trước tháng 4 sang năm.

- Ban Chỉ đạo cũng thống nhất giao Ban QLDA có kế hoạch về thay đổi nhân sự quản lý dự án trước mắt cũng như lâu dài. Và đồng thời giao Ban QL rà soát lại kế hoạch tổng thể của dự án để sớm trình Bộ NN phê duyệt lại cho phù hợp sau khi có ý kiến của đoàn đánh giá.
- Ban QLDA sẽ tiếp tục đẩy nhanh tiến độ triển khai các hoạt động của năm 2017 và các hoạt động năm 2018 đảm bảo đúng thời hạn.
- Liên quan đến vấn đề chia sẻ và sử dụng nguồn gen, thành viên Ban Chỉ đạo dự án đã giải thích trước hội nghị, và Ban QLDA sẽ thực hiện theo đúng quy định. Mong Ban chỉ đạo tiếp tục quan tâm hỗ trợ đảm bảo thực hiện đúng tiến độ, trước mắt là đưa một số mẫu sang phòng thí nghiệm của NB để phân tích.

Bế mạc cuộc họp: Tiến sĩ Nguyễn Thanh Sơn, Giám đốc Viện Chăn nuôi, Bộ NNPTNT.

Ký Biên bản cuộc họp của Đoàn đánh giá giữa kỳ.

KẾT THÚC.

Phụ lục:

1- Chương trình
2- Danh sách đại biểu
3- Bài trình bày kết quả đạt được của DA
4- Biên bản cuộc họp Báo cáo đánh giá giữa kỳ

HỌP BAN CHỈ ĐẠO DỰ ÁN LẦN THỨ 3

Dự án: "Thành lập ngân hàng gen đông lạnh cho các giống lợn bản địa Việt Nam và phát triển hệ thống chăn nuôi bền vững để bảo vệ Đa dạng sinh học"

CHƯƠNG TRÌNH

Thời gian : 08:00 to 12:30, ngày 7 tháng 11, 2017
Địa điểm : Viện Chăn nuôi
Đồng tổ chức : Giám đốc dự án Viện Chăn nuôi
Cố vấn trưởng dự án

Time	Agenda	Person in Charge
08:00-08:30	Đăng ký đại biểu	Các thành viên
08:30-08:40	Giới thiệu đại biểu	Các thành viên
08:40-08:50	Khai mạc	Mr. Naoki Kakioka, đại diện JICA Vietnam
08:50-09:20	Báo cáo các kết quả đạt được của dự án	TS. Lưu Quang Minh –Viện Chăn nuôi, Điều phối viên dự án
09:20-09:40	Thảo luận	Các thành viên
09:40–09:50	*Giải khát giữa giờ*	Các thành viên
09:50-11:50	- Kết quả của đoàn đánh giá giữa kỳ - Các đề xuất sửa đổi khung ma trận dự án - Thảo luận	Dr. Asanuma, Trưởng đoàn đánh giá giữa kỳ và thành viên đoàn
11:50–12:00	Các hoạt động nổi bật trong năm tới	TS. Lưu Quang Minh –Viện Chăn nuôi, Điều phối viên dự án
12:00-12:20	Kết luận	TS. Nguyễn Thanh Sơn, VIện trưởng Viện Chăn nuôi, Giám đốc dự án
12:20-12:30	Bế mạc	TS. Nguyễn Thanh Sơn, Viện trưởng Viện Chăn nuôi, Giám đốc dự án. TS. Kikuchi Kazuhiro, Cố vấn trưởng dự án
12:30-	Ăn trưa tại Viện Chăn nuôi	Các thành viên

MC: TS.Lưu Quang Minh – Viện Chăn nuôi
Có phiên dịch Anh - Việt.

DANH SÁCH BAN CHỈ ĐẠO DỰ ÁN
"Thành lập ngân hàng gen đông lạnh cho các giống lợn bản địa của Việt Nam và phát triển hệ thống chăn nuôi lợn bền vững bảo vệ đa dạng sinh học"

Tham dự họp Ban chỉ đạo dự án lần thứ III
Ngày 07 tháng 11 năm 2017

STT	Họ và tên	Đơn vị	
Thành viên tham dự phía Việt Nam			
1.	TS. Nguyễn Thanh Sơn	Viện Chăn nuôi	
2.	TS. Lưu Quang Minh	Viện Chăn nuôi	
3.	PGS.TS. Chu Hoàng Hà	Viện Công nghệ sinh học - VAST	
4.	PGS.TS Nguyễn Xuân Trạch	Học Viện Nông nghiệp	
5.	Ông Vương Đắc Hùng	Sở NN và PTNT Hòa Bình	
6.	TS. Nguyễn Văn Trọng	Cục Chăn nuôi	
7.	TS. Trinh Thanh Hùng	Bộ Khoa học và Công nghệ	
8.	Nguyễn Thị Phương Thủy	Chi Cục Chăn nuôi TY Hòa Bình	
9.	TS. Nguyễn Văn Lý	Bộ Nông nghiệp và PTNT	
10.	TS. Nguyễn Thành Vĩnh	Bộ Tài Nguyên và MT	
11.	TS.Nguyễn Anh Minh	Bộ Nông nghiệp và PTNT	
12.	TS Nguyễn Anh Miền	Bộ Khoa học và CN	
13.			
14.			
15.			
Thành viên tham dự phía Nhật Bản			
16.	Dr. Kazuhiro KIKUCHI	Viện Công nghệ SH Nhật Bản	
17.	Shuichi ASANUMA	Japan International Cooperation Agency (JICA)	

Minutes of the 4th Joint Coordinating Committee Meeting

For the Project for Establishment of Cryo-Bank System for Vietnamese Native Pig Resources and Sustainable Production System to Conserve Bio-Diversity

The 4th Joint Coordinating Committee (hereinafter referred to as "JCC") Meeting for the Japan International Cooperation Agency (hereinafter referred to as "JICA") technical cooperation projects entitled "the Project for Establishment of Cryo-Bank System for Vietnamese Native Pig Resources and Sustainable Production System to Conserve Bio-Diversity" (hereinafter referred to as the Project) was held on 7th June 2018 at the National Institute of Animal Science (hereinafter referred to as "NIAS-V"), Hanoi, Vietnam. Through a series of discussions made during the meeting, JCC members represented by the Senior Representative of JICA Vietnam Office, and the Director General of NIAS-V, the Ministry of Agriculture and Rural Development (hereinafter referred to as "MARD"), agreed to the matters referred to in the document attached hereto.

Hanoi, 7th June 2018

JAPAN INTERNATIONAL COOPERATION AGENCY JICA Vietnam Office

Mr. Naoki Kakioka
Senior Representative
JICA Vietnam Office

VIỆN CHĂN NUÔI

Dr. Nguyen Thanh Son
Director-General
National Institute of Animal Science (NIAS),
Ministry of Agriculture, Rural Development

4th JCC MEETING MINUTES

Thursday, 7 June 2018
NIAS-V, HANOI

Opening:

1. The 4th JCC meeting for the Project was held on 7 June 2018 at NIAS-V, Hanoi, following the agenda attached (annex 1). The meeting was opened at 08:35 chaired by Project Director, Dr. Nguyen Thanh Son, Director General of NIAS-V. The meeting was attended by a total of 24 participants and the list of participants is attached hereto (annex 2).
2. Important agenda of this 4th JCC meeting include (1) PDM modification recommended by the Mid-term Review Mission last November 2017 (2) Operation and maintenance of gene banking system as a national system (3) Procurement of inhaling anesthesia apparatus and medicine.

Presentation:

3. Project Manager, Dr. Ngo Thi Kim Cuc, Vice Director of NIAS-V presented progress of the last six months covering the period of November 2017 to May 2018 and plan for FY2018 (annex 3: PP slides).
4. Dr. Kazuhiro Kikuchi presented key points of PDM/PO modifications. (annex 4: PDM ver. 1, PDM ver. 2, PO ver. 2. and Comparison table).

Main Discussions and Decisions:

PDM/PO modification:

5. PDM modification does not affect the contents of the Project activities, only changes of expression for clarity.
6. There is no special reason why PERV copy number is set at 5 for OVI of Project purpose, but we need to have SOME number as a Project target and 5 seems to be appropriate achievable target.
7. For OVI 3-1-1 for Output 3, while the word "international" is not specific, it will nevertheless be changed from "the standard of Japanese" to "international" in order to avoid misunderstanding that the cooperation is solely for the purpose of export to Japan, since it is not the case, as per the recommendation of the Midterm Review Team of Nov. 2017.
8. The Vietnamese translation of the word "breeding" in OVI for Overall goal needs to be corrected to reflect the true meaning of "breeding" in English, as it should mean "breeding of pure breed".
9. JCC endorses PDM ver.2/PO ver.2.

Cryopreservation of Semen for gene banking system

10. Basis for selection of the provinces for semen cryopreservation is purity of breeds. Microsatellite analysis showed that Vietnamese native pigs (VNPs) from five provinces (Lao Cai, Ha Giang, Lai Chau, Quang Ngai and Binh Thuan) are relatively pure and it is urgent to conserve them. VNPs from Yen Bai province show good results in terms of PERV copy number, and will be considered for cryopreservation when the geographical areas and breeds are expanded. The purpose of PERV free breeding and the purpose of semen cryopreservation are different, as the latter target is conservation of important breeds.

Embryo Transfer and Anesthesia

11. Three issues need to be addressed in relation to the use of injection anesthesia. One is the safety and the second is animal welfare issue, as compared to inhaling anesthesia. Another issue is publication in scientific journals. The experimental design must follow international standards for publication of papers in scientific journals. Use of inhaling anesthesia with Isoflurane is the best method of anesthesia for these three reasons.
12. As Isoflurane is not on the list of medicines in circulation for animal use in Vietnam, it is necessary to get approval from DAH-MARD. PMU submitted an application to DAH-MARD to get permission for use of Isoflurane in the Project experiments under strict supervision of NIAS-V. However, permission was not yet granted by DAH-MARD. PMU will submit additional documents, i.e., (1) Registration form of animal drugs import (by NIAS-V) (2) Certification of Analysis (CoA) by manufacturer (3) Description of drug characteristics (4) Drug label, as per the instruction of DAH-MARD.
13. Use of Isoflurane is necessary and essential for the Project activities and hence JCC assigned PMU to have a further plan to approach MARD leaders again for final solution, based on the JCC meeting minutes. Evidence that Isoflurane is used in Japan may be useful as additional supporting documents to explain to Vice Minister.

Decree 59:

14. The Project will have to pay attention to the Decree 59 concerning access and benefit sharing of genetic resources. The Decree itself is new and there is no guideline yet in circulation. The Project has DNA samples for analysis in Japan for research purposes and in the future live VNP especially PERV-low copy VNP may be created for export to Japan and other countries.
15. For taking out samples such as semen, embryo, DNA for research purposes, Vietnamese institution can follow the procedures whereby approval is granted 15 days after submission of all necessary dossiers. For a long-term purpose, Japanese and Vietnamese institutions should have agreement on applying License for accessing to genetic resources, including all the detailed necessary conditions relating to beneficiaries and benefit sharing between both parties. This license is valid for three years and extendable. The License has also international recognition. As Japan is also NAGOYA protocol signer, both parties should discuss in detail to

agree on the procedures, for which NIAS-V can consult Form 2 of Decree 59 and MONRE for instructions and solutions.

Operation and maintenance of gene banking system as a national system:

16. Operation and maintenance of gene banking system as national system is an important issue, therefore requests support from relating Vietnamese agencies and ministries, such as MARD and MOST. NIAS-V will cooperate with the Japanese team in terms of experiences and technology to develop an operation plan and set the standard of gene banking system as a national system. NIAS-V will also review the existing current annual plan assisted by MARD for animal genetic resource conservation program and see how a linkage between the Project and the Program may be made to carry out for the next few years.
17. There are already materials and tools developed by the Project, such as a protocol of sample storage, protocol of semen cryopreservation, performance of individual sample, protocol of microsatellite and its results, PERV or gene information, DNA sample, etc. NIAS-V will first prepare a skeleton of the gene banking system for discussion with the Japanese team to see feasibility.

Procurement of additional equipment and tax exemption:

18. JCC endorses procurement of additional equipment (1) Stereo microscope for IBT (2) Manipulator for NIAS-V (3) Thai Nguyen Center (Mountainous Livestock Research and Development Center) additional requirement such as camera, estrus detection device, etc., considering the importance of the equipment in effective implementation of the Project. However, tax exemption is a challenge, as they are not in the Project Document and it will need to clear the lengthy tax exemption procedures of the Government. The inhaling anesthesia apparatus is still awaiting for tax exemption to be granted by Ministry of Finance since February 2018.
19. Upon receipt of JICA's letter of agreement to procure the equipment indicating clearly the budget from JICA, MARD (ICD & Finance Department) will support to issue a list of additional equipment and facilitate by contacting with MOF for tax exemption of the additional equipment, together with the anesthesia apparatus.

Change of JCC membership:

20. There will be a big change in JCC membership by the end of this year. This will be the last JCC for Dr. Son of NIAS-V and Dr. Trach of VNUA. MARD will be reported of the changes with new members.

Remarks by JICA Senior Representative:

Appreciating the efforts and contribution of all stakeholders of the Project, Mr. Kakioka reminded all of the Project overall goal to establish biodiversity conservation system of VNP, and said that NIAS-V needs to think about necessary measures for operation and maintenance in order to establish gene banking system as an officially approved national system. It is hoped that NIAS-V will come up with the direction and roadmap by the next PMU meeting scheduled in August and share and consult with MARD for their

cooperation and support not only for success of the Project but also sustainability of the system in Vietnam. For the issues of inhaling anesthesia apparatus and medicine, it is hoped that they are solved as soon as possible before August when the term of assignment completes.

END

Annex:
1-Agenda
2-Participants List
3-PP Presentation
4-PDM ver. 2, PO ver. 2, Comparison Table

Minutes of the 5th Joint Coordinating Committee Meeting

For the Project for Establishment of Cryo-Bank System for Vietnamese Native Pig Resources and Sustainable Production System to Conserve Bio-Diversity

The 5th Joint Coordinating Committee (hereinafter referred to as "JCC") Meeting for the Japan International Cooperation Agency (hereinafter referred to as "JICA") technical cooperation projects entitled "the Project for Establishment of Cryo-Bank System for Vietnamese Native Pig Resources and Sustainable Production System to Conserve Bio-Diversity" (hereinafter referred to as the Project) was held on 31st October 2019 at the National Institute of Animal Science (hereinafter referred to as "NIAS-V"), Hanoi, Vietnam. Through a series of discussions made during the meeting, JCC members represented by the Senior Representative of JICA Vietnam Office, and the Vice Director General of NIAS-V, the Ministry of Agriculture and Rural Development (hereinafter referred to as "MARD"), agreed to the matters referred to in the document attached hereto.

Hanoi, 31st October 2019

Mr. Naomichi Murooka
Senior Representative
JICA Vietnam Office

Dr. Ngo Thi Kim Cuc
Vice Director-General
National Institute of Animal Science (NIAS),
Ministry of Agriculture, and Rural Development

5th JCC MEETING MINUTES

Thursday, 31 October 2019
NIAS-V, HANOI

Opening:

1. The 5th JCC meeting for the Project was held on 31ST October 2019 at NIAS-V, Hanoi, following the agenda attached (annex 1). The meeting was opened at 08:30 chaired by Project Director, Dr. Ngo Thi Kim Cuc, Vice Director-General of NIAS-V. The meeting was attended by a total of 28 participants and the list of participants is attached hereto (annex 2).
2. One important agenda of this 5th JCC meeting is the report of the Terminal Evaluation of the Project which was carried out on 16th – 31st October 2019.

Presentation:

3. The joint evaluation team presented the summary report of the terminal evaluation. (annex 3: PP slides).

Key Points and Remarks:

1. Data related to Vietnamese Native Pig (VNP) Breeds

The data related to VNP breeds should be consistent with the official data of the Government of Vietnam.

The Project collected samples and data from 32 population covering 21 breeds, based on NIAS-V report that, of 26 breeds that exist in Vietnam, 5 have become extinct. According to the MARD, however, there are officially 22 breeds currently in Vietnam under Government list.

In view of the fact that NIAS-V is developing a proposal for the National Program focused on conservation of all breeds of VNP, it is important for the Project to use appropriate terminology such as "population" instead of "breed", and "line" to clarify the number of breeds, population, and provinces where it collected data, and especially for NIAS-V to be consistent with the Government list and make clear which breeds have already become extinct and which breeds are in danger and for conservation.

The Project collected 2,033 samples. It is recommended to make it clear in the evaluation report how many semen, oocytes, embryos, as well as which 22 provinces are covered. The reasons for increased productivity in Hoa Binh also should be clarified in the report.

MONRE is currently developing a database on domestic animals and plants and the evaluation report of this Project can be good contribution to the MONRE database.

2. Decree 59

MONRE is one of the Government agencies in charge of providing guidance for exchange of genetic resources between Vietnam and other countries. MARD is in charge of issuing a license for accessing genetic resources including domestic animals and plants, while MONRE for other genetic resources. Department of Livestock Production, MARD is developing a circular on management of rare animals for conservation as guidance. The Project is to follow the regulation of the Government for procedures under Decree 59 and other circulars for export of DNA samples.

3. Technologies of cryopreservation of semen and embryos

As MARD is planning to conserve 15 breeds, establishment of the technologies of cryopreservation of semen and embryos is very important. Survival rate of cryopreserved semen and transfer of embryos achieved in the Project is of interest from science and technology point of view.

It is reported that over 35% of sperm frozen and thawed shows good motility, the same rate with western breeds. However, the Project did not carry out AI experiments using the cryopreserved semen, instead, in vitro fertilization using frozen and thawed sperm and Ban sows oocytes was carried out with good results of fertilization ability, as fertilized oocytes developed into blastocysts. Embryo transfer has not yet been successful due to the poor condition of the recipient sows caused by ineffective anesthesia and hormone. Now that the problems relating to anesthesia and hormone have been addressed, we hope to have good results.

So far, the Project undertook three experiments with two sows each time. With good system of anesthesia now available in the Project and good quality hormone brought from Japan, the Project will continue with more experiments till the end of the Project.

4. Breeding of low copy-PERV VNP

MARD has already approved the budget for continuation of breeding of low copy-PERV VNP at NIAS-V Thai Nguyen Center. It is strongly recommended to continue collaboration between two countries, as Vietnam currently lacks advanced technologies for breeding and utilization including medical application. Possible funding sources will also be explored in Japan for continued cooperation.

5. Overall achievement of the Project

The Terminal Evaluation Report was reviewed and discussed between joint members from Japan and ICD, MARD. Given the fact that Vietnamese native pigs could possibly become a valuable organ donor for human medication, it was agreed to add Ministry of Health (MOH) as one related ministry

The joint evaluation team also recognizes possible limitation of the Terminal Evaluation Report due to the absence of other ministries with technical expertise during the Evaluation.

Despite some obstacles on Vietnamese side caused by administrative procedures and change of leadership of the Project, the Project was successful in achieving good results and outputs, including development of technical guidelines and development of human resources through technical transfers. Importance of conservation is also recognized. Technologies acquired through the Project is applicable to other animals and fields, which are the added values of the Project. Based on the experiences of the Project, further results can be achieved after the Project.

Remarks by JICA Senior Representative:

It is highly commendable that the Project changed challenges of African Swine Fever (ASF) into opportunities thanks to the efforts of all stakeholders. As JICA, there are two more evaluations in the future. One is the ex-post evaluation, which will be carried out after 3-5 years, and the other is the state audit mission to assess achievement and sustainability. Therefore, it is important to consider impact and sustainability now. Dissemination of outputs and outcome is very important in order to bring benefits to the society and Hoa Binh is a typical example for this. It is expected that Hoa Binh continue some of the activities based on the success of the Project.

The remaining activities as outlined in the presentation need to be completed for ensured sustainability, and they include development of guidelines and documentation. Appropriate utilization of database and equipment is also important. Continued collaboration between research institutions of Vietnam and Japan and knowledge exchange is important.

Signing of the Terminal Evaluation Report:

Discussions held at this meeting and comments made on the Terminal evaluation report are noted and will be reflected in the Minutes of Meeting of the 5th JCC. Hence, the Joint terminal evaluation report was approved and signed by the representatives of the Joint terminal evaluation team in 5th JCC meeting.

Closing Remarks:

The meeting was closed with closing remarks of the Project Director congratulating the positive results of the evaluation with completion of almost all indicators. It was emphasized that the remaining activities will be completed in the next 6 months.

END

Annex:
1-Agenda
2-Participants List
3-PP Presentations

Minutes of the 6th Joint Coordinating Committee Meeting

For the Project for Establishment of Cryo-Bank System for Vietnamese Native Pig Resources and Sustainable Production System to Conserve Bio-Diversity

The 6th Joint Coordinating Committee (hereinafter referred to as "JCC") Meeting for the Japan International Cooperation Agency (hereinafter referred to as "JICA") technical cooperation projects entitled "the Project for Establishment of Cryo-Bank System for Vietnamese Native Pig Resources and Sustainable Production System to Conserve Bio-Diversity" (hereinafter referred to as the Project) was held on 3rd March 2020 at the National Institute of Animal Science (hereinafter referred to as "NIAS-V"), Hanoi, Vietnam. Through a series of discussions made during the meeting, JCC members represented by the Senior Representative of JICA Vietnam Office, and the Vice Director General of NIAS-V, the Ministry of Agriculture and Rural Development (hereinafter referred to as "MARD"), agreed to the matters referred to in the document attached hereto.

Hanoi, 3rd March2020

Mr. Naomichi Murooka
Senior Representative
JICA Vietnam Office

Dr. Ngo Thi Kim Cuc
Vice Director-General
National Institute of Animal Science (NIAS),
Ministry of Agriculture, and Rural Development

6th JCC MEETING MINUTES

Tuesday, 3 March 2020
NIAS-V, HANOI

Opening:

1. The 6th JCC meeting for the Project was held on 3rd March 2020 at NIAS-V, Hanoi, following the agenda attached (Annex 1). The meeting was opened at 13:30 chaired by Project Director, Dr. Ngo Thi Kim Cuc, Vice Director-General of NIAS-V. The meeting was attended by a total of 30 participants and the list of participants is attached hereto (Annex 2).
2. The purpose of the meeting is to (1) assess the progress made during the last few months on the recommendation of the Terminal Evaluation, (2) review the prospects how to sustain the Project activities in the future, (3) plan the remaining activities.

Presentation:

Progress on "Recommendation" by the Terminal Evaluation of October 2019 and Prospects (Annex 3: PP slides).

1. For "Recommendation for the Project":
   - "Management rules and operation manual of cryobank system and database" is currently under development and the official version will be made available at the end of March 2020.
   - Completion of manuals, guidelines, and protocols for use after termination of the Project has all been completed with (1) Protocol of RT-PCR (2) Reproductive techniques (3) Technical Procedures applied for pigs at isolation section and breeding section at Thai Nguyen Center (4) Technical guidelines for raising management of VNP and AI technology (5) Handbook on raising VNP are all done.
   - ASF documentation on prevention and control based on the Project lessons can't be undertaken due to time constraints
   - Export of DNA samples to Japan is in progress in NARO Japan under Law on Animal Husbandry 2018.
   - Eight research papers have been published and 2 are currently in press.
2. For "Recommendation for the Vietnamese implementation organization":
   - For effective use of Thai Nguyen Center for continued breeding, NIAS-V already secured 500M VND from MARD for three years (2020-2022), but the budget is not enough to maintain the same scale of breeding as the Project and additional support is needed from the Japanese side.

- Strengthening activities toward branding of native pigs in Da Bac District, Hoa Binh Province including supporting cooperatives are planned by Hoa Binh Sub DAH

3. For "Recommendation for the Vietnamese Government authorities":
   - MARD already approved a project for conservation of 15 breeds and only waiting for the budget.
   - MARD already approved the budget of 500M VND for breeding of low copy-PERV VNP for 2020-2022.
   - NIAS got funding from FAO for cryo-conservation of 5 breeds in 2020.
4. The Remaining activities include:
   - Finalization of "Management rules and operation manual of cryobank system and database" by the end of March 2020
   - Embryo transfer (6 & 12 March 2020)
5. After May 2020, breeding will be continued at Thai Nguyen Center and branding activities in Hoa Binh. Collaboration will continue with the Government to develop an integrated strategy for conservation and full use of VNP.

Project Completion Report for JICA HQs (Annex 4: PP slides)

1. The Project has to submit Project Completion Report to JICA HQs due 31 March 2020. The Report has four sections (1) Basic information of the Project (2) Results of the Project (3) Results of the Joint Review (4) For the Achievement of Overall Goals after the Project Completion.
2. JICA carries out an ex-post evaluation three years after completion of the Project based on PDM ver 2 and evaluate if "Overall Goal" of the Project have been achieved. The indicators for overall goal have to be achieved by Vietnamese side only.
3. There are three indicators: (1) the gene banking system of VNP is operated (including addition and distribution of gene resources) in NIAS", (2) PERV copy number less than that at the end of the Project (currently 6.4), (3) geographical coverage expansion from the current 6 to 20 communes in Hoa Binh.
4. It is possible to achieve the first indicator. MARD already approved the NIAS project to conserve semen, oocytes, and embryos of 15 more breeds. FAO will provide budget for cryopreservation of somatic cells in 2020, and possibly next year for semen, oocytes, and embryos. Finalization of the operation manual of database and cryopreservation system is important in this regard. Thus, it is possible to achieve the first indicator.
5. For the second indicator, the lowest number of PERV copy at the end of the Project will be determined by 13 March. MARD budget however will not be sufficient to maintain the same scale of breeding as now (10 boars and 8 sows). Unless additional budget is available, 5 boars and 5 sows may be maintained. This is a potential Project of MARD, and with good results after three years, NIAS can apply for a bigger project. This is one area needing support from the Japanese side.

6. For the third indicator, Hoa Binh will know the budget after May 2020.
7. A seminar may be organized in order to share the good experiences of the Project for prevention and control of ASF.
8. Efforts will be made for continued publication through collaboration on both sides, as it is important for future funding. Publication fee may be discussed with the Japanese side.
9. The draft Project Completion Report will be completed by 13 March 2020 for comments by JCC members and then finalized by end March for submission to JICA HQ.

Open Discussion:

1. There are 3 indicators for achieving the overall goal, one of which is "the gene banking system of VNP is operated in NIAS". "Operation" means something in action. The manual for conservation and use cryo-bank should be developed to align for the purpose.
2. ET experiment is one activity whose target has not been achieved as of now. There will be 2 more experiments in March before the end of the Project. After the Project, the technology will be applied with the National program of the Vietnamese Government, as well as Quang Ninh Project for Mong Cai breed.
3. DNA export to Japan was planned in the framework of Decree 59 and the new circular on management of rare animal for conservation under development. Law on animal husbandry (2018) also takes effect this month in March. Considering the lengthy procedures of the application, however, it will not be possible to get approval from the Vietnamese government before the Project end, as the documents are not ready as of now. Hence, the research analysis will be undertaken with DNA already available in Japan.
4. Vietnamese native pig breeds are mainly named by the geographic names, and there are many breeds we don't know whether they are the same genetic resources or different. The Project collected scientific data on genetic relations and characteristics for classification and identification of Vietnamese native pig breeds. Identification of breeds is important for effective conservation and breeding programs from genetic aspects. However, as naming of the Vietnamese native pig breeds depends on many factors and culture, it will be difficult to change names based on the Project data.
5. MARD Will cooperate with agencies to solve some of the issues raised in the prospects of the project.

Summary:

1. Activities to complete by the end of March 2020:
   - Manual of conservation and database
   - Embryo Transfer
2. Activities to continue after the end of the Project:
   - Breeding at Thai Nguyen Center
   - Continued application of technology learned through the Project
   - Cryopreservation system should be operational in the future

- Marketing system, cooperative system and branding/labeling in Hoa Binh.

3. Continued support from the Japanese side is essential from the Japanese side, especially for breeding of low copy-PERV VNP at Thai Nguyen Center, embryo transfer, and the cryoconservation system. Cryoconservation of somatic cell and semen are easier, while oocytes and embryos more difficult.

Remarks from JICA Senior Representative:

1. The Project successfully implemented planned activities despite difficulties, thanks to the commitment and efforts by both Vietnamese and Japanese sides.
2. SATREPS Project is different from traditional JICA technical cooperation, as it is a combination of research activities and utilization of research results for social benefits. Notwithstanding the challenges to achieve both goals in 5 years, there are certain successful achievements from the Project.
3. JICA will carry out an ex-post evaluation after three years by a third party, focusing on impact and sustainability, and achievement of the overall goal indicators. Collective efforts are expected to fulfill the overall goal, not only NIAS, but also Hoa Binh under the Government and MARD leadership to ensure the sustainability of the Project results, andJICA would like to continue to have a close dialogue.

END

Annex:
1. Agenda
2. Participants list
3. PP slide – Progress on Recommendations and Prospects
4. PP slide – Project Completion Report

Sixth Joint Coordinating Committee (JCC) Meeting

SATREPS Project "Establishment of Cryo-Bank System for Vietnamese Native Pig Resources and Sustainable Production System to Conserve Bio-Diversity"

Agenda

Date: 3 March, 2020
Time: 13:30 to 16:00
Venue: NIAS-V
Chairpersons: Project Director, NIAS-V
Japanese Project Leader, NIAS-J

Time	Agenda	Person in Charge
13:30-13:45	Registration	All
13:45-14:00	Opening Remarks	Dr. Ngo Thi Kim Cuc, Project Director, NIAS-V
14:00-14:30	Progress on "Recommendation" of Terminal Evaluation and Prospects	Dr. Ngo Thi Kim Cuc, Project Director, NIAS-V Dr. Kazuhiro Kikuchi, Japanese Project Leader
14:30-14:55	Discussion and Endorsement of Final Draft of Project Completion Report for submission to JICA HQ	Dr. Kazuhiro Kikuchi, Japanese Project Leader
14:55-15:05	Tea Break	
15:05-15:35	Open Discussion	All
15:35-15:50	Conclusion / Summary	Dr. Ngo Thi Kim Cuc, Project Director, NIAS-V
15:50-16:05	Remarks	Representative from JICA
16:05-16:30	Closing Remarks	Dr. Ngo Thi Kim Cuc, Project Director, NIAS-V Dr. Kazuhiro Kikuchi, Japanese Project Leader, NIAS-J

MC: Dr. Ha Minh Tuan, NIAS-V
Interpreter: Ms. Nguyen Thu Hien, JICA Project

Danh sách tham dự họp Ban chỉ đạo dự án lần thứ VI
Ngày 03 tháng 3 năm 2020 tại Viện Chăn nuôi

Dự án "Thành lập ngân hàng gen đông lạnh cho các giống lợn bản địa của Việt Nam và phát triển hệ thống chăn nuôi lợn bền vững bảo vệ đa dạng sinh học"

Thời gian: 13:30 - 16:30; Thứ 3, ngày 03/3, 2020.
Địa điểm: Viện Chăn nuôi
Đồng chủ trì: Giám đốc dự án NIAS-V; Cố vấn trưởng dự án NIAS-J

TT	Họ và tên	Đơn vị	Chữ ký
Phía Việt Nam			
1	Ngô Thị Kim Cúc	Phó Viện trưởng Viện Chăn nuôi, Giám đốc dự án	
2	Kazuhiro Kikuchi	Viện nghiên cứu sinh học nông nghiệp NB	
3	Chu Hoàng Hà	Viện Công nghệ sinh học - VAST	
4	Nguyễn Văn Dũng	Phó chủ tịch tỉnh Hòa Bình	
5	Nguyễn Anh Minh	Vụ Hợp tác quốc tế (ICD)	
6	Nguyễn Văn Trọng	Cục Chăn Nuôi (DLP)	
7	Ngô Đắc Thái	Vụ Tài Chính (DOF)	
8	Nguyễn Ánh Long	Vụ Kế hoạch (DOP)	
9	Nguyễn Văn Lý	Vụ Khoa học Công nghệ và Môi trường (DOSTE)	
10	Nguyễn Thu Thủy	Cục Thú Y (DAH)	
11	Trịnh Thanh Hùng	Bộ Khoa học và Công nghệ (MOST)	
12	Nguyễn Thành Vĩnh	Bộ Tài nguyên và Môi trường (MONRE)	
Nhóm chuyên gia/Điều phối viên, thư ký dự án			
13	Nobuko Yamagishi	Điều phối viên dự án phía Nhật Bản	
14	Hà Minh Tuân	Điều phối viên dự án phía Việt Nam	
15	Nguyễn Thu Hiền	Thư ký phía Nhật Bản	
16	Lê Thu Hà	Thư ký phía Việt Nam	
Về phía các quan sát viên			
17	Mr. Hiroshi Matsuura	Đại sứ quán Nhật Bản	
18	Mr. Naoki Kayano	Văn phòng JICA	
19	Prof.Dr. Takeshige Otoi	Đại học Tokushima	
20	Dr. Kenji Kawashima	Viện NARO Nhật bản	
21	Dr. Kohtaro Miyazawa	Viện NARO Nhật bản	
22	Dr. Masaaki Taniguchi	Viện NARO Nhật bản	
23	Dr. Shinya Ishihara	Viện NARO Nhật bản	
24	Dr. Tamas Somfai	Viện NARO Nhật bản	
25	Ms. Nguyễn Thu Lê	Văn phòng JICA	

Mr. Murooka Naomichi //

26	Dr. Đặng Quý Nhân	Vụ Hợp tác Quốc tế/MARD	
27	Dr. Phạm Thị Kim Dung	Cục Chăn nuôi/MARD	
28	Dr. Nguyễn Khánh Vân	NIAS	
29	Dr. Sử Thanh Long	VNUA	
30	Dr. Trịnh Đình Thâu	VNUA	
31	Dr. Nguyễn Hồng Nhung	IBT	
32	Dr. Nguyễn Văn Đại	NIAS	
33	Mr. Tạ Văn Cần	NIAS	
34	Mr. Phạm Hải Ninh	NIAS	
35	Dr. Phan Lê Sơn	NIAS	
36	Dr. Bùi Thị Tố Nga	VNUA	
37	Dr. Đỗ Thị Kim Lành	VNUA	
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