

# Terminal Evaluation

## Latin America and the Caribbean

### 1. Summary of the Project

- Country: Dominican Republic
- Project Name: Technology Improvement Project for Irrigated Agriculture
- Field: Agriculture
- Aid Type : Project-type Technical Cooperation
- Responsible Section : Rural Development Department
- Amount of Cooperation (as of the Evaluation) : 454 million Yen
- Project Term

(R/D):

1 March 2001-28 February 2006

(Extension): -

(F/U): -

(E/N) (Grant Aid) -

- Counterpart Organization : INDRHI, SEA
- Japan's Organization : Ministry of Agriculture, Forestry and Fisheries

#### 1-1 Background and Summary of the Cooperation

In the Dominican Republic, agriculture has played a very large role in response to the population increase and growing food demand. In recent years, however, total agricultural production was unstable because of a decrease in cultivation land and obsolete irrigation systems. Irrigated agriculture, in particular, has a problem of water shortage due to poor-conditioned facilities and improper water management.

Under these circumstances, the Government of the Dominican Republic requested the Government of Japan for technical cooperation in order to improve the training programs of INDRHI and also to improve productivity of the agricultural sector by establishing an irrigation management system that aims to transfer INDRHI-owned irrigation facilities to WUAs.

In response to the request, JICA dispatched the Preparatory Study Team to confirm assistance needs and to discuss details of the Project. With regard to the Minutes of Meeting of the Preparatory Study Team, both governments signed the Record of Discussions for the Project on November 15, 2000. The Project started on March 1, 2001 for a five-year period.

#### 1-2 Content of Cooperation

##### (1) Overall Goal

Water management, O&M and cultivation techniques and skills are improved, and irrigation facilities are transferred smoothly.

##### (2) Project Purpose

Leaders of WUA and staff of INDRHI/SEA improve their knowledge and skills on water management, O&M, and cultivation through the training curriculum under the Project.

##### (3) Outputs

1. Problems in the model area are comprehended and examples of technical improvement regarding water management, O&M, and cultivation in the pilot farm will be presented.
2. Training programs and materials for water management, O&M and cultivation are prepared.
3. Lecturers of above-mentioned areas are trained.
4. Training curriculums are prepared and training courses are conducted.
5. Those who attended training courses, improve their knowledge and skills on water management, O&M, and cultivation through the training curriculum under the Project.

#### (4) Inputs

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##### Japanese Side:

Long-term Experts :	8	Provision of Machinery and Equipment:	JPY91,339,000
Short-term Experts :	5	Local Cost:	JPY69,440,000
Acceptance of C/Ps:	20		

##### Dominican Republic Side :

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Assignment of C/Ps : 27

Provision of office spaces for the Japanese experts and necessary facilities

Local Cost: 17949000 Dominican pesos (NDRHI:14,190,000, SEA:3,759,000)

## 2. Summary of the Evaluation Team

### Team Member :

(Field: Name Position)

Team Leader : Dr. Narihida NAGAYO, Senior Advisor, Institute for International Cooperation, JICA

Cultivation : Mr. Teruhisa NANBA, Former JICA expert

Water Management/WUA support : Mr. Takashi KATO, Chief of Irrigation and Disaster Prevention, Project Planning Division, Rural Planning Department, Tohoku Branch Office, Ministry of Agriculture, Forestry and Fisheries

Project Management : Mr. Tasuku ISHAIBASHI, Staff, Field Crop Based Farming Area Team II, Group II, Rural Development Department , JICA

Evaluation Analyst : Mr. Atau KISHINAMI, Permanent Expert, International Development Associates, Ltd.

### Period :

August 29-September 10, 2005

### Evaluation Type Evaluation Type :

Final Evaluation

## 3. Summary of Evaluation Result

### 3-1 Achievement

**(1) Indicators and achievements of the Project Purpose are as follows. It can be evaluated that the Project Purpose is achieved.**

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#### 1-1

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Indicators:

At least, 30% of nucleos (water users group at the tertiary block) who have taken the training courses introduce improved water management technologies in the Rincon Area.

Level of Achievement:

In the Rincon area, the following achievements have been confirmed according to the surveys.

(1) 54.8% of trainees practice the irrigation with 7-day interval that is recommended by the Project. Before the training courses were conducted, the figure was only 9.7%.

(2) 54.8% of trainees have set up a pole to measure the water depth and 80.6% of trainees stated that the water depth has actually been reduced.

(3) 77.4% of trainees practice the appropriate gate operation.

(4) .8% of trainees have achieved shorter duration of irrigation. The average duration has reduced from more than two days to less than one day.

As a result of the above, more equitable water distribution has been achieved and the number of water conflict has been reduced.

JPY69,440,000

## 1-2

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### Indicators:

At least, 30% of farmers who have taken the training courses introduce improved technologies regarding fertilizer reduction in the Rincon Area.

### Level of Achievement:

The major improved technologies include i) appropriate amount of fertilizer, and ii) the third fertilization technology. According to the survey conducted after the training courses, at average, a total amount of nitrogen has been reduced by 24%, from 124 to 94kg/ha. 83.9% of trainees have applied the appropriate timing of the third fertilization, compared to 17.9% before the training courses.

## 1-3

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### Level of Achievement:

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- (1) 54.8% of trainees practice the irrigation with 7-day interval that is recommended by the Project. Before the training courses were conducted, the figure was only 9.7%.
- (2) 54.8% of trainees have set up a pole to measure the water depth and 80.6% of trainees stated that the water depth has actually been reduced.
- (3) 77.4% of trainees practice the appropriate gate operation.
- (4) 96.8% of trainees have achieved shorter duration of irrigation. The average duration has reduced from more than two days to less than one day.

As a result of the above, more equitable water distribution has been achieved and the number of water conflict has been reduced.

## 1-4

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### Indicators:

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## "Output 5 "

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### Indicators:

At least, 30% of farmers who has taken training courses introduce improved technologies regarding apple snail control in the Rincon Area.

### Level of Achievement:

The main improved technology is the introduction of less poisonous agricultural chemicals (e.g. metal aldehydo). According to the survey, 29.0% of farmers have introduced the relevant chemicals after the training courses, compared to 0% before the training courses.

## "Output 6 "

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Indicators: At least, 30% of leaders of WUAs, technical staff of INDRHI and SEA transfer knowledge, in respective organization, obtained by the training courses.

### Level of Achievement:

According to the survey conducted in May 2005, almost all the technical staff of INDRHI and SEA have transferred knowledge in respective organization, and more than 80% of them have conducted technology transfer activities for water users.

## **(2) Indicators and achievements of outputs are as follows.**

### **1-1**

Indicators:

Necessary conditions are established for training in the model irrigated area within 3 years from the commencement of the Project.

Level of Achievement:

The pilot farm of 34ha has been established.

### **1-2**

Indicators:

The number of examples of technical improvement in each technical field.

Level of Achievement:

A total of 16 examples have been presented (three for water management, five for O&M, and eight for cultivation).

### **1-3**

Indicators:

Leveling is introduced in the pilot farm.

Level of Achievement:

Land leveling has been already introduced in the pilot farm and has been proved to be an effective tool for efficient use of water and fertilizers as well as for the reduction of manpower. Regarding outside of the pilot farm, 14 trained farmers in the Ricón area have conducted land leveling and benefited from the production cost reduction.

### **1-4**

Indicators:

Direct sowing by machinery is introduced in the pilot farm.

Level of Achievement:

Direct sowing by machinery has not been successful in the pilot farm due mainly to the high soil moisture condition; however, it has been introduced near the pilot farm. According to the farmer who introduced the direct sowing, approximately 45% of the production costs have been reduced.

### **1-5**

Indicators:

Third fertilization (timing and amount) is improved in the pilot farm.

Level of Achievement:

The third fertilization has been improved in terms of timing and amount.

### **2-1**

Indicators:

Four programs targeting different groups are prepared within 3 years of the commencement of the Project.

Level of Achievement:

Four programs, for i) technical staff of INDRHI and WUAs, ii) technical staff of SEA, IAD and the Agricultural Bank, iii) Executive Committee members of WUAs, and iv) water users group at the tertiary block, have already been prepared.

### **2-2**

Indicators:

Twenty four training materials on water control, WUA/maintenance and rice cultivation are prepared within 3 years from the commencement of the Project.

Level of Achievement:

A total of 34 training materials (10 for water management, four for WUA support, seven for operation and maintenance and 13 for cultivation) have been prepared.

### 3-1

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Indicators:

At least one counterpart personnel (C/P) hold a diploma in teaching methods in each technical field.

Level of Achievement:

Seven counterpart personnel (water management: 3, WUA support: 1, Maintenance: 1, cultivation: 2) have obtained INFOTEP (National Institute of Professional and Technical Education) diploma in teaching methods.

### 3-2

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Indicators:

Capability evaluation on training courses for those who have more than 2-year practical experience as a C/P.

Level of Achievement:

Majority of counterpart personnel has shown a fairly high aptitude of teaching capability, with more than two year experience as an instructor for training courses. According to the questionnaire, almost all the participants are satisfied with the training capacity of counterpart personnel.

### 4-1

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Indicators:

Training methods are developed.

Level of Achievement:

Training methods consisting of theoretical and practical aspects have already been developed.

### 4-2

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Indicators:

The minimum number of times and participants : 9 times for technical staff of INDRHI and WUAs (190 participants), 7 times for technical staff of SEA (150 participants), 6 times for WUAs' Executive Committee members (85 participants) and 6 times for Nucleos (85 participants) are conducted by the completion of the Project

Level of Achievement:

As of July 2005, a total of 20 training courses (six for technical staff of INDRHI and WUAs with 141 participants, five for technical staff of SEA and IAD with 175 participants, four for WUAs' Executive Committee members with 104 participants, five for water users group at the tertiary block with 183 participants) have been conducted by Dominican Republic counterpart personnel. By the completion of the Project, four more training courses will be conducted, and satisfy the indicators.

### 5-1

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Indicators:

Enhancement of understanding by trainees is confirmed.

Level of Achievement:

According to the questionnaire for trainees regarding water management, majority of the participants stated that they have a better understanding after the training.

### 5-2

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Indicators:

Monitoring methods for trainees are established.

Level of Achievement:

Monitoring methods by questionnaire and group discussions for trainees have already been established.

## 3-2 Summary of Evaluation

### (1) Relevance

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Relevance of the Project is considered high for the following reasons.

The "Strategy and Mid-term Development Plan of the Agricultural and Livestock Sector 2001-2010" established in 2000 by SEA

emphasizes the following four important policies; i) promotion of growth and competitiveness, ii) improvement of equality in the rural society, iii) institutional restructuring of agricultural and livestock sector and iv) promotion of agro-ecological sustainability. At the same time, INDRHI currently intends to i) improve productivity of the agricultural sector through rehabilitation of existing irrigation facilities, ii) increase of the national agricultural production by enhancing the irrigated agriculture and iii) establishment of an irrigation management system that aims to transfer the management of INDRHI-owned irrigation facilities to WUAs.

The Project has been designed to train personnel in the field of water management, WUA support/maintenance and cultivation and is clearly suited to the current governmental policy framework.

Moreover, agriculture is one of the six emphasis cooperation fields of JICA to the Dominican Republic. And also sustainable agricultural production for stable food supplies and for the promotion of vibrant rural area is one of the development strategies of Agriculture and Rural development of JICA. This project agrees with these policies.

## **(2) Effectiveness**

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Effectiveness of the Project is evaluated high.

Almost all the indicators at the Project Purpose level have been fulfilled and it can be evaluated that the Project Purpose has been achieved. As a consequence, some positive fruits, such as an activation of WUAs, improvement of water management and farming, have been observed (refer to "Impacts").

All the Outputs are set up in order to achieve the Project Purpose and each of them has directly contributed to the Project progress. The lack of any Output could have held back the achievement level of the Project Purpose.

The change of government in August 2004 has made some positive influences for the Project, especially in terms of assignment of counterpart personnel and the Project management. Recent active involvements of the Dominican Republic side, such as effective management (e.g. well-functioning Joint Coordinating Committee, etc.) and enhanced budget allocation for the project implementation have made it possible to solve a few problems pending at the time of the mid-term evaluation in September 2003.

## **(3) Efficiency**

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Evaluation in terms of efficiency is considered high for the following reasons.

Inputs from both Japanese and the Dominican Republic sides have generally been carried out as planned in terms of timing, quantity and quality. There were delays in the dispatch of Japanese experts, the allocation of C/Ps and preparation of the pilot farm, and also part of machinery has been changed from the initial plan. However, these events did not cause any major problem. All the inputs have been effectively used to achieve Outputs and all C/Ps have now become fulltime staff.

## **(4) Impact**

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Following positive impacts have been observed.

### 1) Improvement of Cost-benefit Effectiveness

Some positive impacts, such as an increase in collection ratio of water users' fee farming income, and also improvement of water management, have been observed. In particular, reduction of paddy production costs through land leveling, reduction of seeding rate, and effective use of fertilizers have started to contribute to the better livings of farmers in some areas. These events are the direct results of technology improvements and activation of WUA's activities.

### 2) Nationwide Impact of the Project

A number of training courses and workshops have been carried out based on the requests from many WUAs throughout the country and the nationwide impact is observed towards the further development of irrigated agriculture. Apart from the training courses which were originally planned and have been carried out (20 times), a total of 43 workshops were carried out to respond to these requests, and as a consequence, it is expected that the improved cultivation technologies become widespread and that the management of WUAs be strengthened.

### 3) Solution of Conflicts of Water Distribution

Conflicts regarding water distribution have been one of the most concerned social problems in the country. According to the interviews with farmers belonging to the Rincón and Hatillo WUAs, the effective water management has reduced the number of water conflicts, which indicates that the appropriate water distribution could contribute to the solution of some specific social problems.

### 4) High Applicability of the Project Technology

The improvement technologies that the project introduced are applied in the model area exceeding project indicators. Moreover, land leveling has been introduced on farmers' own initiative and expenses after the training in the area covered by WUAs of Hatillo, which is outside of the model area.

## **(5) Sustainability**

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Overall sustainability is considered relatively high for the following reasons.

### **1) Institutional Aspect**

The transfer of the management of INDRHI-owned irrigation facilities to WUAs is one of the Dominican Republic's most important national policies and therefore, it is urgent to make technology transfer to farmers and technicians concerned. With the change of government in August 2004, more active involvement by the Dominican Republic side has been observed, which has contributed to accelerate this process as well as to solve the problems which were pending at the time of the mid-term evaluation.

The importance of continuation of the training program as well as implementation of the training courses organized by the Project is fully recognized by the government of the Dominican Republic, which has led to the improvement of the work shift of counterpart personnel to the fulltime basis. The draft of the "Sustainable Development Plan", which aims to maintain and promote the positive effective of the Project, has already been prepared by the Dominican Republic side and specifies the continuous implementation of training courses.

Organizational sustainability, therefore, is considered relatively high.

### **2) Technical Aspect**

The developments of trainers, establishment of curricula and preparation of teaching materials have been realized. It can be said that the basis for the implementation of training courses regarding irrigated agriculture by the Dominican Republic side, therefore, has firmly been established. The technologies improved by the Project have been well understood and utilized by farmers and water users group at the tertiary block, since these technologies were developed based on the detailed survey on the problems and needs of beneficiaries. The examples of technical improvement presented in the pilot farm have also contributed to the general understanding of these technologies and to high application by farmers. As mentioned, counterpart personnel have conducted 20 training courses as an instructor for leaders of WUAs, technical staff of INDRHI and SEA and water users groups at the tertiary blocks. They are quite confident in teaching technical issues of each technical field.

Overall, technical sustainability is considered relatively high.

### **3) Financial Aspect**

To secure sufficient financial resources was also one of the outstanding problems pointed out at the mid-term evaluation. This issue, however, has gradually been solved by enhancing cost allocation (e.g. transportation fee and per dium of participants of training courses) by INDRHI and SEA. In order to implement the Sustainable Development Plan for the year 2006, INDRHI, SEA, the National Federation of WUAs, and each WUA have already agreed to share the necessary costs.

Financial sustainability is considered relatively high.

## **3-3 Contributing Factors**

### **(1) Content of Plan**

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#### **1) Technologies easily acceptable by farmers**

In the water management and cultivation fields, problems/needs of farmers and water users groups at the tertiary block were recognized by holding workshops in the Rincon area. At the same time, advanced technologies used in the neighboring areas were closely observed and collected. In addition, improved technologies were verified in the pilot farm and the results were incorporated into the training materials. Therefore, farmers and water users groups at the tertiary block recognized that the technologies were highly adaptable for them.

#### **(2) Implementation Process**

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##### **1) Presentation of technologies with high applicability**

Development of training materials by C/Ps and management of pilot farm have contributed to establish a confidence between the Project and farmers and therefore, to enhance the effects of the Project activities. In particular, verification and presentation of technologies are widely observed and accepted because the management of pilot farm has directly been done by farmers.

##### **2) Active involvement of INDRHI after the change of government in August 2004**

With the change of government in August 2004, C/Ps have become fulltime staff and always worked together with Japanese experts, which has contributed to the smoother communication and stronger confidence between experts and C/Ps. In addition, problems pending at the time of the mid-term evaluation (e.g. budget) have almost been solved, and various Project activities have been smoothly carried out.

## **3-4 Problems and their Causes**

### **(1) Content of Plan**

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There was no problem.

## **(2) Implementation Process**

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### **1) Replacement of some C/Ps**

This is not a problem particular to the Project. In the Dominican Republic, governmental staffs are largely replaced with the administrative change. In the case of the Project, almost half of the C/Ps who have been trained in Japan were replaced with the governmental change in August 2004, which negatively affected the technology transfer activities of the Project.

## **3-5 Conclusion**

According to the indicators, the Outputs and the Project Purpose will surely be fulfilled by the completion of the Project. In addition, through the accomplishment of the activities, it can be said that a basis has been almost completely established to obtain the accomplishment of the Overall Goal. And the implementation of the Project has been appropriate from the viewpoint of five evaluation criteria (relevance, effectiveness, efficiency, impact, and sustainability).

Therefore, the Project is to be completed in February 2006 as planned.

## **3-6 Recommendations**

### **(1) Establishment of Adequate System for Use and Maintenance of the Machineries and Equipment Provided by JICA**

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INDRI transfers the management of the agricultural machinery and equipment provided by JICA to WUAs of Rincón without shifting its ownership. In this sense, it is necessary to prepare the contract with the list of machinery and equipment between INDRHI and WUAs, which clarifies the responsibilities for equipment control and for operation and maintenance costs.

### **(2) Effective and Continuous Use of the Pilot Farm**

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It is necessary that INDRHI and SEA with cooperation of farmers effectively continue to use the pilot farm and for the technology development, demonstration and extension for the agricultural development as well as for the solutions of newly emerged problems in the scope of the irrigated agriculture in the Dominican Republic.

### **(3) To Examine the Elaboration and Use of Audio-visual Materials (videos) for Training**

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In order to enhance the coverage of training targets, who are farmers and technicians concerned throughout the country, with own effort of the Dominican Republic, it is necessary to examine the elaboration of audio-visual materials and use them for training activities.

### **(4) Preparation of Pamphlets for Extension of Outputs Obtained in the Pilot Farm**

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One of the most effective measures will be the elaboration of pamphlets consists visible and quantitative presentation of the improvements from the results in the pilot farm, in order to transfer and extend a number of outputs.

### **(5) Institutional Strengthening for Sustainable Development Plan of the Project**

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In order to achieve the super goal of the project, it is indispensable to take measures to assure budget necessary for the implementation of the Sustainable Development Plan as well as to strengthen the inter-institutional coordination among the involved institutions.

### **(6) Institutional Strengthening for Development and Extension of Irrigated Agriculture Technologies**

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In order to promote Irrigated Agriculture, it is necessary to strengthen the training functions of existing Organizations.

### **(7) Establishment of the Training Cycle**

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It is necessary that training cycle be established in order to promote the application of the technologies obtained through training.

## **3-7 Lessons Learned (applicable to other similar projects)**

### **(1) Implementation of Training Courses with Higher Adaptation**

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Training courses be carried out according to the acceptability of trainees, and be introduce technology which produce quick results, in order to promote application of these technologies.

### **(2) Necessity of Post-project Evaluation in Baseline Survey Conducted Area**

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It is required to make a post-project survey in the same area in order to facilitate the verification of project impact quantitatively.



### **(3) Establishment of Parameters to Measure Project Impacts Not Specified in PDM**

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Most of the indicators set up for the Project refer to "the level of application of improved technologies in the model area". With these indicators, it is difficult to measure the extent of the impacts of the Project not specified in PDM. From this lesson, in addition to the indicators specified in PDM, it is necessary to establish and refer to the parameters that allow the measurement of all dimensions of impacts.