

Republic of Honduras

Ex-Post Evaluation of Technical Cooperation Project

“Chagas Disease Control Project”/“Chagas Disease Control Project (Phase 2)”

External Evaluator: NISHINO Hiroshi, Value Frontier Co., Ltd.

**0. Summary**

This project aimed to reduce the risk of vector-borne infection with Chagas disease by controlling triatomine bugs, the vectors transmitting the parasite of Chagas disease, and establishing an epidemiological surveillance system with community participation.

“Relevance” of the Project is “High” since the objectives of the Project were consistent with Honduran development policies and needs as well as Japanese aid policies. As for “Effectiveness and Impact,” although the achievements of Project Purpose and Overall Goal in Phase 1 were limited<sup>1</sup>, Project Purpose and Overall Goal in Phase 2 were attained as a result of the promotion of measures against the vectors and the establishment of a surveillance system, and the target area was expanded from 4 to 8 departments. In addition, the Project contributed to Chagas disease control and prevention not only in the area directly targeted by the Project but also throughout the country. Thus, “Effectiveness and Impact” of the Project as a whole is judged to be “High.” On the other hand, since the project input (cost and period) exceeded the plan due to the implementation of Phase 2, which had not been initially planned, “Efficiency” of the Project is “Fair.” “Sustainability” of the project effects is also evaluated to be “Fair” because minor concerns are observed in organizational, technical, and financial aspects of the implementing agency.

In light of the above, this project is evaluated to be “Satisfactory.”

**1. Project Description**



Figure 1 Project Location<sup>2</sup>

Source: prepared by the evaluator

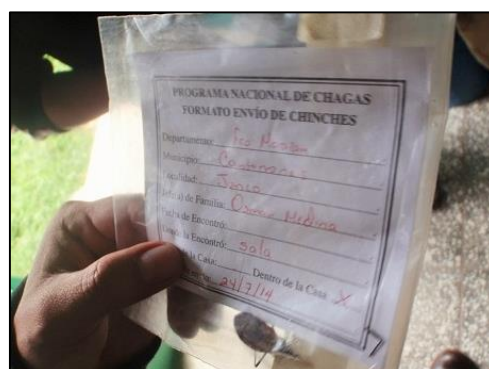


Figure 2 Vector delivered by a resident

Source: Taken by the evaluator

<sup>1</sup> Hereafter, this report uses the word “Phase 1” and “Phase 2” to clearly distinguish phases of the Project. However, the use of the word “Phase 1” is only for the sake of convenience, and the official title of the projects to be evaluated is “Chagas Disease Control Project” and “Chagas Disease Control Project (Phase 2)”.

<sup>2</sup> The target departments in Phase 1 are Intibuca, Lempira, Copan, and Ocotepeque (indicated in orange). The target departments in Phase 2 are, in addition to the 4 departments above, El Paraiso, Francisco Morazán, Yoro,

## 1.1 Background

Chagas disease (also known as American trypanosomiasis), designated by the World Health Organization (WHO) as one of the neglected tropical diseases, is a widespread illness in Central and South America caused by the protozoan parasite *Trypanosoma cruzi* (*T. cruzi*) which is transmitted by the triatomine bug (also called “kissing bug”)<sup>34</sup>. The number of infected persons in Central America as of 2000 was estimated at 2.44 million, and in Honduras alone the number was approximately 300,000 (Schofield 2000). Chagas disease has 2 phases. The initial (acute) phase lasts for about 2 months after the infection. During

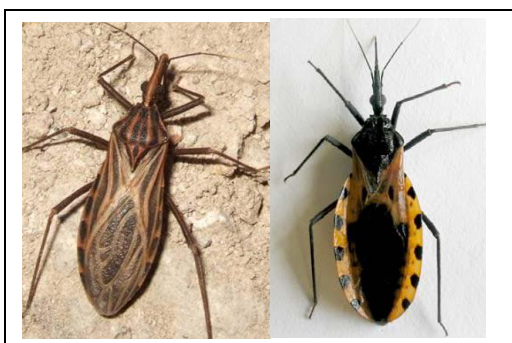


Figure 3 Triatomine bug  
(Left: *R.p.*, Right: *T.d.* Approximately 3 cm.)  
Source: Project document

this phase, infected people can present with fever, headache, difficulty in breathing, and abdominal or chest pain and occasionally have swelling around the eyes and problems in skin, although in most cases symptoms are absent or mild. During the chronic phase, infection can lead to sudden death or heart failure caused by cardiac, digestive, and neurological disorder. There is no vaccine for Chagas disease, and vector control is considered the most effective measure of control (WHO

2014a). Chagas disease is called the “illness of the poor” since the vector species tend to live in the housing of the poor (in thatched roofs or cracks in mud walls), and the poor are the most likely to be affected by the disease.

In 1997, seven countries in Central America, including Honduras, and the WHO/Pan American Health Organization (PAHO) launched the “Initiative of the Countries of Central America for Control of Vector-Borne and Transfusional Transmission and Medical Care for Chagas Disease (IPCA),” and have implemented measures against Chagas disease. In line with this, JICA has supported Chagas disease control since 2000 in many Central American countries, including Guatemala, El Salvador, and Nicaragua, through vector control and the establishment of surveillance systems. The present project in Honduras was conducted as a part of regional cooperation measures.

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and Comayagua (indicated in dark green).

<sup>3</sup> In Honduras, there are 2 major species of triatomine bug through which Chagas disease is transmitted: *Rhodnius prolixus* (*R.p.*) and *Triatoma dimidiata* (*T.d.*). The former is a non-native vector to Honduras (introduced from South American countries) with high infectious capacity and fertility. The control of *R.p.* aims to eliminate them. The latter is an indigenous species in Honduras that is a less effective vector than *R.p.* Since it infests not only housing structures but also peridomestic areas, it is impossible to eliminate *T.d.* Thus, the control of *T.d.* aims to reduce their domestic infestation (Ueda 2012).

<sup>4</sup> In addition, contaminated blood products, mother-to-child transmission, organ transplants, and contamination in food can be causes of transmission (WHO 2014a).

## 1.2 Project Outline

Table 1 Project Outline

		Phase 1	Phase 2
Overall Goal		1. Transmission of Chagas disease is interrupted in Central America by the end of 2010 <sup>5</sup> . 2. Transmission of Chagas disease is interrupted in Honduras by the end of 2010.	Transmission of Chagas disease through vectors significantly decreases in Honduras.
Project Purpose		Transmission of Chagas disease by vectors is interrupted in 4 selected departments in Honduras.	In the target departments, the areas for the attack phase are extended and the epidemiological surveillance system with community participation is established.
Output	1	<i>R.p.</i> is eliminated in 4 departments.	Vector control of <i>R.p.</i> in the attack phase is completed in the target departments.
	2	<i>T.d.</i> is reduced in 4 departments.	Coverage of vector control of <i>T.d.</i> is extended to the localities with high domestic infestation in the departments of Intibuca, Lempira, Copan, and Ocotepeque.
	3	Vector surveillance systems are established with community participation <sup>6</sup> .	The epidemiological surveillance system with community participation in pilot areas is established.
	4	An information system for Chagas disease is implemented in 4 departments and at the national level.	The epidemiological surveillance system with community participation is introduced in the priority localities except pilot areas, where the attack phase is completed.
	5	Diagnostic tests and treatment of patients younger than 15 identified by the project are completed with responsibility of the National Program.	Experience and knowledge of Chagas disease control are shared and exchanged among the target departments.
Total cost (Japanese Side)		282 million yen	204 million yen
Period of Cooperation		September 2003 – September 2007 (48 months)	March 2008 – March 2011 (36 months)
Implementing Agency	Secretary of Health (Secretaria de Salud: SESAL) Headquarter and Regional Offices	Supporting Organization in Japan	Technical Support Committee (Chagas disease control)
Related Projects	[Technical Cooperation Project] Chagas Disease Control Project (Guatemala, El Salvador, Nicaragua) [Other] Counterpart fund of non-project grant aid (House improvement, provision of equipment for spraying insecticide) 【Other organizations】 WHO, PAHO, Inter-American Development Bank (IDB), Canadian International Development Agency (CIDA), World Vision, CARE International, Médecins Sans Frontières, Fondo Hondureño de Inversión Social (FHIS), etc.		

Source : JICA (2007a, 2011a)

<sup>5</sup> “Interruption of Transmission” is defined as the state where new infection is almost zero (Ueda 2012). The criteria of IPCA’s certification of “Interruption of Transmission (by *R.p.*)” are (1) to survey all areas with risk of infestation of *R.p.* and conduct surveillance by community members and regular surveys by SESAL and (2) to confirm, as a result of (1), the absence of new infection by *R.p.* for at least 3 years (Hashimoto 2013).

<sup>6</sup> “The epidemiological surveillance system with community participation” for Chagas disease control consists of the following 3 components: (1) report of vectors and suspected acute cases of Chagas disease from the community to health centers/health posts (CESAMOs/CESARs), (2) recording and analysis of collected information on vectors and suspected acute cases of Chagas disease, and plan of response (educational activities, spraying of infested houses, and treatment of patients), and (3) educational activities, spraying of infested houses, and treatment of patients (JICA 2011a).

### 1.3 Outline of the Terminal Evaluation (Phase 2)

#### 1.3.1 Achievement Status of Project Purpose at the Time of the Terminal Evaluation

At the time of the terminal evaluation, Project Purpose was considered to be achieved except for Indicator 5 (Reduction of *T.d.*). Meanwhile, the terminal evaluation emphasized the importance of further efforts to strengthen the surveillance system.

#### 1.3.2 Achievement Status of Overall Goal at the Time of the Terminal Evaluation

According to the terminal evaluation, the continuous use of the training manuals and other tools developed by the Project and the proper provision of human and financial resources led to the strengthening and expansion of the surveillance system and then contributed to the achievement of Overall Goal.

#### 1.3.3 Recommendations at the Time of the Terminal Evaluation

It was recommended that SESAL secure human and financial resources at the national level and pursue partnership with other development donors in order to promote measures against Chagas disease throughout the country by utilizing the results of the Project. In addition, the terminal evaluation pointed to the importance of properly functioning information systems and the necessity for ministry ordinances to define the roles of development partners related to Chagas disease control.

Also, the terminal evaluation recommended that the Project manage and share the information on the experience and performance of surveillance systems in each department and to conduct activities reflecting feedback from these experiences. The importance of writing academic papers utilizing data acquired through the Project was also recommended.

## 2. Outline of the Evaluation Study

### 2.1 External Evaluator

Hiroshi Nishino, Value Frontier Co., Ltd.

### 2.2 Duration of Evaluation Study

Duration of the Study: August, 2014 - May, 2015

Duration of the Field Study: November 16 - December 13, 2014. February 16–27, 2015.

## 3. Results of the Evaluation (Overall Rating: B<sup>7</sup>)

### 3.1 Relevance (Rating: ③<sup>8</sup>)

#### 3.1.1 Relevance to the Development Plan of Honduras

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<sup>7</sup> A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

<sup>8</sup> ③: High, ②: Fair, ①: Low

Seven countries in Central America, including Honduras, and WHO/PAHO launched IPCA and set a goal of interrupting the transmission of Chagas disease by 2010 (WHO 1998). In line with this initiative, the Honduran government instituted measures against infectious diseases, including Chagas disease, as part of its health sector objectives. Furthermore, Honduras, along with development partners, formulated a “National Strategy Plan for Chagas (2003-2007),” which aimed to strengthen diagnosis, treatment, and surveillance systems in order to reduce the prevalence and incidence of Chagas disease.

At the time of project completion (Phase 2), IPCA had continuously aimed to eliminate Chagas disease in Central America (PAHO/WHO 2010), and the Honduran government had declared in its “National Health Plan (2010-2014)” the importance of effective measures against infectious diseases. Furthermore, in “National Strategy: Prevention and Control of Chagas Disease and Leishmaniasis (2008-2015),” the Honduran government promoted various strategies to sustainably control Chagas disease in Honduras, such as strengthening surveillance and research systems and promoting community participation.

Thus, the Project was consistent with Honduran development policies as well as regional ones from the time of project planning to its completion.

### 3.1.2 Relevance to the Development Needs of Honduras

The number of annual deaths caused by Chagas disease as of 2000 exceeded 8,500 in the Americas, making it a more serious threat than malaria and dengue fever (approximately 1,600 and 500 deaths respectively) and the most significant cause of death by infectious disease in the Americas (WHO 2014b)<sup>9</sup>. In Honduras, the estimated prevalence of Chagas disease as of 2000 was approximately 300,000, and the estimate of the annual incidence was more than 10,000 (Schofield 2000). However, despite the serious health and mortality impact that these figures suggest, little progress was made in measures against Chagas disease in Honduras, and the mission from PAHO in 2003 conveyed the necessity of taking broad action, including elaborating specific strategies, establishing information systems, and promoting measures at the community level (JICA 2007b).

At the time of project completion (Phase 2), more than 7,500 people in the Americas lost their lives due to Chagas disease (WHO 2014b). In Honduras, although the number of newly infected people significantly diminished, it was still necessary to continue surveillance and extend the coverage of the surveillance system in order to keep the risk of infection at a low level<sup>10</sup>. In addition, associated with an increase in immigration from

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<sup>9</sup> In terms of Disability-Adjusted Life Years (DALY), an indicator which shows the social impact of diseases, the burden of Chagas disease in Latin American countries is six times and nine times greater than malaria and dengue fever respectively (Hotez et al. 2008).

<sup>10</sup> In Argentina and Uruguay, the recurrence of vectors was reported in some areas where the interruption of Chagas disease had been once confirmed (Ueda 2012; Hashimoto 2011).

Central America, cases of Chagas disease were reported in North America and Europe, making Chagas disease a global health issue<sup>11</sup>.

As shown above, the objectives of this project were consistent with the development needs of Honduras at the time of both the project planning and its completion.

### 3.1.3 Relevance to Japan's ODA Policy

The consistency of the Project with Japanese ODA policy at the time of project planning (Phase 1) is confirmed in its "Country Assistance Policy," which put a focus on assistance in the health sector as one of its 4 pillars. In addition, the Japanese government showed its commitment to tackling infectious diseases through various international conferences, such as the Kyushu-Okinawa Summit (2000) and the Johannesburg Summit (2002).

Similarly, at the time of project planning of Phase 2, "Health and Water" was highlighted among 5 priorities in "Country Assistance Policy (2007)," and the Japanese government continuously supported measures against neglected tropical diseases, one of which is Chagas disease, as stated in the Hokkaido Toyako Summit in 2008.

Therefore, the objectives of the Project were consistent with Japan's ODA policies at the time of project planning (both Phases 1 and 2).

In light of the above, this project is evaluated as highly relevant to the development plan and needs of Honduras, as well as Japan's ODA policy. Therefore, "Relevance" of the Project is "High."

## 3.2 Effectiveness and Impact<sup>12</sup> (Rating: ③)

### 3.2.1 Effectiveness

#### 3.2.1.1 Achievement of Project Purpose

In general, the Chagas disease control strategy consists of 2 phases: the attack phase (to get rid of vectors by intensive insecticide spraying) and the maintenance phase (to control vectors by continuous monitoring, proper information management, and countermeasures based on the information). This project can be understood to be in line with this general strategy, considering its objectives to reduce vectors by intensive spraying (the attack phase) and to establish information systems and surveillance systems with community participation for the maintenance phase. Based on this understanding, this section examines the achievement of Project Purpose in both Phases 1 and 2.

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<sup>11</sup> For example, in the United States, it is reported that more than 300,000 people are infected with Chagas disease (CDC 2013).

<sup>12</sup> Sub-rating for Effectiveness is to be put with consideration of Impact.

## Phase 1

Table 2 shows Project Purpose of Phase 1, its indicators (target values), and the achievement of each indicator at the time of the completion of Phase 1<sup>13</sup>. As for vector control of *R.p.* (Indicator 1), insecticide sprayings were conducted in all localities where *R.p.* had been found. As a result, the index of dispersion of *R.p.* decreased from 9.1% in the baseline survey (2004–2006) to 0.3%<sup>14</sup>. On the other hand, the index of infestation of *T.d.* (Indicator 2) was approximately 10%, while the target was 5%. In addition, the target value for Indicator 3 (seroprevalence) was not achieved. Thus, the attack phase in Phase 1 did not fully achieve its objectives, although a certain level of progress in control of *R.p.* can be seen. This is because, as pointed out in project reports, the Project focused its limited resources on the control of *R.p.*, which presents a higher risk than *T.d.*

Project Purpose	Indicator (Target Value)	Achievement at the Time of the Completion	
[Phase 1] Transmission of Chagas disease by vectors is interrupted in 4 selected departments in Honduras.	(1) Index of dispersion of <i>R.p.</i> (0%)	<i>R.p.</i> was found in 3 localities out of 1,095 surveyed in 4 departments (0.3%).	Almost achieved
	(2) Index of infestation of <i>T.d.</i> (lower than 5%)	<i>T.d.</i> was found in 165 houses out of 1,659 houses surveyed (9.95%).	Not Achieved
	(3) Seroprevalence under 15 years old (1% <sup>15</sup> )	1.8% were positive (15/839).	Not Achieved
	(4) Established Surveillance System <sup>16</sup>	The system was installed in 6 pilot sites only, and their performance index as of 2009 was below 50%.	Not Achieved

Source: JICA (2007a, 2014), data provided by the implementing agency.

As for the establishment of a surveillance system (Indicator 4) for the maintenance phase, the introduction of the system was limited to 6 pilot sites, and their performance was not satisfactory. Considering that Project Purpose was to achieve the interruption of transmission in 4 departments, the progress regarding Indicator 4 was not sufficient.

<sup>13</sup> As for Output of the Project (both Phase 1 and 2), see Appendix Table in Appendix 1.

<sup>14</sup> The index of dispersion and index of infestation (%) are defined as “number of localities with vector/number of localities surveyed × 100” and “number of houses with vector/number of houses surveyed × 100”, respectively.

<sup>15</sup> Although the target value is not explicitly given in the project documents, this evaluation sets 1% as a target value for this indicator following Hashimoto (2013), which states that the project set the target value at 1% since it was too difficult to achieve zero seroprevalence.

<sup>16</sup> Although no clear definition of “established surveillance system” was found in project documents, it can be understood to mean the proper function of the surveillance system as described in Footnote 5 (above), appropriate management of information, and adequate responses based on the information. The quality of the system is evaluated by the performance index employed in the Project (the percentage of “Yes” answers for 49 questions (“Yes,” “No,” “NA”) about practice at each level (central government, departments, health centers, communities)). For more details of the performance index, see Programa Nacional de Prevención y Control de la Enfermedad de Chagas (2010).

In summary, although the strategy to focus on the control of *R.p.*, which is risky and eliminable, was considered to be adequate, and a significant achievement was confirmed on this point, the other objectives were not fully achieved. Therefore, the Project (Phase 1) did not fully achieve its purposes.

## Phase 2

Table 3 shows Project Purpose of Phase 2, its indicators (target values), and the achievement of each indicator at the time of the completion of Phase 2. As for the activities related to the attack phase, the Project contributed to a significant reduction in the risk of vector-borne transmission of Chagas disease in 8 departments, expanded from 4 departments in Phase 1, resulting from continuous efforts to control both *R.p.* and *T.d.* (Indicators 4 and 5). In addition, while it was not fully achieved in Phase 1, the coverage of the surveillance system expanded, and its performance also reached a satisfactory level. Associated with these achievements, the reduction in seroprevalence was confirmed as well. Thus, it is possible to conclude that Project Purpose of Phase 2 was fully achieved.

Project Purpose	Indicator (Target Value)	Achievement at the Time of the Completion	
[Phase 2] In the target departments, the areas for the attack phase are extended and the epidemiological surveillance system with community participation is established.	(1) Coverage of localities where the epidemiological surveillance system with community participation is introduced (70%)	The system was installed in 119 localities out of 164 where <i>R.p.</i> was found (72.6%). Including the localities with no report of <i>R.p.</i> , the number was 644.	Achieved
	(2) Performance index for the surveillance system (85%)	The average index in 6 pilot sites as of February 2011 was 84%. The average index as of 2013 in 134 localities reporting the index was 84%.	Almost achieved
	(3) Seroprevalence among children under 15 years old (1%)	According to the result of the serological survey in 2010 conducted in 8 target departments, 0.4% were positive (97/22,062).	Achieved
	(4) Presence of <i>R.p.</i> (0%)	No report of <i>R.p.</i> since 2010, and IPCA certified “interruption of transmission of <i>R.p.</i> ” in 2011.	Achieved
	(5) Domestic infestation rate of <i>T.d.</i> (5%)	<i>T.d.</i> was found in 1,123 houses out of 44,993 surveyed (Approx. 2.5%)	Achieved

Source: JICA (2011a, 2014), data provided by the implementing agency.

As shown above, while Phase 1 showed significant progress in the control of *R.p.*, the achievement of *T.d.* control and the establishment of a surveillance system were not sufficient. On the other hand, Phase 2 achieved all of its targets, including *T.d.* control and



an adequate surveillance system, and the coverage was expanded as well. Therefore, it can be judged that the Project as a whole largely achieved its purposes.

### 3.2.2 Impact

#### 3.2.2.1 Achievement of Overall Goal

Overall Goals in Phases 1 and 2, their indicators (target values), and the achievement of each indicator are shown in Table 4. As for Phase 1, since Overall Goal 1 was not achieved, Phase 1 did not fully achieve its Overall Goals, although a significant reduction in infected people in Honduras was observed. It appears that it was logically too difficult to achieve the interruption of transmission in Central America with a single project conducted in one country, and too ambitious to attempt to achieve the goals in such a short term (by 2010)<sup>17</sup>.

Table 4 Achievement of Overall Goal (Phase 1 and 2)

Overall Goal	Indicator (Target Value)	Achievement at the Time of the Completion	
[Phase 1]			
1. Transmission of Chagas disease is interrupted in Central America by the end of 2010.	Seroprevalence (1% <sup>18</sup> )	“Interruption of transmission” was not achieved, although the number of infected people in 7 Central American countries was significantly reduced from 61,823 (2000) to 3,759 (2010).	Not Achieved
2. Transmission of Chagas disease is interrupted in Honduras by the end of 2010.		According to the survey in 2008-2010 in 12 departments, the seroprevalence among children 15 years old and below was 0.5%.	Almost achieved
[Phase 2]			
Transmission of Chagas disease through vectors significantly decreases in Honduras.	(1) Seroprevalence among children 15 years old and younger (1%)	The seroprevalence in 13 departments was 0.2% in 2012 and 0.1% in 2013.	Achieved
	(2) Number of localities where <i>R.p.</i> is absent (0)	No report of <i>R.p.</i> since 2010, and IPCA certified “interruption of transmission of <i>R.p.</i> ” in 2011.	Achieved
	(3) Infestation rate of <i>T.d.</i> (5%)	Infestation rate of <i>T.d.</i> was 3.1% (2012) and 3% (2013).	Achieved

Source: JICA (2007a, 2011a, 2014), data provided by the implementing agency.

Considering the above, it appears reasonable to modify Overall Goal in Phase 2 to “Reduction of transmission of Chagas disease through vectors in Honduras.” As shown

<sup>17</sup> Meanwhile, since “the interruption of transmission of Chagas disease in Central America by 2010” was also the regional goal in Central America as mentioned in 3.1.1, the Project might have had to align with the regional goal by setting the same goal in the Overall Goal of the Project.

<sup>18</sup> Same as Footnote 15.

in Table 4, the risk of vector-borne infection significantly decreased throughout the country, and the percentage of infected people (seroprevalence) was also at a low level.

Measures against Chagas disease have been supported not only by JICA but also by many other donors, including multilateral donors (WHO, PAHO, IDB), bilateral donors (Canada, Sweden, Taiwan), and NGOs (CARE, Plan International, Médecins Sans

**Box 1 Support by multiple donors**

It is pointed out that the following factors have contributed to enhancing the interests of many donors in Chagas disease control in Honduras: strong political commitment of Honduran government, provision of adequate information on Chagas disease in Honduras, and the perception that Chagas disease is not merely a health issue but a broad social issue as well. (from the interview to the staff involved)

Under this circumstance, SESAL together with donors elaborated national strategies, and each entity allocated roles and responsibilities and demonstrated their commitment. They also held regular meetings to share their plans, strategies, and progress. These factors facilitated donor coordination and the utilization of the results of the Project in other areas not directly targeted by the Project.

Frontières). Taking into account the fact that JICA's direct intervention targeted 8 out of 18 departments in Honduras, it is not reasonable to attribute the progress of Chagas disease control throughout the country solely to this project. However, the Project supported the National Program and facilitated information sharing by organizing regular meetings with each department (including departments not directly targeted by JICA) and donors. Also, the materials developed by the Project, such as guidelines, manuals, and pamphlets, were utilized even in departments not targeted by the Project. Thus, it appears that the Project contributed to the progress of Chagas disease control throughout Honduras.

Furthermore, after the completion of the Project (Phase 2), the Honduran government, in cooperation with the Canadian government, has continued to promote Chagas disease control (insecticide spraying, serological surveys, expansion of surveillance system, treatment, etc.) in the entire country by utilizing the strategies and materials developed by the Project.

As explained above, the Project has contributed both directly and indirectly to the progress of Chagas disease control throughout Honduras, and the indicators of Overall Goal in Phase 2 were achieved. Thus, it can be concluded that the Project as a whole has achieved its Overall Goals.

### 3.2.2.2 Other Impacts

No problems have been reported in relocation or land acquisition because this project did not require them. As for the effects of insecticide, the evidence shows that the risk of insecticide use to the health of humans and the natural environment is low (WHO 2002).

In addition to the positive contributions described in 3.2.2.1, the knowledge and experience acquired by implementing the Project have been disseminated through international conferences and academic journals, adding to the positive effects of this project. Furthermore, the Project promoted the celebration of “Chagas Day (July 9<sup>th</sup>),” when educational events are conducted by municipalities, health centers, and schools to enhance efforts to counteract Chagas disease.

#### Box 2 Results at the community level

In this ex-post evaluation, a questionnaire survey of community residents (111 households) was conducted to examine the project results and current situation at the community level. This box shows some findings of the survey. (For details of the survey, see Appendix 2)

##### Knowledge on Chagas disease and its vectors

We observed that 97% of households knew what Chagas disease is, and 69% mentioned triatomine bugs as a transmission route of the disease. On the other hand, only 29% knew both *R.p.* and *T.d.* were the main vector species. Roofs and cracks on the walls were mentioned by 90% of respondents as places with a high risk of infestation by vectors. Further, 80% answered that insecticide spraying was an effective measure against the vectors. These results show that most people have adequate information on Chagas disease, its vectors, the conditions of risk of infestation, and appropriate countermeasures against vectors.

##### Findings of vectors and responses

We found that 29% had the experience of finding vectors in their house, and 69% of them had found vectors in the past 3 years (i.e., after the completion of the Project), showing that vectors still exist to some extent. As for the response to the discovery of vectors, only 50% of households that had found vectors reported them to health volunteers and/or health centers, and the other half killed vectors with no report. This result implies that vector numbers could be underestimated.

Considering the above results, it appears that knowledge of Chagas disease has been acquired in the community, possibly through the activities of the Project, though rigorous analysis is impossible without baseline information. On the other hand, it appears necessary to promote educational activities in order to assure that the discovery of vectors will be properly reported so that the surveillance system functions in an appropriate manner.

In light of the above, although Phase 1 did not fully achieve its Project Purpose and Overall Goal, Phase 2 showed remarkable progress in vector control (both *R.p.* and *T.d.*) and the introduction of surveillance systems in the extended 8 targeted departments; thus, the targets of Project Purpose and Overall Goal in Phase 2 were fulfilled. In addition, the Project has contributed to Chagas disease control not only in the targeted area but also throughout the country. Therefore, “Effectiveness and Impact” of this project is “High.”

### 3.3 Efficiency (Rating: ②)

The “Chagas Disease Control Project” consisted of 2 phases: Phase 1 and 2. However, according to the initial plan, only Phase 1 had been planned, and the implementation of Phase 2 was decided during Phase 1 because the achievement of Project Purpose within the Phase 1 period was thought to be impossible<sup>19</sup>. Thus, in the evaluation of “Efficiency,” Phase 2 is regarded as an “Extension of Phase 1,” and “Efficiency” is judged by comparing the initial plan (Phase 1 only) and the actual input (sum of Phases 1 and 2).

#### 3.3.1 Inputs

Table 5 Project Input

Input	Plan	Actual
[Phase 1]		
(1) Expert	Long-term: 2 persons (60 MM*) Short-term: 2-3 persons (24 MM)	Long-term: 2 persons (72 MM) Short-term: 8 persons in total (9.8 MM)
(2) Trainees Received	1-2 persons per year (Entomology, Tropical diseases)	13 persons (Entomology) <sup>20</sup>
(3) Equipment	Insecticide, spraying equipment, vehicles, computers, etc.	Insecticide, spraying equipment, vehicles, computers, etc.
(4) Third-Country Expert	2-3 persons per year	None
(5) JOCV**	6-8 persons	10 persons
Total Project Cost Japanese side	382 million yen	282 million yen
Honduras side Operational Expenses	<u>Equipment, facilities, wages for sprayers, etc.</u> (No specific amount was available)	<u>780,000 US\$</u> (91.8 million yen) <sup>21</sup>
Cooperation Period	September 2, 2003 to September 1, 2007 (48 months)	September 2, 2003 to September 1, 2007 (48 months)
[Phase 2]		
(1) Expert	Long-term: 2 persons Short-term: more than 3 persons <sup>22</sup>	Long-term: 2 persons (69 MM) Short-term: 9 persons in total (7.5 MM)
(2) Trainees Received	NA***	1 person (Chagas disease entomology)
(3) Equipment	Vehicles, insecticide, test kit	Vehicle, insecticide, test kit, computer, computer software
(4) Third-Country Expert	NA	2 persons in total (monitoring and evaluation)

<sup>19</sup> For example, according to the midterm evaluation of the Project, “whether to extend the Project or not will be decided at the time of the terminal evaluation” (JICA 2006 p. 23). The interviews of JICA staff and a project expert also showed that Phase 2 was planned between the midterm evaluation and the terminal evaluation of Phase 1. These facts support the argument that Phase 2 was not considered in the initial plan of the Project. Meanwhile, as previously mentioned, the official title of Phase 1 is “Chagas Disease Control Project”.

<sup>20</sup> Training was conducted not in Japan but in El Salvador.

<sup>21</sup> The exchange rate at the time of the completion is used (Phase 1: 2007, Phase 2: 2011).

<sup>22</sup> In addition to 3 persons, additional experts were to be dispatched when needs arose based on mutual agreement between Japan and Honduras.

(5) JOCV <sup>23**</sup>	NA	12 persons
Total Project Cost Japanese side	190 million yen	204 million yen
Honduras side Operational Expenses	<u>Equipment, facilities, maintenance of vehicles, etc.</u> (No specific amount was available)	<u>8,557,000 lempira</u> (36.1 million yen)
Cooperation Period	March, 2008 to February, 2011 (36 months)	March 15, 2008 to March 14, 2011 (36 months)

Source: JICA (2007a, 2011a), information provided by the implementing agency.  
Note: \*Man-months, \*\*Japan Overseas Cooperation Volunteer, \*\*\*Not Available

### 3.3.1.1 Elements of Input

The input of the Project is shown in Table 5. The dispatch of experts in Phase 1 was largely as planned. As for Phase 2, it is impossible to compare the planned and actual input of experts as no information on man-months is available for the planning portion of the Project. No major differences are observed in other elements, such as equipment.

### 3.3.1.2 Project Cost

Although the initial plan was 382 million yen, the actual cost exceeded the plan due to the implementation of Phase 2 (486 million yen: 127% of the initial plan).

### 3.3.1.3 Period of Cooperation

Similarly, because Phase 2 was conducted following Phase 1, the actual cooperation period (84 months) was significantly longer than the planned (48 months), which was 175% of the initial plan.

As shown above, due to the implementation of Phase 2, which had not been initially planned, the actual cost and period exceeded the plan. Meanwhile, as discussed in “Effectiveness and Impact,” Phase 2 had 2 aspects: (1) follow-up of remaining issues in Phase 1 (in particular, the vector control of *T.d.* and the establishment of a surveillance system), and (2) extension of project scope (expansion of target area)<sup>24</sup>. Simply considering the results of comparisons (showing inputs at 127% and 175% of the initial plan), “Efficiency” of the Project should be evaluated as “Low.” However, taking into account the fact that Phase 2 set a broader Project Purpose than that of Phase 1, it is not reasonable

<sup>23</sup> JOCV was in charge of educational activities, instruction and support of data management, network building, and so forth. Although JOCV is listed in both the planned input and the actual input, the cost of JOCV is not included in the plan nor the actual cost.

<sup>24</sup> However, as for (1), it should be noted that the Project (Phase 1) was planned without an ex-ante evaluation study, which is usually conducted prior to the finalization of the plan. Thus, it would be reasonable to conclude that the plan, which had aimed to achieve vector control (of both *R.p.* and *T.d.*) and the establishment of a surveillance system with the limited input of 4 years and 2 long-term experts, was too ambitious, not that the performance of the Project was poor.

simply to regard the increase in input associated with Phase 2 as an excess of the initial plan<sup>25</sup>. Therefore, “Efficiency” of the Project is deemed “Fair.”

### 3.4 Sustainability (Rating: ②)

As described in 3.2, as a result of the progress in Chagas disease control in Honduras, the risk of infection has remained at a low level. Thus, the most important issues going forward are continued surveillance and ensuring that the existence of vectors and patients are properly reported (i.e., a continuation of the maintenance phase). With this view in mind, this section examines the sustainability of the project effects by analyzing political, organizational, technical, and financial aspects of the implementing agency.

#### 3.4.1 Related Policy and Institutional Aspects for the Sustainability of Project Effects

At the regional level, Central American countries shared the goal of “eliminating vector-borne transmission of *T. cruzi* by 2015” at the regional committee in 2010 (PAHO/WHO 2010). The national health policy of Honduras (“National Health Plan 2014-2018”) emphasizes that Chagas disease is one of its most important health issues, along with malaria, dengue fever, HIV, and tuberculosis, and promotes strengthening measures against these infectious diseases. Moreover, the Honduran government has pledged to promote Chagas disease (and Leishmaniasis) control with the financial and technical cooperation from Canadian government (2011-2017).

The regional and national policies have continuously supported Chagas disease control, and thus no major problem is observed in the political aspect of project sustainability.

#### 3.4.2 Organizational Aspects of the Implementing Agency for the Sustainability of Project Effects

While the National Chagas Program had taken the initiative for Chagas disease control from the time of project implementation to 2014, the Secretary of Health (Secretaria de Salud: SESAL) has been reorganizing its structure since 2014. In the past, SESAL was organized based on issues such as Chagas disease, malaria, and dengue fever. Under the new structure, however, it is organized based on functions/activities, such as planning and evaluation, information management, surveillance, and logistics. Previously, each activity had been conducted by each individual program, but hereafter each activity is expected to be conducted by units specialized by function, regardless of specific issues (see Figure 4). Along with this restructuring, the responsibility of implementation is expected to be borne

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<sup>25</sup> Although it is impossible to clearly distinguish how much of the additional input in Phase 2 was devoted to the extension of Phase 1 activities and the additional activities of Phase 2, the proportion of input to output as a whole project (Phase 1 and 2) can be regarded to be below 150% considering the expansion of targeted area (4 to 8 departments) and the content of the additional activities in Phase 2.

by the departmental offices, and the central government will focus on the management of each department, such as monitoring, compilation of plans (action plan, financial plan, or procurement plan), and the establishment of regulations and rules.

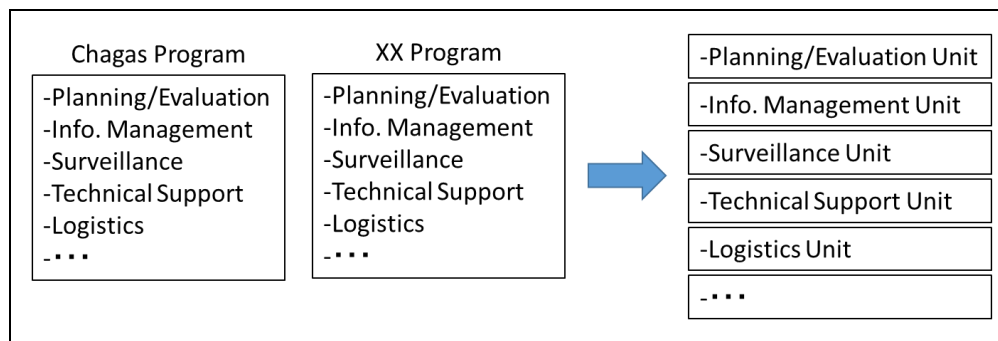


Figure 4 Structure of the SESAL (Image)

Source: Made by the evaluator based on information from the implementing agency.

This reorganization can potentially lead to a more efficient structure by integrating previously segmented and duplicated activities in each program. On the other hand, there is also a concern that the experience and knowledge of each issue accumulated in each program could be dispersed and that the responsibility for each activity becomes unclear, although ad hoc technical teams will be formed when special needs related to individual issues arise. In any case, since the direction of the reorganization was only determined recently, as of the time of this ex-post evaluation (2015), it is impossible to make a judgment about the impact of this reform on the sustainability of the Project<sup>26</sup>.

At the departmental level, at which the responsibility of implementation is borne, Chagas disease control activities are conducted by *Técnicos de Salud Ambiental* (Environmental Health Technician: TSA) and doctors and nurses at health centers (see Table 6 for the number of TSAs in each department)<sup>27</sup>. They are not solely dedicated to Chagas disease activities; however, Chagas activities are only one part of their work. Although the resources required for Chagas disease activities are not sizeable because the main activity is currently surveillance, the number of staff is nonetheless insufficient. The provision of health services, such as the management of health centers, will be gradually outsourced to service providers (e.g., NGOs).

<sup>26</sup> At the time of this ex-post evaluation, the National Chagas Program does not exist due to this reorganization. However, because the new structure has not yet started, the staff of the ex-National Chagas Program is still handling Chagas disease control activities. The number of staff is 7 (3 technicians and 4 administrative officers), a reduction from the number of staff during the project period (9: 1 program director, 4 technicians, 1 information and technology staff, 3 administrative officers). This has coincided with reorganization and the transfer of tasks to the departmental office.

<sup>27</sup> In 4 health centers visited in the field survey, there are 1–2 medical doctor(s), 2–4 nurses, and 0–2 community promoter(s).

Table 6 Number of TSAs and general information of each department

Department	No. of TSAs*	No. of municipalities**	No. of health centers***	No. of villages**	No. of localities***	Population**
Copan	27	23	71	336	678	354,634
Intibuca	12	17	50	126	470	226,227
Lempira	11	28	90	299	732	307,767
Ocotepeque	11	16	40	129	295	129,622
Comayagua	37	21	84	283	2,812	431,597
El Paraiso	26	19	88	233	898	418,391
Francisco Morazan	20	28	94	276	704	1,406,769
Yoro	95	11	79	263	1,336	542,421

Source: \*Information from the implementing agency \*\* Instituto Nacional de Estadística \*\*\*JICA (2011b)

At the community level, health volunteers are involved with Chagas disease control activities along with other health issues. In each locality, 1 to 5 health volunteers closely communicate with health centers and report the existence of vectors and/or infected persons in their community<sup>28</sup>.

At each level, meetings with the central government and each department are held semiannually, and the plan and performance of each department is shared with the central government<sup>29</sup>. Information on vectors or patients is regularly shared between the departmental offices and health centers, as health centers have to note them in the monthly report submitted to the departmental offices. Moreover, as mentioned above, health centers and health volunteers keep in touch with each other frequently.

In sum, although the whole structure appears to function properly, the impact of the reorganization of SESAL is unclear at the time of this ex-post evaluation, and the number of staff at the departmental level is not sufficient considering the geographical coverage and their various tasks. Thus, the organizational aspect of the sustainability is fair.

### 3.4.3 Technical Aspects of the Implementing Agency for the Sustainability of Project Effects

At each level, because Chagas disease control activities have been conducted by staff with professional skills, such as epidemiologists, medical doctors, nurses, and technicians, there is no major problem in basic skills and knowledge.

There seems to be no major concern at the central level since the Canadian government is providing technical cooperation (using 2.14 million Canadian dollars at maximum,

<sup>28</sup> According to the beneficiary survey, 27 and 14 health volunteers have communication at least once a month and receive a visit from health centers at least once a month, respectively.

<sup>29</sup> SESAL puts the meetings together and compiles reports on the overall plan and results.



equivalent to 200 million yen) to support the development of the management capacity of SESAL (e.g., procurement, management of financial and human resources). However, adequate allocation of personnel is necessary so that the experience and knowledge related to Chagas disease control are not dispersed by the structural reorganization.

At the departmental level, staff properly understand their roles and tasks, and the guidelines and manuals developed in the Project continue to be utilized in their activities.

There is a minor concern at the community level, as some cases have been found in which the existence of vectors was not properly reported to either health volunteers or health centers (see Box 2). Since reports from communities are the most important source for planning adequate measures against Chagas disease control, it is important to continuously facilitate proper understanding of their role and the importance of surveillance at the community level.

As explained above, no major technical problems are observed at the central and departmental levels, but there is a minor concern about the understanding of the importance of surveillance at the community level.

#### 3.4.4 Financial Aspects of the Implementing Agency for the Sustainability of Project Effects

The financial information on Chagas disease control is shown in Table 7. The Canadian government pledged to provide financial support of 18.8 million Canadian dollars (approx. 1.78 billion yen<sup>30</sup>) maximum for Chagas disease and Leishmaniasis control between 2011 and 2017, and the Honduran government also pledged to spend 4.44 million US dollars (approx. 528 million yen)<sup>31</sup>. The actual annual amount of the financial support of the Canadian government is determined by considering the achievement of targets in the previous year within the amount limit of each year (1.5-2.75 million Canadian dollars/year). Each department prepares its financial plan based on the annual action plan, and SESAL

Table 7 Budgeted and Actual Expenses for Chagas Disease Control

	2011		2012		2013		2014		2015
	Plan	Actual	Plan	Actual	Plan	Actual	Plan	Actual	Plan
SESAL	13,996	9,940	11,186	9,935	12,760	7,824	12,000	9,679	12,345
Canadian Government	28,552	29,256	16,946	10,229	39,715	35,118	43,505	41,376	46,292
Local Government and NGOs	2,784	2,330	1,583	2,035	1,297	794	1,401	1,022	429
<b>Total</b>	<b>45,331</b>	<b>41,526</b>	<b>29,716</b>	<b>22,199</b>	<b>53,772</b>	<b>43,736</b>	<b>56,905</b>	<b>52,076</b>	<b>59,065</b>

Source: Information provided by the implementing agency.

Note: The unit is 1,000 lempira (equivalent to 5,670 yen). Because of rounding off, there can be slight differences in totals. The expense for Leishmaniasis is included.

<sup>30</sup> Hereafter, the exchange rate as of February 20, 2015 is used.

<sup>31</sup> As long as it can be clearly distinguished, the expense for Leishmaniasis is around 10%. However, as for the

compiles them. Then, the plan is reviewed and approved by the technical committee, which consists of the Ministry of Finance, the Secretary of Planning and External Cooperation, donors, etc.

Each year, 100–250 million yen is devoted to Chagas disease control. Although the target area is larger than that of the Project, considering the cost of the Project (approximately 45–65 million yen/year) as a reference, sufficient financial resources are secured for Chagas disease control. However, delays in the approval and disbursement of the budget have been reported, and the prospect of finance after 2017 (after the termination of the financial support from Canada) is unclear, which are minor concerns in the long-term sustainability of the Project from the financial aspect.

In light of the above, some minor problems have been observed in terms of the organizational, technical, and financial aspects of the implementing agency. Therefore, “Sustainability” of the project effects is “Fair.”

#### **4. Conclusion, Lessons Learned and Recommendations**

##### 4.1 Conclusion

This project aimed to reduce the risk of vector-borne infection with Chagas disease by controlling triatomine bugs, the vectors transmitting the parasite of Chagas disease, and establishing an epidemiological surveillance system with community participation.

“Relevance” of the Project is “High” since the objectives of the Project were consistent with Honduran development policies and needs as well as Japanese aid policies. As for “Effectiveness and Impact,” although the achievements of Project Purpose and Overall Goal in Phase 1 were limited, Project Purpose and Overall Goal in Phase 2 were attained as a result of the promotion of measures against the vectors and the establishment of a surveillance system, and the target area was expanded from 4 to 8 departments. In addition, the Project contributed to Chagas disease control and prevention not only in the area directly targeted by the Project but also throughout the country. Thus, “Effectiveness and Impact” of the Project as a whole is judged to be “High.” On the other hand, since the project input (cost and period) exceeded the plan due to the implementation of Phase 2, which had not been initially planned, “Efficiency” of the Project is “Fair.” “Sustainability” of the project effects is also evaluated to be “Fair” because minor concerns are observed in organizational, technical, and financial aspects of the implementing agency.

In light of the above, this project is evaluated to be “Satisfactory.”

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management cost and overhead cost, it is impossible to know how much is devoted to each disease.

## 4.2 Recommendations

### 4.2.1 Recommendations to the Implementing Agency

#### Continuous Utilization of the Project Results

Although the reorganization of SESAL may lead to a more efficient and effective structure by unifying roles based on functions, there is a risk that knowledge and experience accumulated in the Project will be dispersed, and the responsibility for activities in each health issue area could become unclear. In order for the results of the Project to be continuously utilized, it is important to assign adequate personnel with appropriate skills and experience and to ensure that the technical team mentioned in 3.4.2 functions properly.

In addition, at the departmental level, the allocation of staff with skills and experience and the continuous implementation of Chagas disease control should be explicitly stated in the agreement with the service providers that provide health services so that activities related to Chagas disease control are continuously conducted.

#### Continuous Promotion of Educational Activities

Under the surveillance system with community participation, reports of vectors from community members are crucially important. However, the community surveys showed that some people do not report findings of vectors to health volunteers and health centers. This can lead to an underestimation of vectors and inappropriate countermeasures against vectors. Thus, it is important to continuously promote educational activities in communities and health centers so that findings of vectors are properly reported to health volunteers and/or health centers.

### 4.2.2 Recommendations to both the Implementing Agency and JICA

#### [Integration of Chagas disease control into activities of other health issue]

While Chagas disease control activities at the departmental level are implemented by TSAs, doctors, and nurses, the number of staff is not sufficient, considering their various duties outside of Chagas disease. On the other hand, from the perspective of resource allocation of the health sector as a whole, it is not reasonable to increase resources allocated to Chagas disease since the relative risk of Chagas has been decreased and its priority is now relatively low. In order to continuously conduct Chagas disease control under these circumstances, it is important to incorporate Chagas disease control activities into the activities of other health issues, such as actions against infectious diseases (e.g., malaria or dengue), vaccination, or pre- and post-natal care.

Meanwhile, JICA has conducted a technical cooperation project “Project for Strengthening the Primary Health Care System based on the ‘National Health Model’” since 2013. Because this project has a component related to educational activities at the

community level, it is worth considering the incorporation of Chagas disease control activities into such activities.

### 4.3 Lessons Learned

#### Donor Coordination

Chagas disease control has been supported by various donors including JICA, and the roles and target areas were properly allocated among donors, resulting in efficient overall implementation, as well as the utilization of JICA's results in areas other than those directly targeted by JICA. According to staff who worked on the Project, the following factors have contributed to the enhancement of interests of many donors in Chagas disease control in Honduras: the strong political commitment of the Honduran government, the provision of adequate information on Chagas disease in Honduras, and the perception of Chagas disease as not merely a health issue but also as a broad social issue.

Under these circumstances, SESAL and the donors jointly elaborated the "National Strategy Plan for Chagas (2003-2007)" and the "National Strategy: Prevention and Control of Chagas disease and Leishmaniasis (2008-2015)," and each entity allocated its roles and responsibilities and expressed its commitment. They also had regular opportunities to share their plans, strategies, and progress. It appears likely that these factors facilitated coordination among donors.

#### Planning Considering the Balance between Objectives and Inputs

This project planned to complete vector control of both *R.p.* and *T.d.* and the trial and dissemination of the surveillance systems within the 4-year project period (Phase 1). While it was reasonable to focus limited resources on the control of *R.p.*, it was impossible to complete the control of *T.d.* and the establishment of surveillance systems within the project period, resulting in the extension of the project period (implementation of Phase 2). This was not because the activities in Phase 1 were insufficient but that the plan, which projected completion of all activities in 4 years with 2 long-term experts, was unrealistic. For appropriate project planning, it is important to consider the balance between objectives and inputs (to set sufficient inputs to achieve objectives or to set realistic objectives taking the limitation of inputs into account).

#### Importance to Examine the Applicability of Experiences in Other Projects

This project was planned by applying the strategies employed in a precedent project in Guatemala. However, due to differences in the conditions between Honduras and Guatemala (e.g., the number of staff able to work for Chagas disease control), the project was forced to modify its plan after its commencement in accordance with the specific situation in Honduras.

While an ex-ante evaluation survey, which is usually conducted prior to the commencement of a project, was not conducted for this project, it would have been easy to check basic information, such as implementation structures, if surveys had been performed. Thus, although it is important to learn from experiences in other projects, their applicability should be carefully examined in the planning stage.

#### Importance of Systematic Accumulation and Dissemination of Knowledge and Experiences

The knowledge and experience accumulated through the Project were presented at international conferences and in academic journals. This was valuable, as the information was gathered and disseminated not as implicit knowledge but as systematic knowledge under academic disciplines. In future projects, it would be desirable to disseminate experience and knowledge similarly acquired through project implementation as public goods, although it would depend on the capacity of the staff involved in the projects.

Appendix 1: Appendix Table (Achievement of Output)

Appendix 2: Summary of the beneficiary survey

[Appendix 1: Appendix Table ]

Appendix Table Achievement of Output at the Time of the Completion (Phases 1 and 2)				
	Output	Indicator (Target Value)	Achievement at the Time of the Completion	
[Phase 1]				
1.	<i>R.p.</i> is eliminated in 4 departments.	% of coverage of spraying at the localities positive for <i>R.p.</i>	All 801 positive localities were sprayed (100%). Out of 1,095 localities surveyed in 2007, only 3 were positive (0.3%).	Almost achieved
2.	<i>T.d</i> is reduced in 4 departments.	Index of infestation for <i>T.d.</i>	Out of 1,659 houses surveyed, <i>T.d.</i> was found in 165 houses (9.95%).	Not achieved
3.	Vector Surveillance Systems are established with community participation.	Number of units of surveillance system installed	Systems were introduced in 6 pilot sites only. Their performance indices were below 50%.	Not achieved
4.	An information system for Chagas disease is implemented in 4 departments and at the national level.	Established information system	Information was shared at national, regional, and health center levels. Information formats were utilized. Semiannual meetings for Chagas conducted.	Achieved
5.	Diagnostic testing and treatment of patients younger than 15 identified by the project is completed as a responsibility of the National Program.	(1) Number of patients treated (2) Number of patients who come to be negative	Although more than 90% were treated in 2 departments, only 30% and 0% (no treatment) were treated in the others.	Not achieved
[Phase 2]				
1.	Vector control of <i>R.p.</i> in the attack phase is completed in the target departments.	(1)Coverage of the sprayed localities where <i>R.p.</i> is supposed to exist (100%) (2)Presence of <i>R.p.</i>	(1) All 7,578 houses in 13 localities where <i>R.p.</i> was found were sprayed (100%). (2) No report on existence of <i>R.p.</i> since 2010.	Achieved
2.	Coverage of vector control of <i>T.d.</i> is extended to the localities with high domestic infestation in the departments of Intibuca, Lempira, Copan, and Ocotepeque.	(1)Coverage of sprayed houses where <i>T.d.</i> is supposed to exist (50%) (2)Coverage of sprayed localities where <i>T.d.</i> is supposed to exist (50%) (3)Domestic infestation rate of <i>T.d.</i> (5%)	(1) Out of 15,493 houses that were planned to be sprayed, 13,713 (88.5%) were actually sprayed. (2) All planned localities (244) were sprayed (100%). (3) Domestic infestation rate as of 2011 was 2.5% (367/14,713 houses).	Achieved
3.	The epidemiological surveillance system with community participation in pilot areas is established.	Performance index for the surveillance system (85%)	The average performance index in 6 pilot sites was 84%.	Almost achieved
4.	The surveillance system with community participation is introduced in the priority localities, except pilot areas where the attack phase is completed.	Number of localities where the surveillance system is initiated (80 localities)	The system was installed in 88 localities out of 133 localities where <i>R.p.</i> was found.	Achieved
5.	Experience and knowledge of Chagas disease control are shared and exchanged among the target departments.	(1)Developed package of Chagas disease control (2)Number of workshops (15)	(1) 17 materials were developed (2) 23 evaluation meetings and workshop were conducted	Achieved

Source: JICA (2007a, 2011a, 2014), data provided by the implementing agency.

[Appendix 2: Summary of the Beneficiary Survey]

Sampling

- In total, 4 departments (Lempira and Intibuca from the 4 target departments of Phase 1, and El Paraiso and Francisco Morazán from the additional 4 departments in Phase 2) were selected as target departments for the survey, considering the resource constraints, balance between Phase 1 and 2, and security conditions.
- In each department, 3 sites that had introduced the surveillance system were randomly chosen, and from each site 1 locality was selected at random. Then, in each locality, 10 households were selected by employing systematic random sampling.
- Though the total number of localities should be 12, one site could not be accessed due to bad road conditions. In addition, 11 households were mistakenly interviewed in 1 locality. Thus, the total sample size was 111 households.
- In addition to households, the survey was administrated to health volunteers as well. The number of health volunteers was 29 (1-5 person(s) per locality).

Contents and Methods of the Survey

- Information collected through the interviews includes health status, knowledge of Chagas disease, existence of vectors, current situation of surveillance, access to treatment and examination for Chagas disease, etc.
- Interviews were conducted face-to-face by interviewers using a structured questionnaire.

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