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Country Name: Indonesia

## Ex-Post Evaluation of Japanese Grant Aid Project

The Project for Improvement of Animal Health Laboratories for Diagnoses of Avian Influenza and Other Major Diseases of Animal

**Kaneyasu Ida, Tekizaitekisho Organization**

### 0. Summary

Summary of the study results

This project set up testing facilities able to handle dangerous pathogens such as avian influenza in the three locations of Subang, Medan and Lampung on the island of Java and the island of Sumatra, which are at grave risk of damage due to avian influenza. The objective was to enable the diagnostic facilities to conduct tests rapidly and reduce the risk of infection to inspection staff and residents living in the vicinity of the diagnostic facilities. Reinforcing the diagnostic system is an important pillar of the national strategic plan to eradicate avian influenza and thus its relevance is high. The avian influenza diagnostic facilities and equipment at the three disease investigation centers (DICs) are being utilized and the time until the diagnostic results can be provided has shortened. In addition to these effects, the project objective of improving safety was achieved as they operate as facilities with a biosafety level of three, giving them the clearance needed to diagnose avian influenza virus. This means that the project's effectiveness was high. The Medan and Lampung DIC were completed as planned in terms of both project costs and project duration, but after the Subang DIC's facility was set up there were delays before diagnostic services began. Accordingly, efficiency is assessed as moderate. There are no major problems at present at any of the three facilities that lowered diagnostic services, but DGLAHS has not established standards or a monitoring system for biosafety operations, and dysfunctional equipment is not being repaired, partly due to an inadequate budget for maintenance and management. Accordingly, sustainably is rated as moderate.

Given the above, the project is evaluated to be satisfactory.

### 1. Project Description



(Image of project site location)



(Subang Disease Investigation Center)

## 1.1 Background

Avian influenza has caused severe damage in Indonesia, as evidenced by the declaration of a state of emergency when it spread to livestock and humans in 2005, and there are concerns that the damage could reach an even greater scale in the future. Indonesia has a shortage of laboratories for diagnosing avian influenza on the islands of Java and Sumatra, where both the human population and livestock are concentrated, and it takes considerable time to diagnose specimens suspected of infection. As such, Indonesia clearly lacked the systems needed to quickly take steps to prevent contagions from spreading. Moreover, since Indonesia does not have testing facilities with the safety protocol needed to handle dangerous pathogens such as avian influenza, the laboratory staff and residents living near the facility were put into dangerous situations when tests were, for lack of an alternative, conducted in facilities that were not safe enough.

## 1.2 Project Outline

By setting up disease investigation centers (DICs) in the three locations of Subang (West Java province, the island of Java), Medan (North Sumatra province, island of Sumatra), Lampung (Lampung province, island of Sumatra) and providing them with the necessary equipment and materials, the Centers' ability to diagnose animal diseases such as avian influenza is enhanced, and at the same time testing facilities with the necessary safety protocol to handle dangerous pathogens (A1 laboratory facilities corresponding to a biosafety level 3: laboratories that can handle avian influenza cases) are set up. <sup>1</sup>

The objective of this project is to increase the number of diagnoses and examinations carried out at the three Disease Investigation Centers (DIC) by taking advantage of the newly constructed and upgraded facilities and equipment for Avian Influenza (AI) and other major animal diseases.

Description of the Project

Grant Limit / Actual Grant Amount	178.1 Million Japanese Yen/173.4 Million Japanese Yen
Exchange of Notes Date	September 2007
Implementing Agency	Directorate General of Livestock and Animal Health Services (DGLAHS)
Project Completion Date	March 2009
Main Contractor(s)	Sumitomo Mitsui Construction Co., Ltd. Mitsubishi Corporation

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<sup>1</sup>According to the DGLAHS's definition, BSL2 facilities can handle bacteria and viruses with a low risk of potential contagion to people and the environment and that do not have a grave effect on the human body (such as influenza A, hepatitis, salmonella, measles, HIV, etc.). Facilities must have BSL3 to handle dangerous agents that are a serious risk to human life when inhaled (anthrax, tuberculosis germs, highly pathogenic influenza, etc.). BSL2 can handle agents that should be handled in BSL3 facilities with the DIC director's authorization and if the facility has strict limitations on access, uses safety cabinets, has double doors, and can regulate the flow of air with an air conditioning system. Accordingly, the other five DIC currently handle such agents. DGLAHS recognizes the three DICs (Medan, Subang and Lampung) as being BSL2+ overall since the three DICs' AI laboratories are BSL3, but the other testing facilities of these three DICs are BSL2.

Main Consultant(s)	Joint Venture of Nihon Sekkei Inc. and Fujita Planning Co., Ltd.
Basic Design	“The Basic Design Study on Project for Improvement on Animal Health Laboratories for Avian Influenza and Other Strategic Animal Infectious Diseases in the Republic of Indonesia” Joint Venture of Nihon Sekkei Inc. and Fujita Planning Co., Ltd.
Detailed Design	January 2008
Related Projects (if any)	The Project for Improvement on the Vaccination Program for Avian Influenza Control in Indonesia (2007 – 2009) The Project on Capacity Development of Animal Health Laboratory (2011 – 2015)

## 2. Outline of the Evaluation Study

### 2.1 External Evaluator

Kaneyasu Ida, Senior Consultant, Tekizaitekisho Organization

Maria Ulfah, National Consultant, Bogor Agricultural University

### 2.2 Duration of Evaluation Study

Duration of the Study: January – April 2012

Duration of the Field Study: January 10 – 29, 2012. April 14 – 20, 2012

### 2.3 Constraints during the Evaluation Study (if any)

The Subang DIC does not have information on the users of its diagnostic services, and a questionnaire of private-sector users did not yield an adequate number of responses. As a result, it was not possible to quantitatively ascertain the economic impact on private-sector users.

## 3. Results of the Evaluation (Overall Rating: B<sup>2</sup>)

### 3.1 Relevance (Rating: 3<sup>3</sup>)

#### 3.1.1 Relevance with the Development Plan of Indonesia

(1) In 2005, the Government of Indonesia (GOI) formulated the National Strategic Plan (NSP) to tackle the outbreaks of AI on human as well as poultry. The NSP set ten targets and objectives where the strengthening of diagnostic capacity of national institutions such as the Disease Investigation Centers (DICs) was emphasized. In accordance with the NSP, the Ministry of Agriculture formulated the National Strategic Work Plan (NSWP) and the improvement of relevant facilities and equipment for the control of High Pathogenic Avian Influenza (HPAI) was one of the seven pillars of the NSWP.

<sup>2</sup> A rating of “A” indicates “very high,” “B” indicates “high,” “C” indicates “there are some issues” and “D” indicates a “low” rating.

<sup>3</sup> A sub-rating of (3) indicates “high,” (2) indicates “moderate,” and (1) indicates “low.”

Therefore, the project's objective of strengthening diagnostic capacity of DICs was in alignment with the NSP/NSWP.

- (2) The Directorate General of Livestock and Animal Health Services (DGLAHS) set up the Participatory Disease Surveillance and Response (PDSR) program in local government entities (primarily district animal husbandry offices) and is endeavouring to reinforce it in order to promote the monitoring and reporting of HPAI and the education of the public. The biggest priority of DICs is to provide rapid diagnostic services in collaboration with the PDSR team, and in this sense also strengthening diagnostic capacities is extremely important. Moreover, in a recent development, in 2012 each DIC were designated as reference laboratories specializing in disease diagnosis in ministerial ordinance 89/Kpts/PD.620/1/2012. In this respect, the Subang DIC became the HPAI reference laboratory.<sup>4</sup> In this sense as well, JICA's aid for the Subang DIC can be said to be consistent with the Indonesian government's desire to make this DIC the center for avian influenza diagnosis.

### 3.1.2 Relevance with the Development Needs of Indonesia

There were a total of 1,461 cases of avian influenza in domestic animals nationwide in 2011, including a high proportion of cases on the island of Java (461 cases, or 45.8%) and the island of Sumatra (311 cases, or 21.3%). Selecting Java and Sumatra as the targets for this project aimed at strengthening diagnostic capacity was appropriate. The choice was also optimal in terms of the human population and number of domestic animals in the provinces with jurisdiction over these three DICs.

Table 1 Provinces over which DICs have jurisdiction, population and number of domestic animals for three DIC

	Subang DIC	Lampung DIC	Medan DIC	Total
Provinces over which it has jurisdiction	Jakarta, East Java, Banten	South Sumara, Lampung	North Sumatra, Aceh	
Target population	63,290,000 (26.6%)	15,060,000(6.3%)	17,470,000 people (7.4%)	95,830,000 (40% of total population)
Number of domestic animals (chickens)	641,440,000 (43.6%)	79,260,000 (5.4%)	76,250,000 (5.2%)	796,950,000 (54.2% of nationwide total)

(Source: DGLAHS)

<sup>4</sup> The Medan DIC was designated as the reference laboratory for swine cholera and the Lampung DIC for Newcastle disease and infectious bursal disease (IBD).

The selection of the targeted DIC was also generally appropriate in the following respects. Subang is the center for the poultry industry, with 60% of Indonesia's poultry industry concentrated here, so building a DIC that can rapidly handle diagnoses of avian influenza in Subang is extremely relevant. Medan and Lampung have been diagnosing avian influenza using polymerase chain reaction (PCR; a virus testing method using polymerase chain reactions) protocols since 2005 and reverse transcription-PCR (RT-PCR) protocols since 2007. For this reason, there was a strong need to upgrade from the BSL2 facility, which has a risk of contagion, to a facility that could take biosafety measures exceeding BSL2 and thus address the risk of contagion.

According to the provincial and district animal husbandry offices in the areas where the three DICs are providing diagnostic services, they carry out active surveillance<sup>5</sup> and passive surveillance<sup>6</sup> (monitoring based on reports from livestock owners after an outbreak of disease) on a daily basis in collaboration with the DIC, and there is a great need for the provincial and district animal husbandry offices to strengthen the diagnostic capacity of the DICs. Moreover, the Food and Agriculture Organization (FAO) is strengthening its monitoring, surveying and research of markets and poultry farmers that are medium-sized or larger, and has requested that the Subang DIC, as a hub for poultry farming, carry out diagnoses as its position makes Subang strategically important in terms of epidemiological studies. In this sense, upgrading DIC facilities as a hub for other donors' activities is an effective form of support.

Before this Project, all eight DICs had a level two biosafety level (BSL). As of the ex-post evaluation, only the three DICs upgraded in this project have avian influenza (AI) laboratory facilities exceeding level 2. International organizations such as the World Organization for Animal Health (OIE) advocate that diagnoses of highly risky diseases such as avian influenza should be carried out in laboratories with high biosafety levels, and DGLAHS plans to set up AI laboratories at all DIC in the future. This project's pioneering aim to set up AI laboratories is another reason that it was relevant.

### 3.1.3 Relevance with Japan's Aid Policy

At the time of the ex-ante evaluation, the project was part of the social development program in JICA's country-specific plans and was intended to contribute to the stable supply of food and help raise farmers' and fishermen's incomes. As such, its consistency was high.

Given this, implementation of the project is sufficiently consistent with Indonesia's national development policy, development needs and Japan's aid policy, and thus this project is deemed to be highly relevant.

## 3.2 Effectiveness (Rating: 3<sup>7</sup>)

### 3.2.1 Quantitative effect

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<sup>5</sup> Active surveillance refers to epidemiological surveys to ascertain the outbreak of diseases and its movement.

<sup>6</sup> Passive surveillance refers to monitoring based on reports from livestock owners after an outbreak of disease.

<sup>7</sup> 3: "high," 2: "moderate," and 1: "low."

(1) Fluctuations in number of diagnoses

In the past four years, the Medan DIC has diagnosed an average of 15,030 cases of avian influenza a year, the Lampung DIC has diagnosed an average of 8,215 cases a year, while the Subang DIC has diagnosed an average of 3,623 cases in the past two years. The number of highly pathogenic avian influenza cases diagnosed fluctuates depending on outbreaks and the budget allocated by the government for surveillance, so the increase in diagnosed cases does not simply correlate to the DIC's diagnostic skill and capacity. Nevertheless, it does indicate that diagnostic work is continuing at a certain scale in all three DIC. The number of diagnostic cases decreased at the Lampung DIC in 2011 simply reflects the fact that there was only one case of human infection in the previous fiscal year and thus there was little surveillance and few examinations.

Table 2 Change in the number of diagnosis conducted by the three DICs for HAPI

	2008	2009	2010	2011
HA-HI test	20,208	2,285	5,861	6,385
Virus isolation	2,014	838	1,421	910
PCR	216	919	1,062	2,970
<b>Medan Total</b>	<b>22,438</b>	<b>4,042</b>	<b>8,344</b>	<b>10,265</b>
HA-HI test	4,905	9,421	7,309	5,238
Virus isolation	20	42	81	0
PCR	349	172	3,421	1,903
<b>Lampung Total</b>	<b>5,274</b>	<b>9,635</b>	<b>10,811</b>	<b>7,141</b>
HA-HI test	-	-	1,710	3,547
Virus isolation	-	-	716	1253
PCR	-	-	0	20
<b>Subang Total</b>			<b>2,426</b>	<b>4,820</b>

(Sources: Medan DIC, Lampung DIC and Subang DIC)

Current conditions at the DIC are described below.

The Subang DIC began diagnosing cases in mid-2010, and has endeavored to strengthen its diagnostic capacity with technical support from JICA and FAO.<sup>8</sup> In particular, examination components (1), (4)-(9) and (12) in the table below received technical support from JICA projects aimed at enhancing the capacity of animal health laboratories. As a result of this support, the number of diagnostic cases and the examination components are both on the rise at the Subang DIC, and its diagnostic capacity is improving.

<sup>8</sup> The FAO has provided DICs with technical support related to avian influenza since 2007. The DICs receive the same training on antigenic characterization, and aspects of laboratory operations that are weak are addressed on a case-by-case basis. The FAO also carries out monitoring and surveys of avian influenza in the markets in Jakarta and Bogor (270 markets in which poultry is traded). The samples collected in these activities were primarily sent to nearby diagnostic facilities in Jakarta and Banten province, but began to be sent to the Subang DIC in 2010, resulting in an increase in diagnostic cases (the FAO requested diagnosis using viral isolation rather than PCR).

Table 3 Diagnosis carried out by Subang (2010 – 2011)

No	Items	Diagnostic methods	Number of diagnosis	
			2010	2011
(1)	Anthrax	Isolation/identification		61
		ELISA (serology test)	0	422
(2)	Brucellosis	RBPT	3,120	11,958
		CFT	31	87
		Isolation/identification	0	0
(3)	Salmonella	Rapid Test for Pulum (serology Test)	1,516	889
		Isolation/identification	0	124
(4)	Rabies	FAT	25	21
		ELISA (serology test)	262	453
(5)	BVD	ELISA (serology test)	370	788
(6)	IBR	ELISA (serology test)	658	750
(7)	HPAI	HA/HI, Isolation, PCR	12,446	5,398
(8)	New Castle Disease	TET Isolation	716	649
		HA/HI (serology Test)	1,153	4,075
(9)	Trypanosoma	Geimsa Staining	1,927	2,439
(10)	FMD	ELISA (serology test)	0	2
(11)	EBL	ELISA (serology test)	430	564
(12)	Food born diseases	Total Plate Count	0	157
		Coliform	0	157
		Salmonella sp	0	157
		Formalin Test	0	115
	Total		22,634	29,346

(Source: Subang DIC)

The Medan and Lampung DIC have diagnosed avian influenza using PCR since 2005 and real-time PCR since 2007 (this project's support for the Medan and Lampung DIC consisted of setting up AI facilities and providing equipment, and did not include PCR and other analytical equipment). As a result, the project cannot be said to have directly led to the increase in the number of diagnostic cases, but the project did contribute multi-purpose sterilizers, and having a BSL3 laboratory not only enhanced safety, but also contributed to overall improvements in the examination capacity as relates to avian influenza. The aid from AUSAID (Australian Agency for International Development) was intended to strengthen the accuracy of avian influenza diagnosis at the Medan and Lampung DIC.<sup>9</sup>

<sup>9</sup> AUSAID implemented projects to strengthen the diagnostic capacity and raise laboratory accuracy of DIC throughout Indonesia in the four-year period from 2006 to 2010. This included training on proficiency tests (total



## (2) Effect in shortening period needed to obtain diagnostic results

Before the Subang DIC was constructed in this Project, Jogjakarta's diagnostic center had jurisdiction over six provinces on the island of Java (Banten, Jakarta, East Java, Central Java, Jogjakarta and West Java). Currently the Subang DIC has jurisdiction over the provinces of Banten, Jakarta and East Java. Of the three provinces, two certified laboratories were set up in Jakarta and one in West Java, but Banten has no certified laboratories. As a result, there are significant merits to shortening the duration for companies and farmers in the province of Banten and the Subang region in the province of West Java. According to the livestock farmers surveyed here, it previously took over two days to receive a diagnosis of brucellosis from a diagnostic facility in another province (the sample was delivered and the document with the results was received the following day, so it took two days), but now they can receive results in half a day from the Subang DIC. This demonstrates that the project has helped to shorten the period until results are received and speed up contagious disease measures.

### 3.3.2 Qualitative Effects

According to DGLAHS's definition, a BSL3 facility is needed to viruses that carry a risk of air-borne contagion (anthrax, tuberculosis bacillus, highly pathogenic influenza, etc.). Enhancing safety for the staff of the three DIC and nearby residents by setting up BSL3 facilities was a primarily important effect.

Each DIC has a different level, but essentially they prepare and use biosafety and equipment use manuals, keep equipment records, and regularly clean the air-conditioning equipment and replace the filter as directed and guided by consultants in charge of the soft component. In evaluations of the three DIC in 2011, the provincial and district animal husbandry offices that had requested diagnoses responded that the safety of the environment and diagnostic facilities were high (in a four-stage assessment, the Subang DIC was rated 2.98, the Medang DIC 3.23 and the Lampung DIC 3.27).



(AI laboratory door and air conditioning at the Medan DIC) (Sample receiving door at the Subang DIC)

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of nine sessions) and examination methods for highly pathogenic avian influenza and an accuracy check of DIC by the Australian Animal Health Laboratory. Staff from the Medan and Lampung DIC also participated.



(Sterilizer in changing room at the Lampung DIC)

As such, the anticipated results were generally achieved, given that this project succeeded in ensuring the biosafety level needed to handle highly pathogenic avian influenza, the number of diagnoses is on the rise, and the time needed for diagnosis is falling.

### 3.3 Impact

#### 3.3.1 Realization of Impacts

The Project's construction of a diagnostic center in Subang, where the poultry industry is concentrated, was an important contribution in strengthening the supervision and monitoring of avian influenza. DGLAHS had previously endeavoured to reinforce its system for monitoring small- and medium-scale poultry farmers and businesses, and plans to focus more on strengthening its monitoring and surveying system for markets and medium-scale and larger poultry farms going forward. This will make the role of the Subang DIC, which oversees the area in which poultry raising is popular, even more important.

In Indonesia, important animal diseases other than avian influenza, including brucellosis, which infects both people and animals, and Newcastle disease, are monitored and reported through active surveillance and passive surveillance. Since farmers are very concerned about the risk of human contagion, the number of cases reported to the province and districts is high and the number of passive surveillance cases is rising in Lampung. The provincial and district governments in Subang are also more aware, leading to a rise in the number of passive surveillance diagnosis requests received at the Subang DIC. In Medan, active surveillance still carried out by the DIC accounts for about 80% of its cases.

In terms of human contagion countermeasures, DGLAHS's PDSR teams assigned to district offices and the Ministry of Health's District Surveillance Officer (DSO) work together and, in the event of human infection, DSO contacts PDSR, PDSR monitors the actual site, provides a diagnosis and carries out surveillance (DGLAHS). The DIC are required to play major roles in terms of preventing human infection.

Table 4 Surveillance conducted by the three DICs<sup>10</sup>

	2009	2010	2011
<b>Medan DIC<sup>11</sup></b>			
Active surveillance	26%	26%	17%
Passive surveillance	74%	74%	83%
Total	100%	100%	100%
<b>Lampung DIC</b>			
Active surveillance	18.2% (20,791)	16.0% (25,037)	12.9% (25,180)
Passive surveillance	81.8% (93,514)	84.0% (131,442)	87.1% (170,479)
Total	100% (114,305)	100% (156,479)	100% (195,659)
<b>Subang DIC</b>			
Active surveillance	-	93.1% (13,160)	68.1% (22,430)
Passive surveillance	-	6.9% (968)	31.9% (10,486)
合計	-	14,128	32,916

(Sources: Medan DIC, Lampung DIC and Subang DIC)

### 3.2.2 Other positive and negative impacts

#### (1) Other indirect benefits to beneficiaries

When some livestock, such as cattle, are moved between islands, they must be diagnosed at the DIC and obtain a medical certificate. Before the Subang DIC was built, Subang's producers had to send samples long distances, but now it can be done locally, which is a significant merit. According to interviews with livestock farmers in Subang, they previously requested diagnoses from a diagnosis facility in Bogor, which took at least two days (the sample was delivered and the document with the results was received the following day, so it took two days), but now they can receive results in half a day depending on the disease being diagnosed. As a result, transportation costs amounted to 21.6 million rupiah a year (600,000 rupiah x about 36 times a year), but now there is little need for transportation costs. About 40 businesses use this service in the Subang area, and a modest decrease in costs for livestock owners can be observed. Unfortunately, the Subang DIC does not have a database on its service users, so it was only possible to contact seven companies in this ex-post evaluation and we were not able to ascertain the magnitude of the cost-cutting effect or the effect in reducing time required for diagnosis.

#### (2) Impact on surrounding environment

<sup>10</sup> The active surveillance carried out by the DIC is done using the Indonesian government's own budget. The passive surveillance carried out by local governments and other organizations is also almost entirely funded through the government budget. There are cases in which the FAO and other donors provide local governments with funding to carry out surveillance, but although data on percentages could not be provided since the DIC do not identify which samples are tested using donor support, the DHLAHS states that the number of diagnosed cases attributable to surveillance funded by donors is very small.

<sup>11</sup> Only the percentage of active and passive surveillance is available for the Medan DIC; the actual number could not be obtained.

At the Subang DIC, the incinerator's incomplete combustion could affect the surrounding environment, so this must be redressed as soon as possible (refer to 3.5 for details). The discharge is disposed of in accordance with the operational standards for the DIC's treatment facility, with due attention to pH values and other standards.

None of the three DIC carry out activities to explain efforts to prevent contagion to the surrounding environment and safety measures to the local governments and community. The Lampung DIC is located next to the community, while there are homes near the site of the Subang DIC and Medan DIC. Currently, the DGLAHS has not set up a system or guidelines for reporting and warning local governments of the outbreak of a serious virus, so explaining information to residents and educating them is left up to the DIC.

### (3) Resident transfers and site acquisition

An AI laboratory was added to the site of the existing facilities of the Medan and Lampung DICs. The Subang DIC was built on a site that was originally owned by the Ministry of Internal Affairs, and there were no problems such as site acquisitions or resident transfers.

As shown earlier, the on-site avian influenza monitoring system run by the PDSR team and set up in the DHLAHS office in Indonesia has been strengthened. Since providing a rapid diagnostic service is essential to reinforcing the monitoring system (expanding surveillance), setting up this system can be recognized as contributing to the overall goal of reinforcing the system to eradicate avian influenza. However, a pronounced impact could not be quantitatively confirmed due to the very nature of the primary project goal, which was to raise the BSL level. Other effects include reductions in traders' costs as a result of the decrease in the number of days required to receive a diagnosis. Given these points, we were able to confirm that the project had an impact to a certain extent.

## 3.4 Efficiency (Rating: 2)

### 3.4.1 Output

The table below shows the facility construction for the three DIC and major equipment donated in the project.

Table 5 Comparison of Planned and actual outputs of the project

	Planned		Actual
	Facilities	Main equipment	
Subang	<p><u>Main building</u> Entrance hall, lecture room, autopsy room, PCR room, molecular virus diagnosis room, general examination room, etc.</p> <p><u>Annex building</u> Water tank, pump room, electricity room, generator room</p> <p><u>Others</u> Poultry cage room, small animal room, elevated water tank, incinerator, etc.</p> <p>Total area: 2,965 m<sup>2</sup></p>	<p>High pressure autoclave, paraffin embedding station, rotary microtomes, cryostat, binocular microscopes, inverted microscopes, fluorescence microscopes, refrigerated centrifuge, high speed refrigerated centrifuge, CO<sub>2</sub> Incubator, egg Incubators, safety cabinets, real-time PCR, spectrophotometer, ultrasonic cleaning, water purifier, freezers, etc.</p>	<p>Construction work and provision of equipment were completed as scheduled, yet the operation of the IDC was delayed.</p>
Medan	<p><u>AI laboratory</u> Molecular virus diagnosis room, autopsy room, PCR room, incubation room, fan room</p> <p><u>Other facilities</u> Water tank, pump room, electricity room, generator room, poultry cage room</p> <p>Total area: 855 m<sup>2</sup></p>	<p>High pressure autoclave, inverted microscopes, refrigerated centrifuge, autopsy table, freezers, CO<sub>2</sub> incubator, egg incubator, safety cabinets, clean bench, PCR workstation, etc.</p>	<p>Completed as scheduled.</p>
Lampung	<p><u>AI laboratory</u> Molecular virus diagnosis room, autopsy room, PCR room, incubation room, fan room</p> <p><u>Annex building</u> Water tank, pump room, electricity room, generator room, poultry cage room</p> <p>Total area: 735 m<sup>2</sup></p>	<p>High pressure autoclave, inverted microscopes, fluorescence microscope, refrigerated centrifuge, CO<sub>2</sub> incubator, egg incubator, safety cabinets, spectrophotometer, freezers, etc.</p>	<p>Completed as scheduled.</p>

Technical assistance	<p>Biosafety: Preparation of Standard Operating Procedures (SOP) and a safety inspection checklist for disinfection and sterilization methods, understanding of emergency response procedures and staff flow within laboratory</p> <p>System management in AI facility: Explanation of system flow for AI-related equipment systems, explanation of functions of AI laboratory-related equipment systems, explanation of specifications for equipment systems for BSL-2, explanation of monitoring and alarm designations, maintenance methods</p> <p>System operation and management: Methods for automation, systemization and back-up operations of equipment systems; method for switching operation in event of emergency or malfunction; determining level of humidity, pressure, differential pressure, and quantity of flow; method for preparing daily operation reports; use of monitoring and alarm board</p> <p>Appropriate maintenance and management of equipment: Explanations of keeping maintenance and management records on equipment, regular updates to records, regular maintenance, replacement of consumables</p>	<p>The Soft component included the dispatch of two Japanese experts for a total of 3.3 months to instruct three DIC staff on biosafety and facility and equipment maintenance and management. The specific details were in line with the plan.</p>
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According to the “Completion report of Soft Component Operations,” participants in the training provided by the consultant were as follows.

Table 6 Training provided by Japanese experts

	Subang	Medan	Lampung
Veterinarian	13	8	9
Technical staff (laboratory staff)	2	12	4
O&M and other staff	1	5	5
Total	16	25	18

(Source: The completion report of Soft Component Operations)

The Medan and Lampung DIC began operating their AI laboratories immediately after the facilities were completed, but there was a one year and six month time lag between the completion of the facility and the start of the Subang DIC’s diagnostic services due to DGLAHS’s delay in procedures related to appointing DIC staff (the facility was completed in March 2009, staff assignments were completed in June 2010 and diagnostic services began in October 2010). This was a negative factor for efficiency.

### 3.4.2 Project Inputs

#### 3.4.2.1 Project Cost

The project budget was 1,781 Million Japanese Yen and the actual project cost was 173.4 Million Japanese Yen, which was within the estimated cost under E/N agreement (approximately 97.36%). The Indonesian side bore the costs for the removal of old facilities on the planned construction site (Medan DIC and Lampung DIC), the construction to put in electricity and sewage lines (all three DIC) and build staff dormitories and cafeteria (Subang DIC).

#### 3.4.2.2 Project Period

The project duration as planned at the time of the ex-ante evaluation was 19.5 months, included the detailed design and bidding process. It actually took 13 months, from February 2008 to March 2009 (68%

of the plan), within plan. However, it took time for staff to be appointed to the Subang DIC after the facility was completed, so it took 18 months until diagnostic services could begin.

Accordingly, although project costs were within plan, efficiency is assessed as moderate given that there were delays in assigning staff to the Subang DIC and it was some time after the project's completion that effects materialized.

### 3.5 Sustainability (Rating: 2)

#### 3.5.1 Institutional Aspects of Operation and Maintenance



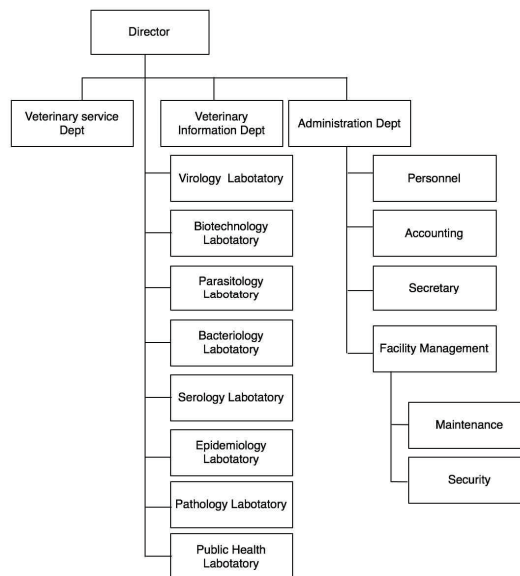
(Incinerator at the Subang DIC)



(Cracks after repairs at the Subang DIC)

The organizational system of the DICs is basically the same, consisting of the three departments of technical services, which carries out diagnoses, administrative, and epidemiology (in charge of field surveys). The technical service department is made of the serology laboratory, the virology laboratory, the bacteriology laboratory, parasitology laboratory, the pathology laboratory, the biotechnology laboratory, epidemiology laboratory and the public health laboratory. The AI laboratory is primarily used by the employees of the virology office, biotechnology office and pathology office under the responsibility of the AI laboratory coordinator, who is appointed by the DIC director (16 employees in Lampung, 10 in Medan and 15 in Subang). A laboratory staff person at the managerial level was appointed to each AI laboratory as the person responsible for equipment management.

Diagram 1 Organizational chart of the DIC



According to interviews with the DIC, there are enough veterinarians, but the Subang DIC has a shortage of laboratory technicians in multiple examination rooms. Three to four people are assigned to the facility management department (four at the Subang DIC, three at the Medan DIC and three at the Lampung DIC), which is adequate, but there is a relatively high number of new employees. Managers for each field, such as air-conditioning, water, electricity and IT, are assigned.

Table 7 Staff composition of the three DICs

	Medan	Lampung	Subang
Veterinarian	15	16	21
Technical staff (laboratory staff)	21	28	12
Administration (Maintenance)	30 (3)	32 (3)	10 (4)
Others <sup>12</sup>	12		17
Total	78	76	64

(Sources: Medan DIC, Lampung DIC and Subang DIC)

DGLAHS has not devised its own standards and rules on biosafety, such as the handling and disposal of samples and waste liquids that pose a contagion risk or rules on taking out samples and restrictions on certain areas within the facility. Currently, the respective DIC set and administer their own internal rules. There is no monitoring and guidance system to determine whether the standards and rules are being observed. DGLAHS recognizes the importance of this issue, but has not improved the situation yet. The DGLAHS has not established guidelines on contagion countermeasures for residents living near the DIC, and although this was not within the scope of the project’s support, the risk management system must be

<sup>12</sup> “Others” includes non-permanent employees such as drivers and security guards.



strengthened.

### 3.5.2 Technical Aspects of Operation and Maintenance

#### 3.5.2.1 Maintenance of AI laboratories

The DIC carry out the necessary maintenance and management following the procedures explained in the soft component training. There are differences in the frequency depending on the DIC, but the cleaning log for the air conditioner filter is filled out once every two weeks and about once a month for the lighting equipment and fixtures. The convex filter in the AI laboratory is regularly replaced with the indicator light flashes. Since the treated water is automatically checked for sulfuric acid, sodium hydroxide, pH and chlorine, it is only checked to see if the necessary chemicals need to be added.

There are two technical issues with maintenance and management. One is that few staff have the full understanding of the AI laboratory's overall maintenance and management. Of the staff who received instruction and training in the soft component, only one staff person at each DIC is currently engaged in maintenance and management. Many staff have already left their jobs or been transferred (there were some training participants who may have not been assigned to the DIC in the first place), and no training on maintenance and management of AI facilities has been provided since the soft component training. The other issue is that there are differences in the AI laboratory maintenance and management methods depending on the DIC. The soft component training gave the participants an understanding of the standard methods for biosafety and facility maintenance and management, but subsequently the three DIC have not taken steps to standardize their procedures and methods. As a result, the DIC staff have spoken up about their concern as to whether they are using appropriate maintenance and management methods.

The Lampung DIC keeps records recording the history of use for all of the equipment in its AI laboratory. The Subang DIC and Medan DIC are inadequate in some respects, but they keep records for the major equipment. All three DIC have all of the operating manuals, but their storage methods and storage places diverge. At the Lampung DIC, usage manuals (1-2 pages of A4 size paper) for equipment written in simple Indonesian were kept. Manuals are kept for the main equipment at the Subang and Medan DIC. The three DIC have SOP conforming to the OIE for all diagnostic methods currently used. Five SOP have been prepared for the diagnosis of highly pathogenic avian influenza and are available in the laboratories.<sup>13</sup>

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<sup>13</sup> HA/HI-Test to AI, AI virus isolation Method, Polymerase Chain Reaction (PCR) for testing AI H5N1, Real time PCR (RRT PCR) for AI Type A, Realtime PCR (RRT PCR) for Sub Type H5



(Microscope usage record and manual at the Lampung DIC)

### 3.5.3 Funding for Operation and Maintenance

As shown in the table below, the budget allocated to the DIC in the past three years is on the rise.

Table 8 Budget allocation to the three DICs

	2009	2010	2011
Subang DIC	-	5,534	13,572
Medan DIC	4,400	4,347	4,949
Lampung DIC	5,493	6,170	7,650

(Unit: Million Rupiah)

(Sources: Medan DIC, Lampung DIC and Subang DIC)

A comparison of the necessary funding for the maintenance and management of the AI laboratory (the Subang DIC has estimates for overall maintenance and management costs) estimated by the consultant dispatched for the soft component training to the actual operating expenditures indicates that the Subang DIC has an adequate budget for its necessary costs. The Medan DIC does not have an adequate budget for maintenance and management, but according to interviews, the maintenance and management budget for the AI laboratory is invariably set at 40 million rupiah a year (excluding consumables and lighting costs), which is inadequate (one replacement filter costs 5 million rupiah). The Lampung DIC was of the opinion that it only has about half of the funding it needs.

Table 9 Estimated costs for O&M by the soft component consultants<sup>14</sup>

		1 <sup>st</sup> year (2010)	2 <sup>nd</sup> year (2011)
Subang	-	227	250
Medan	57	57	71
Lampung	31	115	126

(Unit: Million Rupiah)

(Source: The completion report of Soft Component Operations)

<sup>14</sup> This includes air-conditioner filters, waste water filters, spare parts, service contracts, etc,

Table 10 Actual spending on O&M for the last three years<sup>15</sup>

	2009	2010	2011
Subang	-	243	257
Medan	209	211	239
Lampung	57	64	83

(Unit: Million Rupiah)

(Sources: Medan DIC, Lampung DIC and Subang DIC)

#### 3.5.4 Status of Operation and Maintenance

DGLAHS recognizes that there is a need for regular inspection and monitoring of the AI laboratories, but has not taken specific action yet (such as allocating a budget and introducing visits for instruction). Moreover, there is not a good understanding of the status of operations and the safety system at the respective DICs' AI laboratories. The consultants in charge of the soft component training strongly recommended that the AI laboratories have regular maintenance contracts with external vendors, but the three DIC did not have such contracts with external vendors as of the ex-post evaluation. Moreover, the maintenance and management staff make the repairs themselves due to an inadequate budget. DGLAHS recognizes that the maintenance and management staff's inadequate management capacity is an issue, but does not offer re-training. In addition, several pieces of equipment have malfunctioned, but according to interviews with maintenance and management staff, the warranty period has already expired, so when they directly contact the manufacturer or dealer, they are simply told that there are no spare parts and nothing further is done.

The Medan DC and Lampung DC were waiting on repairs for some equipment, but the equipment was generally operating well. The Subang DIC did not use its equipment for one year due to the delay of operation, and as a result, some equipment was not operational due to breakdowns and other factors (high-speed cooled centrifuges, UPS, etc.).

The Lampung DIC carefully stores its operating manuals and procedure manuals. The Medan DIC and Subang DIC have the manuals for their main equipment. The status of the operation, maintenance and management of the respective DIC facilities is described below.

##### (1) Subang DIC

Subang has no particular problems using its facilities. The water supply and treatment system, effluent treatment facility, and private power generator operate without any problems. Nevertheless, one of the motors in two places in the incineration system has broken down and the incinerator cannot reach a high enough combustion temperature. According to the Subang DIC's maintenance and management manger, samples are appropriately disposed of in the incinerator, but poisonous gases and smoke pollution from the incinerator's incomplete combustion may have posed risks to health and other impacts. The 2010 earthquake resulted in many cracks in the wall of the offices, so construction workers made repairs. There are still visual signs of cracks, but there are no problems in using the buildings.

<sup>15</sup> Total expenditures for equipment and facilities.

## (2) Medan DIC

The AI laboratory facility operates without any problems. The AI laboratory's air conditioning and electricity function without problems, but the alarm frequently malfunctions and there are gaps between the door and the floor at two places. According to the Medan DIC, they had been advised to fix the gaps by using door caulk available in stores. Inspections for the evaluation survey showed that the door had a weather strip, but there was a gap. The alarm continues to malfunction, suggesting that the weather strip is likely inadequate.

## (3) Lampung DIC

Lampung DIC has no problems using its facilities and utilizes them smoothly.

Given the above, there are no significant problems with the systems for maintenance and management nor its condition, but there are some problems in terms of the Medan and Lampung DICs' inadequate maintenance and management budget, the lack of standards for biosafety, and lack of progress in repairing malfunctioning equipment. At this point, sustainability is being protected to some extent, but there are risk factors for the future, and accordingly sustainability is assessed as moderate. There are concerns over the maintenance of biosafety levels at the Medan DIC's laboratory.

## 4. Conclusion, Lessons Learned and Recommendations

### 4.1 Conclusion

In Indonesia, the Ministry of Agriculture and the Ministry of Health work together to eradicate avian influenza in livestock to prevent its spread to people, working in line with the national strategic plan to eradicate avian influenza and protect the public from outbreaks. Setting up diagnostic facilities and providing equipment to the three DIC is consistent both with the need to strengthen the animal disease diagnosis system, including avian influenza, and Japan's aid policy, so the implementation of this project is highly relevant. The avian influenza diagnostic facilities and equipment at the three DIC are utilized in diagnostic work, and the project has not only had the effect of shortening the time until test results are available, but has also achieved the project goal of enhancing safety as a BSL3 facility that can diagnose avian influenza. The Subang DIC was newly established in this project, and as a result of activities in the technical cooperation project titled "Project on Capacity Development of Animal Health Laboratory," both the the number of diagnostic cases and the examination components are on the rise. Some effects can be observed, such as the rapid provision of diagnostic results to regional livestock breeders and local livestock offices, and this indicates that the project's effectiveness is high. Both the project costs and project duration were within plan, but there were delays in starting diagnostic services after the Subang DIC was established, so efficiency was moderate. There are currently no major problems at any of the three DIC that would lower diagnostic services, but DGLAHS has not established standards or set up a monitoring system for biosafety operations, few staff are knowledgeable about the technical aspects of the maintenance and management of diagnostic equipment and facilities, and there has been no progress in repairing malfunctioning equipment, partly due to an inadequate budget for maintenance and management. Given

these issues, sustainability is assessed as moderate.

In light of the above, this project is evaluated to be satisfactory.

## 4.2 Recommendations

### 4.2.1 Recommendation to implementing organization

#### Maintenance and management of facilities and equipment

- The three DIC have introduced the basic and standard procedures from the soft component. There is no scheme for subsequently checking whether operations and maintenance and management are being carried out according to the procedures. As a result, there are already differences among the procedures taken by the three DIC. DGLAHS should introduce standardized regular instruction and monitoring to ensure safe facility management and consistency of maintenance and management procedures. Moreover, there are few facility management employees and many are new hires. As a result, in order to ensure the aforementioned standardization, DGLHAS should give representatives of the DIC maintenance and management staff training and instruction in biosafety and maintenance and management once a year with the aim of continually enhancing maintenance and management techniques.
- Since the Medan and Lampung DIC in particular have an inadequate budget for facility and equipment maintenance and management, DGLAHS and the DICs should strive to work out the required maintenance and management costs on their actual basis and secure a budget. Since there is no progress at present in repairing the malfunctioning equipment, DGLAHS should follow up on the equipment list, and the DICs should amend its current ineffective method of negotiating on an individual basis with the manufacturers and stores in Jakarta and work with the DGLAHS leadership to consider effective measures. Moreover, since the AI laboratories include sophisticated air conditioning equipment, the DIC should sign maintenance contracts with specialized dealers as recommended by the consultants assigned in the soft component. If this is difficult, the DIC should consider using training opportunities to invite representatives from external facility maintenance companies as instructors for on-site training.
- The air pressure control alarm at the Medan DIC malfunctions and a gap between the door and floor leads to pressure irregularities so that there is a possibility that biosafety levels are not being maintained appropriately. Accordingly, we recommend that an expert promptly inspect these issues. Moreover, there are some problems with the incinerator functions at the Subang DIC, requiring urgent repairs.

#### Educating and providing information to nearby residents

There are communities near DIC, and some DIC facilities are right next to homes. Thus far, there has been almost no relationship between local governments and communities and the DIC, so we recommend setting up forum for discussions on safety management and risk response.

#### Others

In this ex-post evaluation, a questionnaire was given to people who had used Subang DIC's diagnostic services, but it was extremely difficult to receive responses since user information is not maintained. We

recommend that information on users be maintained since it is extremely important that DIC be familiar with users' views.

#### 4.2.2 Recommendations to JICA

None.

#### 4.3 Lessons Learned

- In the field of livestock disease diagnosis, fluctuations in the diseases that can be diagnosed and improvements in diagnostic accuracy are suitable performance indicators in measuring diagnostic capacity in projects to strengthen capacity, but fluctuations in the number of diagnosed cases is not necessarily a suitable indicator. In the case of this project, the number of diagnoses fluctuates substantially depending on the outbreak of important livestock diseases and the budget allocated by the government for surveillance. The issue of whether the number of diagnoses and inspections is an appropriate performance indicator should be closely considered in projects that are greatly influenced by the demand side. This is true not only in the case of livestock disease diagnosis, but also in the inspection sector, such as food analysis, quality inspections and water quality inspections run by the Government sector.
- The construction of facilities for the Subang DIC, which was newly established in this project, as well as the installation of equipment, was completed according to plan, but there were delays in the start of facility operations as a result of delays in the Indonesian government's assignment of the necessary personnel. When establishing new facilities (such as centers) within an organization, the substance of the procedures for its approval and the time required should clearly be ascertained at the basic design stage and followed through on.