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| Country Name | Strengthening of Activities of Survey and Control for Chagas Disease |
| Republic of Nicaragua | |

I. Project Outline

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|-----------------------------|---|--------------|---|
| Background | Chagas disease is an infectious disease transmitted by bloodsucking insects of the genera <i>Triatoma</i> , blood infection and mother-to-child infection. It has been widely spread in Central and South American countries mostly by vector-borne transmission. Over 7.5 million people in the region were estimated to be infected, and the Pan American Health Organization (PAHO) claimed it as the second serious tropical disease after malaria. In Nicaragua, according to the data of PAHO in 2005, at least 50,000 people were infected out of a population of 5.14 million. Since the insects primarily inhabit in houses built of materials such as mud, adobe and thatch, the poor who live in such houses are at the high risk of infection. Therefore, in Nicaragua the infection is concentrated in the northern poor areas. | | |
| Objectives of the Project | Through: 1) strengthening institutional capacity of the Ministry of Health (Ministerio de Salud: MINSa) to conduct surveys, operate and manage spraying and surveillance systems, and 2) improving the community capacity for prevention of Chagas disease, the project aimed at a control of vectoral transmission of the disease in the 5 target departments (prefectures), thereby contributing to interrupting vectoral transmission of Chagas disease in the target departments. 1. Overall Goal: Vectoral transmission of Chagas disease is interrupted in the target departments. 2. Project Purpose: Vectoral transmission of Chagas disease is controlled on a sustainable basis in the target departments. | | |
| Activities of the Project | 1. Project Site: Departments of Nueva Segovia, Madriz, Matagalpa, Jinotega, Estelí. 2. Main Activities: 1) strengthening MINSa's capacity to design and conduct surveys integrating entomological and serological methodologies, 2) strengthening MINSa's capacity for operation and management of spraying, 3) strengthening MINSa's capacity for operation and management of surveillance systems, and 4) improving community capacity for prevention of Chagas disease. 3. Inputs (to carry out above activities) Japanese Side 1) Experts: 13 persons 2) Trainees Received: 7 persons 3) Equipment: vehicles, computers, projectors, serological test reagent, microscopes, pesticide, pesticide sprays, and others. Nicaraguan Side 1) Staff Allocated: 7 persons in the headquarters of MINSa, approximately 40 persons in the prefectures and others 2) Land and Facilities: Office spaces 3) Local Cost: cost for utility of offices (electricity, water and telephone charges), travelling cost of the staff, fuel for vehicles, and others. | | |
| Project Period | September 2009 – August 2014 | Project Cost | (ex-ante) 480 million yen, (actual) 419 million yen |
| Implementing Agency | Ministry of Health (Ministerio de Salud: MINSa) | | |
| Cooperation Agency in Japan | None | | |

II. Result of the Evaluation

<Constraints on Evaluation>

- Due to the extended social turmoil in the country, the survey methodologies for the ex-post evaluation were limited to reviewing key documents, and the questionnaires to and telephone interviews with MINSa Headquarters and its Department Health Administrations (Sistemas Locales de Atención Integral en Salud: SILAIS) in the five target departments, and the site survey was not conducted. Therefore, as for the community members involved in the project, while the information obtained from the documents and MINSa Headquarters and SILAIS was utilized, the current voices of the community members were not directly reflected in this evaluation.

<Special Perspectives Considered in the Ex-Post Evaluation>

- Achievement of the Overall Goal which set the target year in 2019 was estimated based on the quantitative data collected by MINSa in its survey in 2017 and the qualitative data obtained by the ex-post evaluation survey in 2018.
- Concerning the Indicator 1 of the Overall Goal, i.e. (by 5 years after the project completion) Sero-prevalence rate of under 16 years old ($\approx 0\%$), because the rate of positivity among the children under 16 years old in 2019 would not be zero even if the infection had been interrupted by the end of the project in 2014 since the children under 16 years old in 2019 would include the children who were already infected in 2014. Therefore, this Indicator was not applicable in this ex-post evaluation.
- Infestation rate of insects at the time of this ex-post evaluation was judged by the data collected by MINSa in its survey in 2017, since no survey has been conducted in 2018.

1 Relevance

<Consistency with the Development Policy of Nicaragua at the Time of Ex-Ante Evaluation and Project Completion>

The project was consistent with the development policies of Nicaragua at the time of ex-ante evaluation and project completion. Under the "National Health Policy 2004-2015" prepared by MINSa, the General Directorate of Public Health Surveillance (Dirección General de Vigilancia y Salud Pública: DGVS) of MINSa formulated the "Action Plan 2013-2014" which included a vector disease control program. The "Multi-Year Health Plan 2011-2015" also referred to the need of Chagas disease control.

<Consistency with the Development Needs of Nicaragua at the Time of Ex-Ante Evaluation and Project Completion >

The project was consistent with the needs of Nicaragua for enhancement of Chagas disease control at the time of ex-ante evaluation and

project completion. Although the government had been implementing insecticide spraying intensively in the villages where the vectors were captured in the high-risk northern areas, many villages were left uninvestigated and the full habit data on the vectors were not available, and thus the attack phase¹ of the disease control had not been completed. The surveillance phase² for keeping low population of vectors had not been systematically introduced either.

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

The project was consistent with the Japan's ODA policy for Nicaragua at the time of ex-ante evaluation. The "Country Assistance Program for the Republic of Nicaragua" (October 2002) listed six priority areas including health and medical services, and in said area, control of infectious tropical diseases was raised as one of the needs to be addressed in relation to poverty reduction.

<Evaluation Result>

In light of the above, the relevance of the project is high.

2 Effectiveness/Impact

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

The Project Purpose was achieved by the time of project completion. The domestic infestation rate of *Triatoma dimidiata* (*T.d.*)³ had been sustained below 5% (Indicator 1) and the number of communities infested with *Rhodnius prolixus* (*R.p.*)³ was zero (Indicator 2) in the project target municipalities. The coverage rate of entomological surveillance system in the surveillance system pilot municipalities was 100% (Indicator 3) and all municipalities in the project target departments had introduced the entomological surveillance system improved under the project (Indicator 4).

<Continuation Status of Project Effects at the time of Ex-post Evaluation>

The project effects have been mostly continued by the time of ex-post evaluation. Out of 5 project target departments, 3 departments have maintained the domestic infestation rate of *T.d.* below 5% (Indicator 1), and the number of communities infested with *R.p.* has been kept at zero in the target municipalities of the project (Indicator 2) according to the entomological survey conducted by MINSa in 2017. As for the surveillance system, the coverage of the entomological surveillance system in the pilot municipalities has been sustained at 100% (Indicator 3), and for the 49 municipalities introduced to the surveillance system in the project target departments, 94% of the municipalities (46) have kept the system active (Indicator 4). Although the reason for the increase in the infestation rate of *T.d.* in 2 departments was not explicitly identified, insufficient coordination with related agencies, rotation and relocation of the staff of MINSa, and limited budget for spraying were raised as reasons in the interview with the person in charge in the SILAIS Jinotega.

<Status of Achievement for Overall Goal at the time of Ex-post Evaluation>

The Overall Goal was partially achieved at the time of ex-post evaluation. Domestic infestation rate of *T.d.* in the project target departments in 2019 is not verifiable (Indicator 2), because the possibility of doubling of the infestation rate after 2017 cannot be denied based on the experience in Estelí from 2013 to 2014. The number of communities with *R.p.* infestation in the project target departments has been zero since achieving the target in 2009 according to the survey carried out in 2013, 2014, and 2017 by MINSa (Indicator 3)⁴.

<Other Impacts at the time of Ex-post Evaluation>

There are various positive impacts observed at the time of ex-post evaluation. The improved cooperative relationship with the Ministry of Education (MINED) attained through the awareness-raising activities implemented by the project with elementary schools has been maintained, and activities such as wall painting contests and educational talks with students are still being carried out in collaboration with MINED. The male community members who learned the importance of keeping house clean and tidy for prevention of insect infestation through the project still keep helping housework. This is very rare to be seen in Latin American machismo culture especially in rural areas. No resettlement and land acquisition, and no other negative impact has been caused by the project.

<Evaluation Result>

Therefore, the effectiveness/impact of the project is high.

Table 1. Achievement of Project Purpose and Overall Goal

| Aim | Indicators | Results | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|--|--------------------|--------------------|--------------------|--|-------------------|------|------|------|------|---------------|------|-----|-----|-----|--------|------|-----|-----|-----|-----------|------|-----|-----|-----|----------|------|-----|-----|------|--------|------|-----|-----|-----|
| Project Purpose: Vectoral transmission of Chagas disease is controlled on a sustainable basis in the Project target departments. | Indicator 1 Domestic infestation rate of <i>T.d.</i> in the project target municipalities (objective: <5%). | Status of the Achievement: achieved (partially continued) (Project Completion and Ex-post Evaluation) Table 1. Domestic infestation rate of <i>T.d.</i> Unit: % <table border="1"> <thead> <tr> <th rowspan="2">Year Department</th> <th>Before the project</th> <th colspan="2">During the project</th> <th>After the project</th> </tr> <tr> <th>2011</th> <th>2013</th> <th>2014</th> <th>2017</th> </tr> </thead> <tbody> <tr> <td>Nueva Segovia</td> <td>16.1</td> <td>3.0</td> <td>2.9</td> <td>3.0</td> </tr> <tr> <td>Madriz</td> <td>11.7</td> <td>2.0</td> <td>2.9</td> <td>6.9</td> </tr> <tr> <td>Matagalpa</td> <td>18.0</td> <td>2.8</td> <td>3.6</td> <td>3.8</td> </tr> <tr> <td>Jinotega</td> <td>23.8</td> <td>4.1</td> <td>4.8</td> <td>12.7</td> </tr> <tr> <td>Estelí</td> <td>15.7</td> <td>2.5</td> <td>4.5</td> <td>1.0</td> </tr> </tbody> </table> | Year Department | Before the project | During the project | | After the project | 2011 | 2013 | 2014 | 2017 | Nueva Segovia | 16.1 | 3.0 | 2.9 | 3.0 | Madriz | 11.7 | 2.0 | 2.9 | 6.9 | Matagalpa | 18.0 | 2.8 | 3.6 | 3.8 | Jinotega | 23.8 | 4.1 | 4.8 | 12.7 | Estelí | 15.7 | 2.5 | 4.5 | 1.0 |
| Year Department | Before the project | During the project | | After the project | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 2011 | 2013 | 2014 | 2017 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nueva Segovia | 16.1 | 3.0 | 2.9 | 3.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Madriz | 11.7 | 2.0 | 2.9 | 6.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Matagalpa | 18.0 | 2.8 | 3.6 | 3.8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Jinotega | 23.8 | 4.1 | 4.8 | 12.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Estelí | 15.7 | 2.5 | 4.5 | 1.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Source: 2011-2014: Project Final Report (2014) 2017: Chagas Entomological Survey by MINSa | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

¹ An early phase of vector control by spraying insecticide aiming at the eradication of vectors.

² A phase of vector control for maintaining low population of vectors by introducing surveillance system for vectors and patients. While it was called "maintenance phase" in the Detailed Planning Survey Report (2009), it has been called as "surveillance phase" in all other project documents, the term "surveillance phase" is applied in this ex-post evaluation.

³ *T.d.* and *R.p.* are the principal triatomine vectors of the Chagas parasite, whose range extends from northern South America, throughout all the countries of Central America and into Southern Mexico.

⁴ *R.p.* has not been found in Nicaragua since December 2009, and the interruption of infection of Chagas disease through *R.p.* in the country was certified by PAHO on August 2011. Therefore, the project did not interrupt the infestation of *R.p.* but has maintained its non-infestation situation.

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|--|---|---|
| | Indicator 2 The number of communities with <i>R.p.</i> infestation in the project target municipalities (objective: 0) | Status of the Achievement: achieved (continued) (Project Completion) The survey conducted by MINSAs from November 2013 through July 2014 found no communities infested with <i>R.p.</i> in the project target municipalities. (Ex-post Evaluation) The survey conducted by MINSAs in 2017 found no communities infested with <i>R.p.</i> in the project target municipalities. |
| | Indicator 3 Coverage rate of surveillance system in the entomological surveillance system pilot municipalities (objective: 100%) | Status of the Achievement: achieved (continued) (Project Completion) The coverage of the surveillance system in the pilot municipalities was 100% in 2013. (Ex-post Evaluation) The coverage of the surveillance system in the pilot municipalities was 100% in 2018. |
| | Indicator 4 % of municipalities which introduced the surveillance system in the project target departments (objective: 50%). | Status of the Achievement: achieved (continued) (Project Completion) All municipalities (49 municipalities in total) in the project target departments have introduced the surveillance system improved under the project (100%). (Ex-post Evaluation) As of 2018, 4 departments have maintained the surveillance system active in all the municipalities (maintenance rate: 100%), while in Matagalpa the maintenance rate has dropped to 85% (maintenance rate in the project target departments: 97%). |
| Overall Goal: Vectoral transmission of Chagas disease is interrupted in the Project target departments. | Indicator 2 (by 5 years after the project completion) Domestic infestation rate of <i>T.d.</i> (< 5%) | (Ex-post Evaluation) not verifiable Domestic infestation rate of <i>T.d.</i> has increased in Madriz and Jinotega between 2014 and 2017 from 2.9% to 6.9% and 4.8% to 12.7% respectively as shown in the Table 1. Based on this experience, the possibility of increase of the infestation rate after 2017 in other departments cannot be denied. Therefore, the infestation rate in 2019 is not predictable with the available data. |
| | Indicator 3 (by 5 years after the project completion) Number of communities infested with <i>R.p.</i> (= 0) | (Ex-post Evaluation) achieved The number of communities with <i>R.p.</i> infestation in the project target departments has been zero since 2013. |

3 Efficiency

Both the project cost and period were within the plan (ratio against the plan: 87% and 100%, respectively). The outputs were produced as planned. Therefore, efficiency of the project is high.

4 Sustainability

<Policy Aspect>

The “Multi-Year Health Plan 2011-2015” was updated for the period of 2015-2021 and maintains the guidelines for Chagas disease control. The “Strategic Plan for Neglected Infectious Diseases 2014-2018 in Nicaragua” was also established as a national health plan. In the framework of these upper level plans, the “2012-2020 National Operational Plan for the Prevention and Control of Chagas Disease” was formulated by DGVS and approved by MINSAs in September 2013 and has been implemented at the initiative of DGVS.

<Institutional Aspect>

There has been no significant change either in organizational structures or in responsibilities and mandates of MINSAs and SILAIS since the time of ex-ante evaluation of the project. According to the questionnaires to and interviews with MINSAs Headquarters and SILAIS, the retention rate of their staff has been high, but the number of staffs has been slightly insufficient at both MINSAs Headquarters and the field level. This was because the supportive supervision from the central to the region requires the significant number of officials at MINSAs Headquarters, and the scope of work of the vector control team at field level is wide covering not only Chagas disease but also Malaria and Dengue fever. However, specific measures have been taken to address this situation. Recruitment of additional personnel specifically to the Chagas Section in MINSAs has been in process at the central level, and efforts are made to strengthen the Community Health Networks and encourage active participation of communities at SILAIS and municipality level. The SILAIS Madriz has started community nursing training courses to train and qualify community nurses who can be hired as field level staff. The volunteers’ work has been active after the completion of the project until now. The key to this sustainable community participation lies in the monitoring system set up in MINSAs that has allowed to monitor the outputs of volunteers’ works and to timely provide technical support and feedback to the volunteers through the Community Health Network.

<Technical Aspect>

MINSAs Headquarters and SILAIS keep acquiring the latest knowledge and guidelines on Chagas disease control by attending international conferences such as the Initiative of Central American and Mesoamerican Countries (ICAMC) by PAHO and others. Also, field level staffs in SILAIS and municipalities have been maintaining their knowledge and skills through day-to-day activities by using the National Guidelines and the Work Manuals prepared under the project. So do community members through the continuous talks and lectures provided by the Family and Community Health Team (Equipos de Salud Familiar y Comunitario: ESAFC) of SILAIS. In addition to these activities, MINSAs has been providing an annual nationwide training program with its own resources to introduce and refresh the knowledge on surveillance, diagnosis and treatment of Chagas disease, and community activities, as well as to disseminate further the aforementioned National Guidelines and Work Manuals. All of five target SILAIS have kept providing training for community members in

cascading manners from SILAIS to the Health Units (Health Posts, Basic Health Teams, etc.) and from the Health Units to the members of the Community Health Networks (community volunteers).

<Financial Aspect>

The budget for Chagas disease control has been on an upward trend at the national level (Table 2). The budget at SILAIS level has varied from department to department and year to year. This was because the budget for Chagas disease control has been affected by the outbreaks of other epidemics including Malaria and Dengue fever.

<Evaluation Result>

In light of the above, some problems have been observed in terms of institutional and financial aspects of the implementing agency. Therefore, the sustainability of the project effect is fair.

Table 2. Estimated budget allocated to Chagas disease control

| Year | Unit: 1,000 Córdoba | | | | |
|---------------|---------------------|-------|-------|-------|-------|
| | 2014 | 2015 | 2016 | 2017 | 2018 |
| National | 1,470 | 1,523 | 1,575 | 1,628 | 1,680 |
| Nueva Segovia | 15 | 21 | NA | 7 | 7 |
| Madriz | 64 | 65 | 67 | 68 | 34 |
| Matagalpa | 16 | 17 | 19 | 20 | 20 |
| Jinotega | 20 | 20 | 10 | 20 | 10 |
| Estelí | 15 | 75 | 89 | 29 | 5 |

Source: The above chart is composed by information provided by the MINSA Headquarters and five target SILAIS for this evaluation

5 Summary of the Evaluation

The Project Purpose was achieved by suppressing the infestation of vectors of *T.d.* and *R.p.* under the target levels and extending the surveillance system improved by the project to all municipalities in the project target departments. The Overall Goal was partially achieved by maintaining the infestation rate of *R.p.* at zero in the project target departments. As for sustainability, it was identified that the number of personnel and the budget has not necessarily been sufficient especially at department and municipality levels. However, it must be noted that MINSA and SILAIS have taken various substantial measures to counter the situation of the lack of personnel. Considering all of the above points, this project is evaluated to be highly satisfactory.

III. Recommendations & Lessons Learned

Recommendations for Implementing Agency:

- It is recommended for MINSA and SILAIS Madriz and Jinotega to investigate the situation in the departments, find the cause of high domestic infestation rate of *T.d.*, and undertake necessary measures to suppress the domestic infestation rate below 5%.
- It is recommended for MINSA and SILAIS Estelí to find the contributing factors of the decrease in domestic infestation rate of *T.d.* between 2014 and 2017, and share the experience with other departments to maintain the infestation rate as low as 1%.

Lessons Learned for JICA:

- Nicaragua has a long history of active grassroots volunteerism, and the project had successfully involved the grassroots volunteers through the Community Health Network for building community surveillance system of the vectors and infections as well as awareness-raising campaigns, which played a crucial role in achieving the Project Objective. For the projects in which community members are expected to play important roles in achieving the project objective, it is recommended to formulate a monitoring and supervision system in the implementing agency, which enables volunteers to see the outcomes of their activities and receive a feedback from the agency, and the agency to continue the supportive activities after the project completion to ensure project sustainability.
- The overall goal of this project was set to achieve within 5 years of project completion. However, one of the indicators for the overall goal “(by 5 years after the project completion), sero-prevalence rate of under 16 years old ($\approx 0\%$)”, included individuals who had already been infected before the project completion. Therefore, it was impossible to achieve even if the transmission was interrupted within 5 years of project completion. This was because the indicator was included for project overall goal in order to align with other international donors, as it was an internationally agreed goal for Chagas disease control. When there is an international goal for a targeted problem and the project aims to achieve the same goal, it can be included for a super-goal, while project overall goal needs to establish its own indicator(s) adjusted to the project target group.



Awareness raising activity in a Health Center



Insecticide spraying by MINSA
Photo credit: SILAIS Nueva Segovia