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

conducted by Mongolia Office: February, 2024

Country Name	**The Project for Epidemiological Studies on Animal Protozoan Diseases in Mongolia and Development of Effective Diagnostics Measures**
Mongolia	

I. Project Outline

Background	In Mongolia, where livestock farming is one of the most important industries, efforts have been made to enhance livestock productivity and profitability through measures against animal diseases. The capability for diagnosing, preventing, and treating infectious diseases had reached a level where self-reliant implementation was possible. However, addressing protozoan diseases in livestock posed a significant obstacle to the countermeasures due to the lack of understanding regarding their distribution and the extent of damage within Mongolia. In particular, the collection of comprehensive information on the status of infections of protozoan diseases such as trypanosomoses and piroplasmoses has been slow in Mongolia, partly because the mortality rate for these diseases is not as high as for other infectious diseases. Under these circumstances, the Institute of Veterinary Medicine (IVM) at the Mongolian State University of Agriculture[2] conducted a nationwide epidemiological survey on piroplasmosis in horses from 2008 to 2010. The results revealed that approximately 35% of horses were infected with protozoan diseases, making it an urgent issue to address protozoan diseases, along with other infectious diseases, in order to realize a productive livestock industry.		
Objectives of the Project	Through the development of on-site diagnostics of animal protozoan diseases, conducting epidemiological studies and proposing socially implementable methods of prevention and control of protozoan diseases, the project aims at improving the research and development capacity of IVM for the early detection, prevention and control measures against animal protozoan diseases through collaborative research throughout Mongolia, thereby contributing to the implementation of prevention and control measures against animal protozoan diseases based on the guideline, using on-site diagnostic kits[3] and Enzyme Linked Immunosorbent Assay (ELISA) diagnostic kits[4]. 1. Expected Overall Goal: Prevention and control measures against animal protozoan diseases (trypanosomoses and piroplasmoses) are taken based on the guideline, using on-site diagnostic kits and ELISA diagnostic kits. 2. Project Purpose: Research and development capacities of IVM for early detection, prevention and control measures against animal protozoan diseases (trypanosomoses and piroplasmoses) are improved through conducting epidemiological studies and developing on-site diagnostics through collaborative research.		
Activities of the Project	1. Project Site: Throughout Mongolia 2. Main Activities: 1) Activities related to the development of on-site diagnostic kits for animal protozoan diseases; 2) Activities related to the implementation of epidemiological studies on protozoan diseases and vector ticks and to the clarification of the current situation; 3) Activities related to the proposal of socially-implementable methods of prevention and control of protozoan diseases. 3. Inputs (to carry out above activities) Japanese Side 1) Experts: (Long-term) 3 persons, (Short-term) a total of 13 persons 2) Trainees Received (training in Japan): 50 persons 3) Equipment: vehicles, immunochromatographic test kit manufacturing devices, low-temperature storage devices (Cryostat) 4) Local Operational Expenses Mongolia Side 1) Staff Allocated: a total of 20 persons 2) Provision of Land and Facilities: office for experts, laboratory building for medium and large size animals, new laboratory building 3) Local Costs: Counterpart salaries, utilities, field survey expenses, etc.		
Project Period	(ex-ante) June 2014 - May 2019 (60 months) (actual) June 2014 - May 2019 (60 months)	Project Cost (Japanese side only)	(ex-ante) 362 million yen (actual) 335 million yen
Implementing Agency	Mongolian University of Life Science, Institute of Veterinary Medicine (IVM)		
Cooperation Agency in Japan	National Research Center for Protozoan Diseases (NRCPD) in the Obihiro University of Agriculture and Veterinary Medicine (OUAVM)		

II. Result of the Evaluation

<Special Perspectives Considered in the Ex-Post Evaluation>

The target year for the Overall Goal is set for 2022, three years after the project completion, taking into account the following factors.

- In the Terminal Evaluation Report, it is stated about Indicator 1 of the Overall Goal that "it is reasonable to set a target of increasing the number of units to be distributed to 40% of all units by 2022 [approximately 400 units (91 + 320 = 411 units)]."
- In the Terminal Evaluation Report, it is stated that "Indicator 3 of the Overall Goal is expected to be achieved within three years after the end of the cooperation period."

1 Relevance/Coherence

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

[2] In August 2014, the name was changed from Mongolian State University of Agriculture to Mongolian University of Life Sciences.

[3] Immunochromatographic Test (ICT) for Trypanosoma based on Recombinant GM6-4r Antigen.

[4] Test to determine the concentration of antibodies or antigens in a sample.

[Relevance]
<Consistency with the Development Policy of Mongolia at the Time of Ex-Ante Evaluation>
In the "National Comprehensive Development Plan of Mongolia" (2008), the target for 2007-2015 was to control infectious and parasitic diseases of livestock. In addition, the "National Mongolian Livestock Programme" (2010) included the development of human resources in the pastoral sector and the strengthening of measures against animal infectious diseases. Therefore, the project is consistent with Mongolia's development policy at the time of ex-ante evaluation.
<Consistency with the Development Needs of Mongolia at the Time of Ex-Ante Evaluation >
As indicated in the "Background" section, the project is consistent with development needs of Mongolia at the time of ex-ante evaluation, given the urgent need to address protozoan diseases in order to realize a productive livestock industry.
<Appropriateness of Project Design/Approach>
The project design/approach was appropriate as no problem attributed to the project design/approach was confirmed.
<Evaluation Result>
In light of the above, the relevance of the project is ③[5].

[Coherence]
<Consistency with Japan's ODA Policy at the Time of Ex-Ante Evaluation>
Japan's Country Assistance Policy for Mongolia (2012) stated that assistance would be provided to improve the income of agricultural and livestock workers and to strengthen infectious disease control and inspection systems to produce quality products, and therefore the project is consistent with Japan's assistance policy at the time of ex-ante evaluation, as the project aimed for the implementation of prevention and control measures against animal protozoan diseases.
<Collaboration/Coordination with JICA's other interventions>
The collaboration/coordination between the project and another project of JICA was planned at the time of ex-ante evaluation and was implemented, and the positive effects were confirmed at the time of ex-post evaluation. The project collaborated with the "Project for Strengthening the Capacity for Human Resource Development in the Field of Veterinary and Animal Husbandry" (2014-2019), and research findings and other information were shared by mutually appointing representatives of the two projects as members of the Joint Coordination Committee. Additionally, both projects collaborated on the analysis of pathology samples, shared research results, and research papers and video materials produced by the project were used in classes at the Veterinary Faculty at the Mongolian University of Life Sciences, thereby creating synergies for improving the level of education and advancing veterinary research in the field.
<Cooperation with other institutions/ Coordination with international framework>
Any the cooperation/coordination with other organizations was not clearly planned at the time of ex-ante evaluation or during the project period.
<Evaluation Result>
In light of the above, the coherence of the project is ③.

[Evaluation Result of Relevance/Coherence]
In the light above, the relevance/coherence of the project is ③.

2 Effectiveness/Impact

<Status of Achievement of the Project Purpose at the Time of Project Completion>
At the time of project completion, the Project Purpose was achieved beyond the plan. The ICT on-site diagnostic kits developed at IVM were submitted to the State Laboratory for Quality Control and Certification of Veterinary Drug (SLQCCVD) and approved by the Pharmacopeia Committee[6]. In addition, diagnostic kits using ELISA and PCR methods were also developed and submitted to SLQCCVD (Indicator 1). Furthermore, 30 papers regarding research outcomes of the project were published in international journals (Indicator 2).
<Continuation Status of Project Effects at the Time of Ex-Post Evaluation>
By the time of the ex-post evaluation, the project effects have been continued and further developed. The diagnostic kits developed under the project have been continuously manufactured using the equipment provided under the project, and used for testing for various diseases nationwide. Additionally, the diagnostic kits were also used in surveys conducted independently by provincial veterinary departments. Furthermore, since the project completion, a total of 36 papers regarding the research outcomes of the project and the subsequently deployed research findings have been published in international journals. Moreover, the ICT on-site diagnostic kits received the grand prize for "Outstanding Innovative Products" from the Minister of Food, Agriculture, and Light Industry of Mongolia in 2020. The four PCR diagnostic kits developed under the project were approved by the Pharmacopeia Committee in 2020 and the four ELISA diagnostic kits in 2021.
<Status of Achievement for the Expected Overall Goal at the Time of Ex-Post Evaluation>
At the time of ex-post evaluation, the Overall Goal has been mostly achieved as planned. In 2022, the ICT on-site diagnostic kits were distributed to the State Central Veterinary Laboratory, the capital and all provincial veterinary departments (Indicator 1). Additionally, in 2022, all 17 out of 22 provinces, including Ulaanbaatar, received distributions of all three types of ELISA diagnostic kits (Indicator 2). The guidelines developed under the project continue to be utilized nationwide in veterinary departments without the need for revisions as of the post-evaluation period (Indicator 3).
<Other Impacts at the Time of Ex-Post Evaluation>
The diagnostic kits developed under the project were also used in a technical experiment called "Diagnostics and production of medicines for equine dourine" (2019-2020), which was funded by the Science and Technology Fund of the Ministry of Education and Science of Mongolia. In addition, the diagnostic kit manufacturing equipment provided by the project, the research findings and the resources of the trained researchers developed under the project were used in a joint project between IVM's molecular and genetic laboratories and the NRCPD, under the theme "Vaccine Development Study for Toxoplasmosis in Small Ruminants in Mongolia" (research period: 2020-2025). Furthermore, within the framework of collaboration related to the mangrove conservation area involving

[5] ④ : very high, ③ : high, ② : moderately low, ① : low
[6] Since August 2014, a new law stipulates that manufacture and sell pharmaceutical products manufacture and sell pharmaceutical products requires approval by the Pharmacopeia Committee.

IVM, OUAVM, Tohoku Medical and Pharmaceutical University, Prague Zoo, and the International Takhi Group[7], the outcomes of the project have been applied in research activities, including monitoring diseases caused by parasites and protozoa in livestock and wildlife, as well as tick-borne transmissions, and the ex-post evaluation confirmed the continued and progressive implementation of the research activities. It can be said that the research outcomes of the project have been applied and implemented in society in various ways.

<Evaluation Result>

In light of the above, the effectiveness/impact of the project is ④.

Achievement of Project Purpose and Overall Goal

<table>
<tr><th>Aim</th><th>Indicators</th><th>Results</th><th>Source</th></tr>
<tr><td rowspan="2">(Project Purpose)
Research and development capacities of IVM for early detection, prevention and control measures against animal protozoan diseases (trypanosomoses and piroplasmoses) are improved through conducting epidemiological studies and developing on-site diagnostics through collaborative research.</td><td>Indicator 1
On-site diagnostic kits are developed by IVM and submitted to SLQCCVD.</td><td>Status of the Achievement (Status of the Continuation): achieved beyond the plan (continued and further developed)
(Project Completion)
The ICT on-site diagnostic kits developed at IVM were submitted to SLQCCVD and approved by the Pharmacopeia Committee in 2018. In addition, four PCR[8] and four ELISA[9] diagnostic kits were developed and submitted to SLQCCVD in 2018. These facts demonstrated that the research and development capacity of IVM for early detection, prevention and control measures against livestock protozoan diseases has been strengthened through epidemiologic research achievements and the development of field diagnostics.
(Ex-Post Evaluation)
By 2022, a total of 22,980 ICT on-site diagnostic kits have been manufactured and used for testing for various diseases at the IVM's molecular and genetic laboratories, as requested by the capital and 21 provincial veterinary departments, the State Central Veterinary Laboratory and others. In addition, the diagnostic kits developed under the project were used in monitoring surveys conducted independently by the veterinary departments in Bayankhongor (2019) and Gowisümber (2019-2020) provinces, respectively. Furthermore, the ICT on-site diagnostic kit was awarded the grand prize for "Outstanding Innovation Products" by the Minister of Food, Agriculture and Light Industry of Mongolia in 2020.
The four PCR diagnostic kits were approved by the Pharmacopeia Committee in 2020 and the four ELISA diagnostic kits in 2021.</td><td>Terminal Evaluation Report, questionnaires and interviews with IVM</td></tr>
<tr><td>Indicator 2
More than 10 international publications with citation index are coauthored by Mongolian and Japanese researchers.</td><td>Status of the Achievement (Status of the Continuation): achieved beyond the plan(continued and further developed)
(Project Completion)
The Mongolian researchers co-authored 30 papers with Japanese researchers, which were published in international journals.
(Ex-Post Evaluation)
After the project completion, a total of 36 research papers related to the project's findings were published in international journals. In addition, 1,000 copies in Mongolian and 200 copies in English of Important haemoprotozoan diseases in Mongolian livestock, prepared under the project, were published in 2019 (publication number: ISBN: 978 -9919-21-340-4), delivered to local veterinarians via 21 provincial veterinary departments. It was confirmed that they are used at the time of post-evaluation.</td><td>Terminal Evaluation Report, questionnaires and interviews with IVM</td></tr>
<tr><td rowspan="2">(Expected Overall Goal)
Prevention and control measures against animal protozoan diseases (trypanosomoses and piroplasmoses) are taken based on the guideline, using on-site diagnostic kits and ELISA diagnostic kits.</td><td>Indicator 1
On-site diagnostic kit is distributed to 40% of veterinary service units in Mongolia.</td><td>Status of the Achievement: mostly achieved as planned
(Ex-Post Evaluation)
The government-procured on-site diagnostic kits were provided to the State Central Veterinary Laboratory and the capital veterinary department and provincial veterinary departments, and from there, they are distributed to the veterinary service units. Although data on the distribution to the veterinary service units were not available and therefore it could not be confirmed how much was distributed to veterinary service units from veterinary departments, it was confirmed that on-site diagnostic kits were distributed to all veterinary departments nationwide in 2022, as shown in the table below.
<table>
<tr><th>Year</th><th>Number of veterinary departments in the country</th><th>Number of veterinary departments receiving on-site diagnostic kits</th><th>Percentage (%)</th></tr>
<tr><td>2018</td><td>20</td><td>15</td><td>75%</td></tr>
<tr><td>2019</td><td>23</td><td>23</td><td>100%</td></tr>
<tr><td>2020</td><td>24</td><td>23</td><td>95.8%</td></tr>
<tr><td>2021</td><td>24</td><td>20</td><td>83.3%</td></tr>
<tr><td>2022</td><td>24</td><td>24</td><td>100%</td></tr>
</table></td><td>Questionnaires and interviews with IVM and the General Authority for Veterinary Services (GAVS)</td></tr>
<tr><td>Indicator 2</td><td>Status of the Achievement: mostly achieved as planned</td><td>Questionnaires and</td></tr>
</table>

[7] Registered association under Swiss law.

[8] PCR Trypanosomosis, PCR Anaplasmosis, PCR Babesia bovis, PCR Babesia bigemina

[9] ELISA Trypanosoma equiperdum, ELISA Babesia caballi, ELISA Theileria equi, ELISA Trypanosoma

<table>
<tr><td></td><td>Three ELISA diagnostics kits[10] are distributed to all provincial veterinary laboratories.</td><td>(Ex-Post Evaluation)
In 2022, ELISA diagnostic kits for all three types were distributed to veterinary laboratories in 17 of 22 (77.2%) provinces including Ulaanbaatar. Additionally, these kits were also distributed to the State Central Veterinary Laboratory and the General Authority for Border Protection.
<table>
<tr><th>Year</th><th>Number of provinces that received Trypanosoma equiperdum</th><th>Number of provinces that received Babesia caballi</th><th>Number of provinces that received Theileria equi</th><th>Number of provinces that received all three ELISA diagnostic kits and percentages (%)</th></tr>
<tr><td>2018</td><td>5</td><td>7</td><td>6</td><td>3/22 (13.6%)</td></tr>
<tr><td>2019</td><td>12</td><td>12</td><td>12</td><td>12/22 (54.5%)</td></tr>
<tr><td>2020</td><td>20</td><td>10</td><td>20</td><td>10/22 (45.4%)</td></tr>
<tr><td>2021</td><td>22</td><td>17</td><td>6</td><td>6/22 (27.2%)</td></tr>
<tr><td>2022</td><td>22</td><td>17</td><td>22</td><td>17/22 (77.2%)</td></tr>
</table></td><td>interviews with IVM and GAVS</td></tr>
<tr><td></td><td>Indicator 3
Contents of guidelines are revised by IVM to reflect the current status of animal protozoan diseases.</td><td>Status of the Achievement: not subject to evaluation
The guidelines developed under the project have been used by veterinary departments nationwide. Although the guidelines are supposed to be revised when scientific studies confirm any changes in the situation, the need for revision has not arisen by the time of ex-post evaluation, so the guidelines have not been revised. Therefore, this indicator is not subject to evaluation.</td><td>Questionnaires and interviews with IVM and GAVS</td></tr>
</table>

3 Efficiency

The project cost was within the plan and the project period was as planned (compared to the plan: 93% and 100% respectively). The outputs of the project were produced as planned.

	Project Cost (Japanese side only, yen)	Project Period (months)
Plan (ex-ante)	362 million yes	60 months
Actual	335 million yen	60 months
Ratio (%)	93%	100%

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

4 Sustainability

<Policy Aspect>

In Mongolia's long-term development plan, "Vision 2050" (2020), the agricultural and livestock sectors are recognized as crucial areas for economic development. Within this framework, livestock sector is particularly emphasized. One of the goals outlined in the vision is "regional revitalization," which emphasizes the health and protection of livestock as part of sustainable agriculture. Furthermore, the "New Recovery Policy" (2021) focuses on specific policies aimed at fostering healthy livestock rearing and improving profitability, balancing both food safety and the economic interests of the livestock sector. Additionally, the government resolution approved in 2022 clearly outlines initiatives such as early implementation of comprehensive livestock infectious disease prevention and control measures, introduction of advanced technologies in the production of bioproducts, enhancement of diagnostic laboratory capabilities and strengthening of veterinary practices.

<Institutional/Organizational Aspect>

There have been no changes in the organizational or institutional mechanisms for the use of the research outcomes of the SATREPS project. IVM remains the sole national scientific research institute in Mongolia and has been operated steadily. At IVM, the molecular and genetic lab and the pathology lab, positioned as key research units, continue to operate and maintain the equipment provided by the project effectively. These labs ensure the continuous and appropriate management of the equipment and engage in ongoing research activities. Additionally, further development of the molecular and genetic laboratory has been approved in IVM's mid-term strategic plan (2021-2030). Moreover, to facilitate research, a collaborative system has been established where equipment has been shared among researchers from the Veterinary Faculty and other universities, and a number of research outcomes have been produced.

<Technical Aspect>

Researchers who participated in training in Japan as part of the project and researchers who improved their research and development skills through joint research with OUAVM continue to work for IVM. After the project completion, two researchers who were members of the project team obtained doctoral degrees, and three others enrolled in doctoral programs. In addition, a joint project with NRCPD has been implemented to develop the capacity of young researchers. Furthermore, to facilitate the social implementation of the SATREPS project, training sessions on the usage of diagnostic kits have been conducted annually for veterinarians since 2019. In 2023, IVM organized a total of six certification training sessions for veterinarians, and 217 veterinarians participated in these sessions.

<Financial Aspect>

The Ministry of Education and Science, which has jurisdiction over IVM, allocates sufficient budget to IVM every year. Additionally, IVM generates stable financial resources through vaccine production (commissioned by the Veterinary and Animal Breeding Agency) and sales, diagnostic kit sales, infectious disease diagnosis, training programs, and other activities. The General Authority for Veterinary Services (GAVS), under the Minister of Food, Agriculture, and Light Industry, is responsible for procuring diagnostic kits and distributing

[10] Three ELISA diagnostic kits: 1. Trypanosoma equiperdum; 2. Babesia caballi; 3. Theileria equi.

them to the provinces. GAVS secures the necessary financial resources from the national budget, and procurement operations have been carried out without any problems, including the diagnostic kits developed under the project in its public procurement list. Furthermore, the Mongolian government, in 2022, made a cabinet decision on the "Procedure for identifying basic research policies for state-owned institutes and centers and securing financial resources." This decision demonstrated the government's commitment to support IVM's activities financially.

<Environmental and Social Aspect>

It was confirmed that the activities were conducted in strict compliance with the Animal Health Law, Environmental Protection Law, and the Law on Waste Management, and no issue on environmental and social aspects has been observed, and it has not been necessary to take any countermeasures.

<Evaluation Result>

In light of the above, no problem has been observed in terms of the policy, institutional/organizational, technical, financial, and environmental and social aspects of the implementing agency. Therefore, the sustainability of the project effects is ④.

5 Summary of the Evaluation

The project achieved the Project Purpose beyond the plan, improving the research and development capacity of IVM for the early detection, prevention and control measures against animal protozoan diseases. The Overall Goal has been mostly achieved as planned, contributing to the implementation of prevention and control measures against animal protozoan diseases. The sustainability of the project is very high, given that the diagnostic kits developed under the project have been included in the public procurement list.

Considering all of the above points, this project is evaluated to be highly satisfactory.

III. Non-score Items

Adaption and Contribution:

- The JICA Mongolia Office consciously facilitated collaboration with other JICA project by organizing meetings among stakeholders and encouraging their participation in relevant conferences. Through such close information sharing, it was possible to generate synergies between SATREPS and other JICA project, resulting in added value in terms of promoting collaboration and improving the educational level in the field, as well as advancing veterinary research. Additionally, within the scope of SATREPS activities, organizing academic conferences and symposiums provided opportunities to share the outcomes of JICA projects. Providing input on the results and activities of JICA projects to researchers in related fields further enhanced synergistic effects.

IV. Recommendations & Lessons Learned

Recommendations for Implementing Agency:

- GAVS is recommended to continue to include the diagnostic kits developed under the project in the public procurement list and to strengthen the human resource development of veterinarians for the appropriate use of these diagnostic kits, especially in rural areas, in order to promote the nationwide dissemination of diagnostic kits. When training veterinarians, it is recommended to incorporate the introduction and utilization of the diagnostic kit developed in the project into the training program of the veterinarian license renewal system introduced in 2022.
- IVM is recommended to cooperate in the human resource development of veterinarians in rural areas by utilizing the abundant human resources within the organization, dispatching lecturers, rather than keeping the research results within the organization, for the promotion of the nationwide dissemination of diagnostic kits.

Lessons Learned for JICA:

- The project, while careful consideration was given to the exit strategy, actively engaged with government agencies including the implementing agency, and gained their understanding on the effectiveness and usefulness of the products being developed during project implementation. As a result, the diagnostic kits developed under the project have been included in the public procurement list of the Mongolian government, and were purchased using government budget allocations, thus ensuring sustainability of the project. Similar to this project, in SATREPS and other research and development-related projects, advocating for the inclusion of developed products in the public procurement list of the partner government agencies can enhance sustainability after project completion.
- On-site diagnostic kits can be manufactured using smaller-scale facilities and equipment compared to drugs and vaccines. Consequently, with a smaller investment, it becomes feasible to produce on-site diagnostic kits for distribution to veterinary departments nationwide, resulting in a substantial impact of the project.

Director of IVM introducing the diagnostic kit at an exhibition.

Catalog of diagnostic kits available for sale.