Summary of Terminal Evaluation

１．Outline of the Project

Country: Republic of Nicaragua		**Project Title:** Improvement of Cattle Productivity for Small and Medium Scale Farmers Project
Issue/Sector: Agricultural development		**Cooperation Scheme:** Technical cooperation project
Division in Charge: Field Crop Based Farming Area Division I, Rural Development Department		**Total cost:** 476 million yen
Period of Cooperation	R/D: From May 11, 2005 to May 10, 2010	**Partner country's implementing organizations:** Ministry of Agriculture and Forestry (MAGFOR), National Agrarian University (UNA), Institute of Rural Development (IDR), National Nicaraguan Cattlemen's Association (CONAGAN)
		Supporting organization in Japan: Ministry of Agriculture, Forestry and Fisheries

1-1 Background of the Project

In the Republic of Nicaragua (hereinafter called Nicaragua), the civil war that lasted for 10 years from 1979 frazzled the domestic economy and the real GDP per capita dropped to US$508 from that was US$1,153 before the civil war, having made the country the second poorest after Haiti in Central and South America. In such situation, the Nicaraguan government has been making efforts to promote job creation and develop new industries under the slogan of "Development and Reform". Nicaragua is an agricultural country where the agriculture, forestry and fisheries industry accounts for 31.6% of the GDP (1999, the Central Bank of Nicaragua) and 43% of the employed population (2001, the Central Bank of Nicaragua). Primary commodities accounts for 74% of the total exports from the country (2002) and the national economy largely depends on agriculture, forestry and fisheries. Especially livestock products are the top export item (2002) and demonstrate superiority while other traditional and nontraditional products compete with those from other Central American countries. There are many small and large dairy processing factories in the country and the export of cheese has recently been increasing. Thus cattle breeding is expected to play an important role in stimulating Nigeria's economy as it can promote not only production of primary commodities but also the processing industry.

1-2 Project Overview

The Project was carried out in the target areas of Boaco Department and Chontales Department, located in the central highlands of Nicaragua, with the purpose of agricultural management and living improvement through productivity improvement. The purpose was to be achieved with activities to disseminate technologies and information according to the management status of each farmer via livestock cooperatives etc. to small and medium scale farmers in the target area, and these activities would help solve such issues as serious shortage of cattle feed in dry seasons, deterioration of livestock caused by inbreeding and lowered reproductive rate of cows.

(1) Overall Goal: Cattle production technologies of small and medium scale farmers in the target area are enhanced and their agricultural management is improved.

(2) Project Purpose: Cattle production technologies of small and medium scale farmers in the model areas are enhanced and their agricultural management is improved.

(3) Outputs

Output 1: Cattle breeding technicians practicing in the target area acquire technologies appropriate for

the farmers.
Output 2: Technologies appropriate for the farmers are disseminated to the farmers in the model area.
Output 3: Technologies for artificial fertilization and embryo transfer for the benefit of farmers are enhanced at a national-level research institute.
Output 4: Living conditions as well as support from the project-related organizations to farmers in agricultural management are improved.

(4) Inputs (at the time of evaluation)
Japanese side: About 476 million yen of total input
Dispatch of Experts (long): 5 persons (Chief Advisor, Agricultural Management Improvement, Feeding Management, Dissemination, Hygiene Management, Breeding Technologies, and Business Coordination) *4 persons after May 2008
Dispatch of Experts (short): 5 persons (Campylobacteriosis Diagnosis and Bull Reproductive Function Diagnosis (3rd country), Rural Society Research, Cow Reproductive Function Diagnosis, Agricultural Management Improvement, and Cattle Management)
Provision of Equipment: Worth about 242K US dollars (vehicles, program freezers, cattle scale, ultrasonic diagnostic equipment, spectrometer system, stereomicroscope, electrical stimulus sperm collector, etc.)
Training in Japan: 7 persons
Local cost expenditure: 257 million yen
Nicaraguan side (extension period):
Counterpart personnel: 10 counterparts engaged in project operation management, 14 technical counterparts, etc.
Project operation cost: About 1,040K US dollars

2. Evaluation Team

Members of Evaluation Team	(Responsibility: Name and Title) Leader: Yusuke TADA, Senior Advisor, Institute for International Cooperation, JICA Cattle Breeding Technologies: Kazuto YANAGITANI, Miyazaki Farm, National Livestock Breeding Center Plans and Management: Yoshifumi YAMANAKA, Field Crop Based Farming Area Division I, Rural Development Department, JICA Evaluation and Analysis: Takeshi KIKUKAWA, Centinos Incorporated Interpreter: Aki HIGUCHI, Japan International Cooperation Center	
	*Evaluation was conducted jointly with three Nicaraguan evaluation members. Ing. Gustavo Adolfo Rodriguez National Nicaraguan Cattlemen's Association (CONAGAN) Ing. Lesber Rodriguez Sarria Ministry of Agriculture and Forestry (MAGFOR) Ing. Marvin Mairena Bejarano National Agrarian University (UNA)	
Period of Evaluation	November 15 – December 5, 2009	Type of Evaluation: Terminal evaluation

3. Results of Evaluation

3-1 Achievement
(1) Achievement of Outputs

Output 1: Cattle breeding technicians practicing in the target area acquire technologies appropriate for the farmers.

Output 1 is expected to be achieved by the time the Project is completed.

· Indicator 1-1 "Over 50% of the veterinarians placed in the target area receive training on cattle conception rate improvement."

<Result> The goal indicator has been achieved. 26 veterinarians out of 50 (estimated number) have completed training.

· Indicator 1-2 "60 cattle breeding technicians practicing in the target area acquire technologies appropriate for the farmers."

<Result> The goal indicator is expected to be achieved by the end of the technical cooperation period. As of end of October 2009, 44 cattle breeding technicians out of 60 have completed training. Another 20 will receive training in the model areas.

Output 2: Technologies appropriate for the farmers are disseminated to the farmers in the model areas.

Output 2 has been achieved.

· Indicator 2-1 "In the model areas, a total of 900 persons – 450 farmers and 450 workers – receive training on appropriate technologies for the farmers."

<Result> The goal indicator has been achieved for farmers. 450 farmers and 15 workers have received training. The number of workers who have received training remains at the current level because day wage has to be guaranteed for training, it can be hard to gain understanding from farm managers, the number of workers is smaller than originally estimated, etc.

· Indicator 2-2 "Over 50% of the small and medium scale farmers who have received training adopt the appropriate technologies."

<Result> The goal indicator has been achieved. Over 50% of the farmers who have received training have adopted and implemented most of the appropriate technologies. The implemented items include giving mineral salts to cows, giving supplemental feed in dry seasons, increase of improved grass land and weed control in grazing land.

· Indicator 2-3 "At least 10 monitor farmers have been set up in each model area."

<Result> As of the end of October 2009, the total number of monitor farmers is 29 and the number of monitor farmers per unit model area is about 5, lower than the target. However, considering the actual conditions such as deployment of local technicians and road conditions, about 5 monitor farmers in each area is a realistic upper limit and considered to be adequate for the implementation of monitoring and farmer training.

Output 3: Technologies for artificial fertilization and embryo transfer for the benefit of farmers are enhanced at a national-level research institute.

Output 3 is expected to be achieved by the time the Project is completed.

· Indicator 3-1 "Good-quality frozen semen (whose sperm motility +++ is over 30% after dissolution, hygienically guaranteed) is produced."

<Result> The goal indicator has been achieved. In sperm motility valuation conducted in November 2007, all six samples satisfied the predetermined standard (+++ 30%) and passed the test.

· Indicator 3-2 "The conception rate with experimental embryo transfer at a national-level research institute is over 40%."

<Result> The average conception rate in the technical cooperation period is 12% and the goal indicator has not been achieved. However, the series of embryo transfer technologies have been transferred to the counterparts and they are now able to conduct embryo transfer independently.

· Indicator 3-3 “In the areas where artificial insemination technicians who have received re-education training are in charge, the number of cows that have had artificial insemination increases by more than 30%.”

<Result> The target number of cows is 351, 30% of the 1,170 cows that initially received artificial insemination. Activities need further reinforcement to achieve the target.

Output 4: Living conditions as well as support from the project-related organizations to farmers in agricultural management are improved.

Output 4 is expected to be achieved by the time the Project is completed.

· Indicator 4-1 “In over 30% of the target farmers for training in the model areas, roofing and flooring are improved for hygienic milking.”

<Result> The goal indicator has not been achieved at the time of the evaluation. While the groups with many cooperatives’ members have achieved the goal for roofing (38% for roofing and 10% for flooring), the overall result of all groups remains at 26% for roofing and 6.4% for flooring. The challenge is to finance capital expenditure. However, the Project have completed training of site technicians as well as conducted design so that practical effect can be achieved with minimal equipment and response can be taken according to the budget. Therefore, it is expected that appropriate improvements will continuously be made in the future.

· Indicator 4-2 “Hygienic milking technologies are spread and adopted by 50% of the target farmers in the model areas.”

<Result> The goal indicator has not been achieved at the time of the evaluation. However, it is likely to be achieved through future activities.

(2) Achievement of Project Purpose

Project Purpose: Cattle production technologies of small and medium scale farmers in the model areas are enhanced and their agricultural management is improved.

It is believed that the project purpose can be achieved by the end of the Project through continuous activities.

1） **Indicator 1: The average milk taken from a cow in a dry season increases by over 30% in over 50% of the monitor farmers in the model areas.**

<Result> The average milk production from a cow at 5 monitor farmers has increased by 54%, 39%, -5%, -16% and -49% and the average rate was 40%. Thus the goal indicator of 50% has not strictly been achieved. It is believed that some farmers experienced decrease in average milk production because the amount of feed per cow decreased when the number of cows increased. The Project has already provided technological advice to improve the situation and activities to encourage the implementation of these technologies will be continued. Please note that, despite the decrease in average milk production from a cow, the total milk production increased from 2006 to 2009. Therefore, it is considered that the goal indicator is virtually satisfied.

2） **Indicator 2: The annual birthrate is at least 60% at over 50% of the monitor farmers in the model areas.**

<Result> The indicator has been achieved. According to the data of 12 monitor farmers, 8 farmers have a birthrate of over 60% and about 66% of the monitor farmers in the target area have achieved the goal.

3） **Indicator 3: The average daily weight gain of 7-month-old cows increases by over 30% at over 50% of the monitor farmers in the model areas.**

<Result> The average daily weight gain at 5 farmers is 20%, 19%, -17%, -44% and -68%, and the indicator has not been achieved at the time of evaluation. There were negative results in some cases

because supplementary feed was not secured enough, calves were not fed with enough milk, etc. Improvements are being proposed and training is being further reinforced.

4) Indicator 4: At least 50% of the monitor farmers and pilot farmers in the model areas produce grade-A milk.

<Result> The rate of grade-A milk produced in the model areas is about 41%, slightly lower than the goal indicator. However, the rate of grade-A milk produced by the groups of cooperatives' members is as high as about 67%. It is believed that it was because cooperatives conducted hygiene guidance and educational activities to meet customers' needs and raised motivation for improvement through pricing by grade, etc., as well as the Project provided effective technological guidance.

3-2 Summary of Evaluation Results

(1) Relevance: Relevance is high.

1) Consistency with Nicaraguan national policy: In the National Plan for Human Development and Food Security (Draft) (planned for 2012-2016), the Nicaraguan government has an emphasis on wealth creation for poverty reduction as an important task. Considering that cattle breeding is an important activity for Nicaraguan farmers to make daily income and about 70% of all milk production in the country comes from small and medium scale farmers, the Project has a large effect on living improvement for cattle farmers. Therefore, the Project is consistent with the needs of the cattle breeding sector of Nicaragua.

2) Consistency with Japan's aid policy for Nicaragua: In the Country Assistance Program for Nicaragua (2002), promotion of cattle breeding is mentioned as one of the important development tasks. In JICA's Country Program (2007), agricultural and rural development is mentioned as one of the four priority areas. Therefore, the Project is highly consistent with Japan's ODA policy for Nicaragua.

3) Appropriateness of the Means: The means of the Project that aim to improve technical capabilities and reinforcement of organizational power directly contribute to the improvement of productivity and production technologies, which are major development tasks in agriculture and stock raising in Nicaragua. Therefore, the means are considered appropriate.

(2) Effectiveness: Effectiveness is high.

Concerning the four outputs, the following theory holds true.

> "Technologies appropriate for farmers will be disseminated to the farmers in the model areas" when "local technicians practicing in the model areas acquire technologies appropriate for the farmers". At the same time, "technologies for artificial fertilization and embryo transfer for the benefit of farmers are enhanced at a national-level research institute" at the national level. With these three outputs, the project purpose will be achieved when "living conditions as well as support from the project-related organizations to farmers in agricultural management are improved".

Thus, the project purpose is to be achieved in a comprehensive manner. Therefore, the effectiveness of the Project is considered high.

(3) Efficiency: Efficiency is relatively high.

1) Experts: Japanese long-term experts were dispatched in the following 7 areas – Chief Advisor, Agricultural Management Improvement, Hygiene Management, Business Coordination, Feeding Management/Dissemination, and Breeding Technologies. Thus efficient inputs were made according to the contents of the Project.

2) Equipment for Project: Major equipment items provided were those necessary for the achievement of outputs, such as office supplies, OA equipment, stereomicroscope and instruments for semen

collection.

3) Counterpart: Counterparts from MAGFOR and UNA are appropriately placed for feed crop, artificial insemination, animal hygiene and breeding, agricultural management, feeding management, and embryo transfer.

4) Facilities: MAGFOR provided project offices in the Cattle Breeding Center (CSGP) and the MAGFOR regional office, which have become base offices for the implementation of the Project. UNA provided an office for the field of breeding, a laboratory for embryo transfer, and lodging facilities and a training building for trainees.

(4) Impact: Impact is being generated in multiple aspects including technology, society and economy and is relatively large.

1) Chance of Achievement of the Overall Goal: It is believed that the foundation for the dissemination in the target area has been developed through the implementation of the Project up to this time. The contributing factors include the facts that manuals for the implementation of technical training have been developed; that livestock cooperatives and other relevant organizations have been developed to some extent; that appropriate technologies have been verified and there is a prospect for their actual application; and that heightened interest and motivation have been confirmed among farmers.

2) Technical impact: It is expected that there is a positive impact on technological improvement for agriculture and stock raising in MAGFOR, UNA, city governments, livestock cooperatives, etc. It is believed that there is an extremely significant technical impact, e.g., the introduction of clinical reproductive technologies and embryo transfer technologies to UNA has improved UNA's research and education level and it has become possible for other donors to implement artificial insemination projects.

3) Strategic Impact: Currently UNA is having discussion with INTA about deployment of agricultural dissemination strategy for technical support to producers. This system will make it possible to disseminate technologies to farmers as well as provide graduates and interns with opportunities for on-site work experience. These activities are considered to be very effective means for the promotion of dissemination activities in the future.

4) Social and Economic Impact: Based on the result of a questionnaire, a certain level of economic impact of the project implementation is confirmed. As for expansion of training opportunities and technical improvement for women, the female respondents to the questionnaire gave almost full score, showing that the Project is highly appreciated in terms of provision of technologies and expansion of opportunities to women. Therefore, the social and economic impact is considered to be significant.

(5) Sustainability: Sustainability is high.

1) Organizational Sustainability: The implementing organizations of the Project – MAGFOR, UNA, IDR and CONAGAN – have deepened cooperation for development of the agricultural sector through the implementation of the Project although they normally have different roles and responsibilities. The counterparts are especially highly motivated and have high interests and enthusiasm concerning the continuous activities in the future. MAGFOR and UNA are already looking at expansion to other areas and their organizational bases have been secured. Moreover, at the field level, responses of such organizations as city governments, livestock cooperatives and other relevant organizations have been improved through monitoring and training activities and technicians have been deployed. It is expected that further dissemination can be made through such organizations in the future. Thus, preparations for organizational responses have been made and sustainability is considered high.

2) Technical Sustainability: It is believed that the technical capabilities of the counterparts have dramatically improved through the Project. The introduction of clinical reproductive technologies and embryo transfer technologies to UNA has improved its research and education level and it has become

possible for other donors to implement artificial insemination projects. Thus the technical sustainability is believed to be remarkably large. Also, technical manuals necessary for the deployment of activities have been developed and technicians of MAGFOR, livestock cooperatives, city governments, etc. have acquired appropriate technologies that can be applied on site. Moreover, they have also gained knowledge and experience for monitoring and additional technical guidance. Therefore, the technical sustainability is considered high.

3) Financial Sustainability: Since the implementation plan for continuous activities in the future has not been developed yet, necessary financial resources have not been calculated. Financial sustainability will have to be ensured by securing such financial resources.

3-3 Factors that Promoted (Impeded) Realization of Effects

(1) Promoting Factors

1) Flexible deployment of human resources: The number of long-term experts dispatched for the implementation of the Project was five till the third year and four for the remaining period. Short-term experts were dispatched when needed. Thus flexible actions were taken.

2) Selection of Target Organizations: Selection of livestock cooperatives, which have high organizational capability, led to the promotion of field-level activities.

(2) Impeding Factors

As it took about 1 and half years from the initiation of the Project to the start of actual training dissemination activities, it affected the subsequent schedule of the Project, especially dissemination activities. Concerning this situation, based on the recommendations of the Interim Report, relevant organizations carried out appropriate activities to establish a dissemination system with cooperation among relevant organizations. Thus the establishment of a field-level dissemination system has been promoted.

3-4 Conclusion

Although some of the individual indicators have not been achieved, it is believed that the indicators for the Project Purpose can be achieved by the end of the cooperation period.

Establishment of the dissemination base and reinforcement of the dissemination system are recognized both at the central and local levels. It is believed that the Overall Goal and the Project Purpose can be achieved if the relevant organizations continue project activities.

Based on the above, it is considered that the expected results from the cooperation period have been achieved and the technical cooperation will be terminated in May 2010 as planned.

3-5 Recommendations (Concrete Actions, Recommendations and Advice concerning the Project)

[Matters to be completed before the end of the cooperation period] (Actions to be taken by the Nicaraguan implementing organizations according to the advice and instructions of JICA experts)

(1) Summarize project activities, dissemination processes and their good practices and success cases, and share with relevant organizations.

(2) Hold seminars, symposiums, workshops, etc., to share project experience. Strengthen the interface functions of MAGFOR's department offices to enhance their capabilities to help cooperation and coordination between the central-level technicians (UNA and MAGFOR) and the locally-practicing cattle breeding technicians (city governments and livestock cooperatives).

(3) MAGFOR, UNA, CONAGAN and IDR provide training to site cattle breeding technicians for the purpose of dissemination in other areas.

(4) Strengthen the foundation for further deployment of the project activities by improving manuals

with effective and appropriate technologies established by the Project and cases of their application.

[Deployment of the Project after the technical cooperation period] (Actions to be taken by the Nicaraguan implementing organizations)

(1) MAGFOR, UNA, CONAGAN and IDR continue and expand training of site cattle breeding technicians.

(2) Reinforce and organize technological dissemination units in city governments and cooperatives.

(3) Continue investigation processes to determine and verify application of models for small and medium scale cattle farmers in Nicaragua.

3-6 Lessons Learned (Information Derived from the Project to Help the Identification, Formation, Implementation and Operation Management of Other Similar Projects)

(1) Many of the technologies introduced to the farmers are inexpensive and easy to implement. In case more expensive technologies that involve facility improvement are introduced, the possibility of other financial resources should be considered.

(2) It is recommended to select pilot farmers after grasping the current situation and motivation of the farmers through project activities. It is considered desirable to appoint monitor farmers at the time of the project initiation and select pilot farmers later from among monitor farmers based on their activities.

(3) Selection of existing cooperatives and city governments that have high organizational power as target organizations led to the promotion of activity development.