# Case 7

# Tackling Regional Challenge of Livestock Hygiene in South America through the Development of Professional Network

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## 1. Introduction

This paper looks at the "Project of the Capacity Development for Improvement of Livestock Hygiene in the Southern Part of South America through Regional Technical Cooperation". The aim of the project is to enhance the capacity of researchers and university faculty members to improve livestock hygiene in South American countries by means of veterinary epidemiology and disease diagnostic methods. Participants of the projects were Argentina, Bolivia, Paraguay, and Uruguay. Japan played a catalyst's role.

The project started in 2005. It adopted the distinctive approach of promoting regional network of university-based veterinary professionals for active mutual exchanges of information, knowledge and experiences. Through its five-year project activities, the project has attained several achievements. At the country level, for instance, participating scientists have acquired knowledge and skills of the latest diagnostic methods on animal diseases. Furthermore, they disseminated the knowledge to a broad range of stakeholders, including field veterinarians and livestock farmers. At the regional level, the network members have undertaken joint research activities and widely shared their research results with the veterinary professionalsin the region.

In the following Section 1, we first outline the background and development process of the professional network through the project. Section 2 then examines key success factors in the process that regional and country-level actions for the improvement of livestock hygiene has thrived and be sustained by development of a professional network. In Section 3, the author provides implications based on the case.

## 2. Overview: A Challenge of the Regional Cooperation

### 2-1 Background: The Expansion of Economic Connections and the Threat of Animal Diseases

In the Southern part of South America, the liberalization of trade was progressing among the members of the Southern Common Market (MERCOSUR). MERCOSUR established in 1991 was an economic and political agreement, aimed to promote free trade and the free mobility of goods, people, and currency.[1] As part of the activities, in 2003, MERCOSUR entered into a Free Trade Agreement (FTA) with the Andean Community (CAN)[2] as a customs union established in 1969. Thus, the economic linkage of the region was being widened and strengthened. The expansion of regional economic connections greatly stimulated the livestock industry, which was one of the most important industries in the region, and rapidly promoted animal product export within and beyond the region.

However, the promotion of such economic partnerships brought the risk of animal diseases spreading beyond national boundaries. Should an outbreak occur, it would damage not only livestock and farmers' economy, but also greatly influence the national economy. In the case that it spread to neighboring countries, it also would damage their economies. In fact, when an outbreak of foot-and-mouth disease (FMD) occurred in the early 2000s in the region, other countries imposed bans on imports.[3]

In addition, economic damage was not the only problem that would result from animal diseases. There were zoonoses, such as bovine spongiform encephalopathy (or ovariant Creutzfeldt-Jakob disease), rabies, and highly pathogenic avian influenza, which could be transmitted between animals and humans. The poor counter-measures to animal diseases could threaten human health.

Therefore, various international organizations formed political frameworks and standards concerning animal health. For instance, the World Organization for Animal Health (OIE) prepared a list of animal

[1] The full members are Argentina, Brazil, Paraguay, Uruguay, and Venezuela, and the associate members are Bolivia, Chile, Colombia, Ecuador, and Peru.

[2] The full members are Bolivia, Colombia, Ecuador and Peru, and the associate members are Argentina, Brazil, Paraguay, Uruguay, and Chile.

[3] JICA 2006, p. 149.

diseases, including zoonoses, technical disease cards, and regulations on how to deal with them.[4] The OIE, the FAO, the Pan American Health Organization, the World Health Organization (WHO/PAHO), and the Inter-American Institute for Cooperation on Agriculture (IICA), worked in the field of animal health in South America. The World Trade Organization (WTO) also created provisions on the trade of plants and animals, the so called Sanitary and Phytosanitary Measures (SPS), so as to be able to take the appropriate measure should an outbreak occur.[5]

However, most of the activities conducted by these international organizations were limited to establishing standards, providing guidance and advice, and exchanging information. In many cases, the implementation of specific measures and the introduction of special techniques for the prevention of animal diseases were often left to national efforts.

Therefore, counter-measures of countries were of mixed standards and coverage. For the animal diseases listed by the OIE, each country formed their own national guidelines and conducted various activities for preventing them: diagnosis, diagnostic medicine production, insect control, vaccinations, and public relations activities supporting regional communicable disease control. The levels and degrees of these activities often depended on their socio-economic-political circumstances.

International donors provided loans (e.g. Inter-American Development Bank) and technical support (e.g. International Atomic Energy Agency (IAEA)) for the development of animal health and the prevention of animal diseases.[6] For instance, the IAEA provided Enzyme Linked Immunosorbent Assay (ELISA) kits to diagnose and control animal diseases. However, the improvement of knowledge and techniques was not sufficient at the field level.

[4] OIE 2012a.

[5] WTO 2010. According to the SPS, the OIE has decided on international standards for animal health (WTO 2010, pp. 18-19). The OIE sets the international standards, namely the Terrestrial Animal Health Code (the Terrestrial Code), which includes standards for safe international trade in terrestrial animals and their products (OIE 2012b).

[6] JICA 2003, pp. 10-25.

## 2-2 Region-Wide Challenges for Animal Health

### (1) The formation of an idea of the regional cooperation[7]

Being ahead of its neighboring countries in animal disease measures, Argentina, along with Brazil, had one of the reference laboratories of the OIE,[8] which had been established as a center of expertise to standardize diagnostic techniques for its designated diseases. In the laboratories of both countries, experts conducted inspection, set regulations, and provided recommendations in collaboration with neighboring countries. In Argentina, the National Institute of Technology-Agricultural Quarantine and Sanitation Services (SENASA) was appointed as an OIE laboratory. The SENASA, together with the National Institute of Agricultural Technology (INTA) and the Faculties of Veterinary Sciences of eight national universities,[9] worked for the improvement of diagnostic methods, vaccinations, and public relations activities for communicable disease control in Argentina. It was the National University of La Plata (UNLPVS) who undertook the education of the staff of the SENASA and played a key role in maintaining animal health in Argentina.

The Faculty of Veterinary Sciences, the UNLPVS (FCV-UNLP), had a close relation with Japan. For example, the Japan International Cooperation Agency (JICA) provided support to the FCV-UNLP through a five-year technical cooperation and a two-year follow-up cooperation starting in 1989. The main purpose of this cooperation was to contribute to the development of the livestock industry by strengthening their basic research activities.[10] Consequently, the FCV-UNLP established excellent research facilities and human resources in South America. The FCV-UNLP developed its capacity to the point that they were able to share their advanced skills and experiences with neighboring countries where there was a growing demand for knowledge and techniques.[11]

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[7] JICA 1996.

[8] As of 2011, the OIE has established 225 Reference Laboratories in 37 countries (OIE n.d.).

[9] The SENASA had responsibilities for the quarantine of animal diseases, sanitary regulations, and the supervision and inspection of slaughter houses and meat facilities. The INTA was established for the purpose of agricultural technology reform and the research and dissemination for the development of farmers and corporations, and had branches throughout the country. The eight national universities were located in areas where livestock productivity was high.

[10] JICA 1993.

[11] JICA 1996, p. 13.

In those days, the Government of the Argentine Republic (GOA) was starting to consider implementing regional cooperation in the field of animal health. In 1992, the GOA who had had a long history of international cooperation as both a receiver and provider of assistance in several areas established the Argentina Fund for Horizontal Cooperation (FO-AR) in order to share knowledge and experiences through training and the transfer of skills with the countries of the region.[12] It was compatible with the national policy indicated in the FO-AR to cooperatively work to solve animal health problems as a long concern among the countries of the region. This also would contribute to the Argentinean economy and the health of their citizens. The GOA conducted international training with support from donors.

Japan through JICA also supported such GOA's goals. In cooperation with JICA, the GOA through the FCV-UNLP provided training in the Diagnosis and Research of Animal Diseases to neighboring countries from 1996 to 2000 (the first phase) and from 2001 to 2005 (the second phase). When the second phase started, Japan came to further support the national policy of the GOA. In 2001, the two countries signed The Partnership Programme for Joint Cooperation between Japan and Argentina (PPJA)[13], a framework for the cooperation to jointly support economic and social development of other Latin American countries. Under the PPJA, Japan assisted the GOA to conduct international training in various areas, including animal health, and dispatch their experts to other countries.[14]

**Training on Diagnosis and Research of Animal Diseases[15]**
Participants (Phase I 1996-2000): Bolivia, Brazil, Chile, Paraguay, Uruguay, Ecuador, Costa Rica, Cuba, Nicaragua, Mexico, Guatemala
Participants (Phase II 2001-2005): Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Ecuador, Guatemala, Mexico, Nicaragua, Paraguay, Uruguay, Venezuela

The aim of the training was to provide an opportunity for Central

[12] PAHO/WHO and Ministerio de Relaciones Exteriores, 2009, p. 9. About 3,600 activities have been implemented under the FO-AR (INSOUTH n.d.).

[13] In 2005 when the original period had been expired, the PPJA was extended after evaluation.

[14] JICA 2005.

[15] JICA 1996.

and South American countries to improve knowledge and techniques of veterinary diagnosis. Participants were university graduates in veterinary science (veterinarians) and had experiences of more than two years in related fields. A six-week training program was divided into two: 1) three-week introductory courses for all participants to learn the general concepts of ten themes (i.e. immunology, biochemistry, laboratory animals, microbiology, virology, parasitology, genetics, pathology, physiology, CEDIVE) and 2) three-week specialized courses for individuals to enhance their knowledge and research methods in selected themes. This training was highly evaluated by the participants. Through this training, the FCV-UNLP developed their capacity to play a key role in animal health in the region.

When the GOA was conducting the training of the Diagnosis and Research of Animal Diseases, the idea of establishing regional cooperation emerged. In the early 2000s, outbreaks of FMD were reported in South American countries, such as Bolivia, Uruguay, Argentina, and Paraguay. This highlighted the different degrees and levels of counter-measures taken by these countries. It was becoming an important, urgent issue for the countries of the region, who had been largely preoccupied with monitoring the border of their own countries, to strengthen their capacities to deal with trans-boundary diseases.

Under these circumstances, a basic survey was conducted in 2003 to identify the situations and problems of prospective countries for regional cooperation. The mission members of the survey visited Argentina, Uruguay, Paraguay, and Bolivia who were both participants of the Diagnosis and Research training and MERCOSUR.[16] Following the basic survey, two preliminary surveys were conducted in 2003 and 2004. Through these surveys, the prospective countries elaborated on an idea of regional cooperation for the development of animal health, by maintaining and utilizing training results, although their national risk priorities of animal diseases and capacities varied.

The three surveys and a series of following discussions among stakeholders

[16] With concern over the excessive expansion of targeted countries, Brazil who had a vast land was excluded in this regional cooperation (JICA 2003, Appendix pp. 37-38).

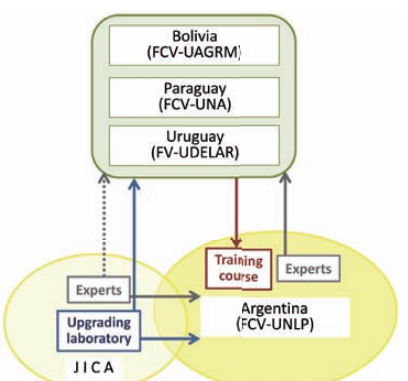
defined the direction for regional cooperation. The three surveys identified specific local conditions needed to maintain activities and continue to manage both animal and human health after the cooperation. It seemed neither sufficient nor efficient to focus on only the improvement of diagnosis techniques. For the sustainability of activities, it was thought to be more effective to develop human resources with the ability to conduct proper veterinary diagnosis in the region, and create some mechanism in which they would keep improving their knowledge and skills.

### (2) Regional cooperation of the four universities

The regional cooperation called the Project of the Capacity Development for Improvement of Livestock Hygiene in the Southern Part of South America through Regional Technical Cooperation (PROVETSUR) started in August 2005 under the framework of the PPJA.[17] Four universities from the four countries participated as implementing agencies: the FCV-UNLP in Argentina, the Faculty of Veterinary Science, Autonomous University of Gabriel René Moreno (FCV-UAGRM) in Bolivia, the Faculty of Veterinary Science, the National University of Asunción (FCV-UNA) in Paraguay, and the Faculty of Veterinary Medicine, the University of the Republic (FV-UDELAR) in Uruguay. The selection of universities rather than national laboratories was because of the priority given to human resource development. Like the FCV-UNLP,

**Figure 1: Participants of the PROVETSUR**


**Figure 2: Structure of the PROVETSUR**




[17] The participation of Uruguay was in 2006 due to necessary administrative arrangement with the government (JICA 2006, pp. 8-9).

Bolivia: Survey on rabies virus antibody valency (assessing the age of a dog by dentition)

the faculties of the other three universities, also had had experienced cooperating with JICA in the areas of livestock production and animal health.[18]

The activities of the PROVETSUR consisted of two layers. In the regional level, the PROVETSUR aimed to establish a mechanism of continuing professional education for veterinarians and develop networks of mutual cooperation and of sharing diagnostic and epidemiological information. These were crucial activities for the four countries to continuously develop their capacities for dealing with animal diseases.[19] The targets at the national level were to strengthen the capacity of Argentina's FCV-UNLP as a regional veterinary center for providing professional education and for improving the capacities of veterinary diagnosis of the other universities. Their final goal was to contribute to the development of animal health through proper implementation of veterinary diagnosis in the region.

Uruguay: Survey on antibody to Infectious diseases induced miscarriages (Sampling blood from sheep)

The implementing mechanism of the PROVETSUR was designed to make smooth coordination among a number of stakeholders. A project secretariat was located in the FCV-UNLP as a pivotal institution, which would provide international training for and dispatched experts to the other three universities. In the secretariat, there were three coordinators for Bolivia, Paraguay, and Uruguay, and administrative staff members. Each faculty of the three universities appointed one country coordinator for necessary coordination with the secretariat. One Japanese long-term expert who stayed in the secretariat circulated the three countries regularly. In so doing, he provided necessary advice face-to-face and

[18] JICA 2006, pp. 160-161.

[19] JICA 2006, p. 16.

support to the stakeholders. All four universities annually held a joint coordinating committee (JCC) in order to discuss an annual plan and related issues. Though it took some time before the JCC became fully functional and the implementing mechanism of the project under the JCC contributed to enhancement of smooth communication among the stakeholders.

Equipment and materials were provided by JICA and were used to develop each university's laboratory for appropriate diagnosis and research activities. They chose equipment for diagnosis that was particularly easy to maintain. Materials such as reagents were procured locally.[20]

Paraguay: Survey on *salmonella* (sampling specimen)

PROVETSUR covered various diseases. Workshops and interviews with the stakeholders during the second preliminary survey revealed the different countries' differing priorities of animal diseases to cover. Their priorities were: rabies in Bolivia, gumboro disease in Paraguay, and avian and equine influenzas in Uruguay.[21] Given the mixed priorities, it was decided not to have specific common targeted diseases. Consequently, each country started to work to improve diagnostic techniques for the diseases which had priority.

The targets and activities of the PROVETSUR were changed in the middle of the five-year implementation as shown in Figure 3, to clearly distinguish regional and national targets and activities, which were not clearly separated at the beginning, causing confusion in the participating universities.

[20] An interview with the Japanese long-term expert.

[21] JICA 2006, pp. 164-165. It was examined to set the prevention of FMD as a common task at the very beginning of the formation of the project. However, there was a great risk to research on FMD without proper laboratories of the bio safety level 3 in the international standard, which the four countries did not have. The outbreak of FMD, which could trigger ban on export and damage national economy, might cause political disputes among countries. Therefore, despite the importance of its prevention, FMD was excluded from the targeted animal diseases of each country (JICA 2010, p. 35).

**Figure 3: Relations between Regional and National Targets and Activities**


In the new structure, the regional and national targets and activities of each country were separated. One regional and four national targets were set. For instance, at the national level, the three universities aimed to develop the capacity of diagnosis for their priority diseases by receiving training from the FCV-UNLP, while the latter also improving their capacities by providing training. At the regional level, all of them participated in activities that would contribute to the region, such as joint research and sharing results. The FCV-UNLP took the main responsibility for managing the regional level activities. The overall goal was modified to promote the professional education of veterinarians in order to improve their veterinary disease diagnosis in the region.

## 2-3 Consequence: Towards the Strengthening of a Regional Network[22]

### (1) Regional level: Cooperation and network construction

*The formation of a network and its expansion*

The PROVETSUR provided a precious opportunity for the four countries to create a network among them. Although they were members of MERCOSUR and the CAN, there had been little practical regional cooperation and coordination in animal health until the start of the PROVETSUR. However, the activities of the PROVETSUR promoted regular personal face-to-face interactions among the faculty members and students of the four universities, which resulted in the formation of a network. The network is currently still utilized for joint activities, such as the publication of joint research papers.

The members of the network are also gradually expanding their activities beyond the PROVETSUR by connecting it with other networks. For instance, the Iberoamerican Society of Veterinary Epidemiology and

[22] JICA 2010, pp. 35-37.

Preventive Medicine (SIEVMP) was established by responding to the call of Professor Dr. Andre Perez in 2009.[23] The FCV-UNLP, together with the Regional International Organization for Plant Protection and Animal Health (OIRSA) in El Salvador, is managing the information network of the SIEVMP. Many university researchers who participated in the PROVETSUR have joined the SIEVMP and have been sharing the fruits derived from the former's activities with the latter's academic members. By making a bridge with other network(s), the scale of the network of the PROVETSUR is growing little by little within and beyond the region.

*The improvement of the research level in the region*

During the PROVETSUR, the research level of the faculties of the four universities was significantly improved. One of the focused activities was to prepare and distribute epidemiological information, since it was considered an effective research activity for planning and implementing the comprehensive counter-measures of animal diseases at the national and regional levels.[24] Epidemiological methods that mainly rely on non-laboratory methods were more fitted to the conditions of the four universities, whose laboratories lacked the latest equipment. This, in turn, provided researchers with an incentive to write academic papers based upon data collected through fieldwork and sampling. More than 25 regional research groups were formed, consisting of mixed faculty members of the four universities. They published a number of research papers in academic journals, including well-known international ones. As of 2010, the following number of papers and reports were published.[25]

**Table 1: A Number of Publications (as of 2010)**

| | Argentina | Bolivia | Paraguay | Uruguay |
|---|---|---|---|---|
| Papers (peer-reviewed) | 17 | 4 | 3 | 2 |
| Reports | 3 | - | 2 | 5 |

These research outputs were shared through the website of PROVETSUR and with presentations in conferences, and contributed to the enhancement of knowledge on animal health in the region.

[23] JICA 2010, p. 22. The headquarters of the SIEVMP is in Chile.

[24] JICA 2010, pp. i-ii.

[25] JICA 2010, pp. vii-ix.

## (2) National level: Development of human resources

*Development of veterinary diagnosis techniques*

According to their national risk priority, the faculties of the four universities developed their capacities of implementing veterinary diagnosis both at the individual staff level and at the faculty level as a group. The improvement of laboratory facilities also contributed to supporting technical development. The following table shows the major achievements for the development of the capacities of veterinary disease diagnosis, including notable outcomes, such as the preparation and dissemination of manuals and the increase of providing related services to those outside the universities (e.g. diagnosis).

**Table 2: Major Achievements in Veterinary Disease Diagnosis[26]**

| | Obtained diagnosis techniques | Animal diseases to be diagnosable | Notable outcomes |
|---|---|---|---|
| FCV-UNLP (Argentina) | Polymerase Chain Reaction (PCR), Real time PCR* | - | - Prepared and disseminated 'The Manual of Biostatistics for Veterinary Science', which is expected to be used as a common text of biostatistics in the region.<br>- The official approval of the veterinary epidemiology training as a course for the professional education of the faculty members of the FCV-UNLP<br>- The increase of providing services (e.g. diagnosis, laboratory techniques) |
| FCV-UAGRM (Bolivia) | Hemagglutination test, Hemagglutination inhibition test, ELISA, Real time PCR, Agglutination test plate, Agar-gel immunodiffusion test | Rabies, New Castle disease, Brucellosis in cattle, Equine infectious anemia, Bovine leukemia | Reduced the number of people with rabies by effectively controlling it, in cooperation with the Veterinary Diagnostic Center (LIDIVET) and municipal authorities |
| FCV-UNA (Paraguay) | ELISA, PCR, Immunomagnetic separation, Morbid anatomy, Immunohistochemical staining, Separation and fixation of bacteria | Gumboro disease, *Mycoplasma* infection, Avian infectious bronchitis, Salmonellosis in poultry and pigs | The increase of diagnostic requests from outside |

[26] JICA 2010, pp. 22-23.

| | | | |
|---|---|---|---|
| FV-UDELAR (Uruguay) | ELISA, PCR, Indirect immunofluorescence assay | - Infectious diseases induced miscarriages in sheep and cattle: Infectious bovine rhinotracheitis, Bovine viral diarrhea-mucosal disease, *Campylobacter* disease, Trichomoniasis, Neosporosis<br>- Poultry diseases: *Chlamydia*, *Mycoplasma* infection, Infectious *orthobacterium rhinotracheale*, Avian pneumovirus disease, Gumboro disease) | - Made an agreement with a producer association on the provision of diagnostic services of poultry disease<br>- Prepared and disseminated a manual of diagnostic methods (e.g. ELISA, PCR, Indirect fluorescent antibody method) |

* These diagnostic techniques were transferred to the FCV-UNLP by Japanese short-term experts. Then, their staff members were dispatched as experts to the other three universities in order to transfer the techniques.

*Development of the national capacities of diagnosis*

The faculty members who participated in the PROVETSUR have been disseminating obtained skills and knowledge through training and workshops to fellow researchers and veterinarians in the field. In Argentina, the FCV-UNLP has been providing education for faculty members, particularly junior members, to improve their diagnosis techniques and enhance epidemiological knowledge and skills. They have organized a number of seminars on various topics, from the introduction of veterinary epidemiology and the research design to individual animal diseases, for faculty members, students, staff members of related organizations, veterinarians in the field, and producers. The other three universities also conducted similar seminars. In Paraguay and Uruguay, researchers of the National Service for Animal Quality and Health (SENACSA) and staff members of the Ministry of Agriculture Livestock and Fisheries were invited in order to provide professional education and disseminate output of the project activities respectively.[27]

## (3) Future tasks

It is indispensable for the four countries to cooperatively continue developing their capacities for preventing animal diseases and improve animal health in the region. This requires several actions: the systematization of professional education on the basis of the needs of

[27] JICA 2010, p. 24.

veterinarians in the field; the further development of diagnosis and epidemiological techniques among faculty members; the continual efforts of the standardization of diagnosis among countries; and the financial security of maintaining necessary materials (e.g. reagent) for diagnosis.[28] In addition, it is necessary to strengthen relationships with governmental organizations and institutions such as veterinary medical associations, in order to meet the needs of production sites by raising the overall level of the veterinary medical services. It is also important to continue supporting veterinarians by surveying their needs and monitoring the results of professional education.[29]

**(4) Step forward: New challenges**

The PROVETSUR opened a path for promoting regional cooperation in animal health in South America. In 2011 after its completion, a new collaboration, namely the Prevention and Zoonosis Control of South American Region, began among Argentina, Bolivia, Paraguay, Uruguay, Nicaragua, Peru, and Ecuador. Here again Argentina is acting as a pivotal country, and the FCV-UNLP is providing training. In the PROVETSUR, the selection of targeted diseases depended on each country due to their different socio-economic circumstances, risk priority, and capacities. The task of preventing common animal diseases was left as a task yet to be achieved in the future. The seven countries of the new project who had observed the activities and achievement of the PROVETSUR decided to focus on zoonotic diseases, such as leptospirosis, *Escherichia coli* infection, *salmonella* infection, brucellosis, trichinosis, anthrax, highly pathogenic avian influenza, rabies, and West Nile encephalitis. These diseases have been threatening human lives in Central and South America. The close cooperation under the PROVETSUR fostered trust among the participants of the four countries, which were encouraged to promote further cooperation among them and develop their activities with new member countries.

The cooperation of the PROVETSUR is being succeeded by another form of regional cooperation. The four universities obtained certification of regional accreditation of university education, and became members of the network of thirty universities from the seven countries of MERCOSUR, who had agreed to exchange credits among them.[30]

[28] JICA 2010, pp. xiv-xv.

[29] JICA 2010, p. 26.

[30] JICA 2010, p. 36; and JICA 2011.

## 3. Lessons Learned from the Case Study

### 3-1 Key Success Factors

#### (1) Ownership of the stakeholders

The ownership of the GOA and the FCV-UNLP became a driving force for the implementation of the PROVETSUR. The FCV-UNLP had been working with the GOA, for instance, by providing education to the staff of the SENASA. The implementation of the PROVETSUR was motivated by the GOA, who intended to promote the internationalization of the university, and by the FCV-UNLP, which was rich in experience and human resources in the area of animal health.

In addition, the ownership of the other three universities was also important. They actively supported the PROVETSUR by developing their diagnosis techniques and providing seminars to faculty members, students, and veterinarians in the field in each country. They also collaborated with government officials and local veterinarians. University researchers who participated in the PROVETSUR continued related research and published results of the activities of the PROVETSUR.

The four universities were not uniformly committed to the project early on. However, as the project progressed, and particularly after the reorganization of regional and national activities as well as of the JCC's mechanism, tangible achievements from activities that crossed national boundaries helped foster their commitment.

#### (2) Change drivers

There were several drivers behind the formation and dynamic development of the PROVETSUR.

*Outbreaks of FMD*

The outbreaks of FMD in the Southern part of South America in the early 2000s highlighted the importance of maintaining animal health in the region. The countries of the region directly felt the dangers of animal diseases to their economies and to the health of their citizens.

*Socio-political frameworks of regional cooperation and international standards*

The existence of socio-political frameworks of regional cooperation, such as MERCOSUR and the CAN, contributed to establishing quick linkage among the four countries and motivating them to work together for the benefits of the region, as well as their own. Existing international

standards, such as the OIE list and technical disease cards, also became guidelines for them to conduct their activities.

*Flexible adaptation of young researchers*
Junior researchers at the four universities had the flexibility to try epidemiological and other methods introduced by the Japanese experts, and were encouraged to publish findings based on statistics and data obtained through fieldwork. Successful publication in international journals not only greatly stimulated other junior researchers but also motivated senior researchers in the region.

**(3) Learning in the process of the cooperation**
*A virtuous circle of learning through publications*
During the PROVETSUR, the faculty members of the four universities changed their ways of thinking and expanded their research activities by using epidemiological methods and jointly working with fellow researchers in the region. Researchers, particularly senior ones, of the four universities had not thought much about publishing papers in leading academic journals, given their working environment lacked sophisticated equipment. However, the performance of young researchers who successfully started to publish peer-reviewed papers encouraged senior researchers to do the same.

Such successful publication in international journals brought about a virtuous circle of learning. Through publication, researchers of Bolivia, Paraguay, and Uruguay, as well as Argentina, could obtain opportunities for joining in the international academic circle crossing national boundaries. Research results were also presented and shared with fellow researchers in various seminars and conferences, such as the SIEVMP. They could exchange research results and views with researchers of other countries, which consequently contributed to develop their knowledge and research level. Their research activities expended. In so doing, the gap of their research level gradually narrowed. As a result of this, they have more opportunities to participate in joint research activities and publish papers.

*From competition to cooperation through face-to-face interactions*
The activities of the PROVETSUR enabled them to find and understand the great merits of regional cooperation. Before the implementation of the PROVETSUR, the framework of MERCOSUR in the area of animal health

meant only competition among the members.[31] The assumption changed with the progress of the project. The member countries learned that they could obtain actual benefits from the regional cooperation and mutual support.[32] The cooperative relationships of the four universities have been constructed through individual face-to-face interactions, rather than institutional ones, in frequent international training in the FCV-UNLP and national training conducted by dispatched Argentinean experts.[33] In so doing, they fostered trust among them, which created the friendly circumstance in which they could consult with each other and exchange opinions. These experiences consequently lead them to form the new project mentioned above. In 2010, participants said that with support from Japan as a bridge, MERCOSUR changed to a framework of cooperation.[34]

### (4) Mutual learning

Knowledge transfer was not a one-way flow from the FCV-UNLP as a pivotal institution to the other three universities. SENACSA in Paraguay dispatched two experts to Bolivia's FCV-UAGRM. With their support, the FCV-UAGRM was able to obtain the technique of producing the diagnostic reagents for brucellosis and became able to produce three kinds of diagnostic reagents.[35] The FCV-UNLP also learned from the other three universities. By participating in the project, they could accumulate experiences and know-how of providing training and managing a regional cooperation project. Thus, mutual learning occurred among the members.

## 3-2 Support for the Network Creation

### (1) Strengthening a network through the enhancement of communication

The FCV-UNLP as a main pivotal institution effectively combined different types of training, by responding to the needs and requests of the other three universities. Within Argentina, the FCV-UNLP provided both group-training with the combination of classroom lectures and practices for all three universities, and individual training with the focus of specific technique(s) for individual universities. They also dispatched experts to each university and transferred techniques

[31] JICA 2010, p. 30.
[32] JICA 2008, p. 37.
[33] JICA 2010, p. 30.
[34] JICA 2010, p. 30.
[35] JICA 2010, p. 23.

through on-the-job training.[36] Regarding some of the latest diagnosis techniques, such as PCR and Real Time PCR, the FCV-UNLP cooperatively worked with Japanese short-term experts. After Japanese short-term experts had provided guidance to the faculty members of the FCV-UNLP, they transferred their obtained knowledge and skills to the other three universities. The combination of these different training programs was very effective and efficient in raising the capacities of diagnostic knowledge and techniques in the three countries, and in the region as a whole. Consequently, face-to-face interactions through these training programs contributed to the enhancement of communication among participants, fostering of mutual trust, and strengthening of their network.[37] The FCV-UNLP also could enrich their experiences as a provider of international training.

Staff members of the FCV-UNLP, who were learning from a Japanese short-term expert.

In addition, the strengthened monitoring process used during the project, which included a reinforced quarterly reporting mechanism, further facilitated the development of the network and the management skills of the FCV-UNLP. Through such actions, the FCV-UNLP, together with the secretariat, were able to prepare an even more strategic annual plan for the PROVETSUR's activities. The annual plan was intensely discussed and agreed to by the four universities in the JCC. This reflective and continuous improvement of project management significantly contributed to the project's achievements.[38] Enhanced communication made possible through training, and the monitoring process resulted in smooth cooperation between the four universities, which also helped consolidate their network.

### (2) Bridge making, clear objectives, and visualized outputs

Japan through JICA played a role of catalyst. As stated before, there was little cooperation in animal health in the region before the implementation of the PROVETSUR. JICA had previously provided bilateral assistance in animal health for the four Spanish-speaking countries and recognized the

[36] JICA 2010, p. 23.
[37] JICA 2010, p. 36.
[38] JICA 2010, p. 26.

potential for regional cooperation. This facilitated the creation of a practical linkage among the countries and promoted regional cooperation. During the PROVETSUR, both long- and short-term experts from Japan assisted the FCV-UNLP, which conducted a variety of training activities for the other three universities. Particularly, at the early stage of the project, the Japanese long-term expert played an important role in connecting the four universities, who had not yet developed a strong sense of trust.[39] He assisted the FCV-UNLP in organizing the JCC and making it functional. His regular visits to the three universities also helped the FCV-UNLP, which was still developing its management capabilities, to maintain and strengthen the whole network. This kind of direct support in linking the four universities and the assets of bilateral cooperation contributed to the overall activities of the PROVETSUR and resulted in a good combination of bilateral and regional cooperation.

In addition, JICA successfully motivated individual participants by introducing a clear structure with visualized output at both the national and regional levels. It is easy for individuals placed in a regional cooperation framework to lose sight of the bigger picture. Therefore, the creation of an easy-to-understand structure for project implementation was an effective means through which individual members could understand how their daily activities connected to overall output and outcome as well as to individual and regional benefits. The knowledge and techniques required for the PROVETSUR were explicitly defined. The publication of papers and reports also helped the visualization of outputs derived from daily activities. The outputs were also modified (e.g. translated into Spanish) and widely shared with other researchers and veterinarians through the project website and conferences. This approach helped elucidate the benefits of cooperating regionally to the four universities and consequently provided motivation for them to maintain the network.

## 4. Implications

This case study provides some implications for future effective cooperation.

*The importance of fostering a common vision by linking national and regional activities*

It is important to foster a common vision among stakeholders to ensure

[39] JICA 2010, p. 25.

effective implementation of regional cooperation. At the beginning of the PROVETSUR, the linkage of national and regional activities did not seem to be sufficiently defined for stakeholders. The four countries also had little experience in regional cooperation and had different national risk priorities. In response to a mid-term review of the PROVETSUR, the structure and implementation mechanism of the project were revised and revitalized. This enabled individual participants to obtain a clear understanding of actual outputs/outcomes and understand the connection between the daily activities in each country and the meaning of the activities at the regional level.

*The necessity of sufficient preparation in forming an effective mechanism of implementation and coordination*

Since it essentially involves a larger number of stakeholders, regional cooperation often requires a longer time than bilateral cooperation to design and initiate an effective mechanism of implementation and coordination. For the PROVETSUR, the four universities worked together with the Japanese long-term expert and spent a certain amount of time constructing a practical, workable mechanism for implementing and coordinating related activities, making the JCC function properly, and introducing a monitoring system.

*Mechanism for promoting communication and strengthening networks*

The preparation of a mechanism for promoting communication among participants is very important for regional cooperation, especially when the participants have divergent socio-economic-political situations, interests, and capacities. Smooth communication is the first step in fostering the trust necessary to construct a solid network and attain expected outputs. A variety of activities in the PROVETSUR provided such a mechanism, including personal face-to-face interactions through attending international training in the FCV-UNLP in Argentina, dispatching Argentinian experts to the other three universities, the circulation of the Japanese long-term expert, and the participation in academic conferences held in the region.

*Bringing productive, inclusive competition through visualized outputs in the region*

The introduction of a certain level of competition in a project sometimes encourages productive outputs by enhancing mutual learning among participating countries. The PROVETSUR successfully utilized publication

as a tool for motivating participating researchers to form regional research groups and activate research in the region. This also became an alternative to funds and equipment as an incentive to maintain activities.[40] Some kinds of visible, clear objects can stimulate participants' motivation and bring about productive, inclusive competition in the region.

*Political and policy framework and resources for the promotion of regional cooperation*

Favorable political and policy circumstances are important for the promotion of regional cooperation. The existing regional cooperation frameworks, such as MERCOSUR and the CAN, provided a political foundation for the formation of the PROVETSUR. Simultaneously, Argentina had the FO-AR as a national policy for promoting horizontal cooperation. Under the PPJA, Argentina and Japan also agreed to work together for the development of South-South and triangular cooperation. Moreover, in Argentina, there were several institutions, such as the FCV-UNLP, the SENASA, and the INTA, which with their accumulated knowledge and expertise are capable of providing support to neighboring countries in the area of animal health.

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