Internal Ex-Post Evaluation for Technical Assistance under Finance and Investment

conducted by Tunisia Office: November, 2019

Country Name	The project for the Development of Irrigated Area of Northern Tunisia
Republic of Tunisia	

I. Project Outline

Background	In Tunisia, most of the arable area is arid or semiarid. Therefore, rein-fed agricultural areas were often heavily damaged by droughts. In addition, as surface water and groundwater are limited, the preparation of agricultural water for the dry season, in particular, became a major issue. In order to stabilize agricultural production and increase yields, the Government of Tunisia implemented ODA loan projects supported by JICA, such as "Water Pipeline Construction Project in Northern Tunisia", "Goubellat Irrigation Perimeters Construction Project" and "Barbara Irrigation Project" to construct irrigation facilities for the total farmland of 11,107ha. However, in the "Water Pipeline Construction Project in Northern Tunisia" (completed in 2004) and "Barbara Irrigation Project" (completed in 2006), it was pointed out that the yield and earnings were not achieved as expected due to the low collection rate of water charge and limited use of irrigation. In addition, as the majority of farmers earned their main income from rain-fed wheat and pastoral farming through autumn to next spring, it was difficult for ordinary farmers to venture to introduce vegetable cultivation by irrigation during the hot dry season. Therefore, the ratio of cultivated areas with irrigation remained only 42% at its maximum.		
Objectives of the Project	The project aims at establishing a self-sustaining irrigation agriculture practice and a dissemination system applicable to other areas, by establishing an irrigated agriculture model at pilot sites in three irrigated areas in the Northwestern region of Tunisia, human resource development of the Regional Directorate-General for Agricultural Development (CRDA) and the Development Grouping for Agriculture and Fishery Sector (GDA), as well as, technical training and educational activities based on the project results to CRDAs, GDAs and farmers, thereby contributing to promoting efficient agriculture in the 4 target irrigated areas. 1. Overall Goal: Suitable irrigation is practiced and efficient agricultural production in the 4 target irrigated areas (Nefza, Sedjnane, Fernana, and Hammam Bourguiba)) is achieved with desirable irrigation farming. 2. Project Purpose: Irrigation agriculture model is established and the dissemination system adaptable to the 3 pilot irrigated areas (Nefza, Sedjnane, and Fernana) is developed.		
Activities of the Project	1. Project Site: Irrigated areas of Nefza (Béja Governorate), of Sedjnane (Bizerte Governorate), of Fernana (Jendouba Governorate) 2. Main Activities: (1) a baseline survey in the 3 irrigated areas, (2) development/verification/dissemination of a system modeled irrigated agriculture practices through farm demonstration at the pilot sites, (3) technical instruction and training for CRDA and GDA staff on irrigated agriculture, (4) educational seminars on irrigation and technical training for GDA member farmers, awareness-raising activities on non-GDA farmers, (5) seminars to relevant organizations and groups in the irrigated areas and confirming the effects on participants. 3. Inputs (to carry out above activities) Japanese Side 1) Experts: 10 persons 2) Trainees Received: 3 persons 3) Equipment: vehicles, motorbikes, generator, electric jackhammer, excavators, soil moisture meters, PC, printers, office appliance, etc. Tunisian Side 1) Staff Allocated: 30 persons 2) Land and Facilitsies: Office space for the experts in the Ministry of Agriculture		
Project Period	October 2010 ~ February 2015 (Extension period: October 2013~February 2015)	Project Cost	(ex-ante) 370 million yen, (actual) 545 million yen
Implementing Agency	General Direction of Rural Engineering and Water Management (DGGREE), Ministry of Agriculture, Water Resources and Fishery (MARHP)		
Cooperation Agency in Japan	Ministry of Agriculture of Japan, NTC International Co., Ltd.		

II. Result of the Evaluation

<Constraints on Evaluation> / <Special Perspectives Considered in the Ex-Post Evaluation >

With regard to Haman Bourguiba, which was one of the target areas of the Overall Goal, it is assumed that the irrigated agriculture model established through pilot projects in the other 3 target areas was expected to be extended after the project completion. However, according to the ex-post evaluation survey, to compare with the other target areas, the extension of the irrigated agriculture model was challenging, mainly because; other existing sources of income such as trading with a neighboring country, lack of CRDA support, and small scattered farmlands unsuitable for irrigated agriculture. As suchdata collection on irrigation in Haman Bourguiba could have not been conducted due to unavailability of data. Therefore, although Haman Bourguiba was subject to the evaluation, it is difficult to measure the achievement of the Overall Goal including that region.

1 Relevance

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

The project was consistent with Tunisia's development policies, as "the 11th Five-Year Social Economic Social Development Plan " (2007-2011) and "the 12th Five-Year Social Economic Social Development Plan" (2010-2014) proclaimed productivity enhancement of the agricultural sector as an important development agenda. As for the policy in 2015, the 13th Five-Year Plan was not formulated as the restructuring of the regime was imperative after the revolution in 2011. Development program in 2015 was thus substituted and directed

under the policy of the 12th Five-Year Plan.

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

The project was consistent with the development needs of Tunisia where most of the farmland is arid or semiarid so the introduction of irrigated agriculture was essential. As the irrigation facility improvement highly needed by farmers, and the know-how and practice of farming as well as its dissemination were not sufficient, the water charge collection from the farmers and irrigated land were limited. Consequently, GDA faced a challenge to operate on a self-supporting basis. There was no change in the needs by the time of the completion.

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

The project was consistent with Japan's ODA policy toward Tunisia. As one of the three pillars in "the Country Assistance Program for Tunisia, October 2002" was water resource development and management. Also, in the context of the promotion of underdeveloped rural and poor areas, it was to assist them as the comprehensive water resource management.

<Evaluation Result>

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

2 Effectiveness/Impact

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

The project purpose was partially achieved. According to the project completion report, as shown in Table 1, the proportion of irrigated cultivation area for the 3-year project period of each pilot site was lower than the target value (Indicator 1). However, the actual proportion of irrigated cultivation areas in Nefza and Sedjnane showed increases to the target level for some years. As for the yield per 1 ha of the main crops (Indicator 2) as shown in Table 2, yields of the four main crops (tomato, melon, watermelon, pepper) in the pilot sites in the three areas (Nefza: 4 sites, Sedjnane: 6 sites, Fernana: 4 sites), in 2014/15 generally increased compared to those of the previous year.

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

The project effects have been sustained since the project completion. According to the survey result, although there were external factors, such as declines in crop prices and malfunctioning water distribution facilities during the post-project period, the increase in the proportion of irrigated cultivation area has sustained throughout the three areas, with the use of various programs held in demonstration farms and the guidelines on irrigated agriculture developed by the project (Indicator 1). Likewise, through the utilization of the project outputs, the yields of the four main crops by the irrigation agriculture have increased in the irrigated cultivation lands of three areas (Indicator 2).

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

The Overall Goal has been partially achieved at the time of the ex-post evaluation. According to the survey result, as shown in Table 1, while the proportion of irrigated cultivation area (Indicator 1) reached to the target value of 50% in Sedjnane among the three areas (2014/15 and 2017/18), it did not achieve in Nefza and Fernana. Thus, the average of the proportion in the three areas was 40% in 2017/18. With regard to the increase in the crop yields (Indicator 2), as shown in Table 2, the yields of three main crops (tomato, watermelon, and pepper) out of the four (tomato, melon, watermelon, and pepper) in the three areas have increased (the data of 2017/2018 is not used for judgment as affected by the external factor and with the actual annual yield of melon for the period from 2013/14 to 2016/17 averaged out, it has resulted in the increase). Nonetheless, the achievement levels of each target and indicator vary depending on the pilot sites and crops, with some of them unmet. However, as mentioned above, while many farmers earn their income by not only rainfed farming but also timber in the dry season, as well as trading with the neighboring countries, it is reasonable to say that, relatively speaking, there was considerable difficulty in adopting irrigated agriculture. Given the increase in the proportion of irrigated cultivation area and yield of some products in some areas, despite the above-mentioned fact, it is noteworthy that the project made a meaningful step for dissemination of the irrigated agriculture, as it improved the value chain and promoted irrigated agriculture contributing to more stable crop production and more income in the pilot areas.

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

There were several positive impacts. According to the field survey results and the answers to the questionnaire, the expansion of irrigated cultivation area at the pilot sites required the farmers more manpower, which contributed to the job creation for women in local communities, as was an indirect effect of the project. It was reported that, on average, three women have been employed per 1ha of irrigated area for three to four-month during the cultivation period. The cumulative number of women newly employed reached approximately a hundred as a result. In addition, as a positive impact unexpected in the planning phase, it was reported that farmers, the beneficiary of the training by the project, got further motivated to learn the know-how to grow irrigated crops. Specifically, those farmers started to visit private nursery companies to obtain information on new varieties of irrigated crops. In addition, many young farmers learn by themselves, via the internet sites introduced in the project, how to cope with pests and diseases. In the meantime, no negative impact was confirmed.

<Evaluation Result>

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

Achievement of Project Purpose and Overall Goal

Aim	Indicators	Results
(Project Purpose) Irrigation agriculture model is established and the dissemination system adaptable to the 3 pilot irrigated areas (Nefza, Sedjnane, and Fernana) is developed.	(Indicator 1) The proportion of irrigated cultivation areas increases to 45% in Nefza, 55% in Sedjnane, and 35% in Fernanam by the completion of the Project.	Status of the Achievement: Partially achieved (partially continued) (Project Completion) The proportion of irrigated cultivation area in each pilot site was 42% in Nefza (2014), 52% in Sedjnane (2013), 33% in Fernana (2014). (Ex-post Evaluation) - Nefza: the proportion of the irrigated cultivation area showed a slightly increasing trend. The reasons were the introduction of new crops and grafting, the fertilization program, and the use of guidelines for irrigation management, based on the knowledge obtained in the demonstration farms of the Project. - Sedjnane: The proportion of the irrigated cultivation area showed an

		increasing trend. It decreased to 33% in 2015/16 and to 29% in 2016/17, due to lower crop prices, turned to improve to 50% in 2017/18. - Fernana: Of the four sub-areas, one sub-area on the decrease, one sub-area broadly flat, and two sub-areas on the increase. Although it decreased in 2015/16 due to the cracks in the water channel routed from the Barbara Dam to the area and clogging at the pumping station in 2015, it has been recovering since then.
	(Indicator 2) The yield of major products per ha increases in the pilot sites.	Status of the Achievement: Partially achieved (continued) (Project Completion) The average yields of the four main crops in the pilot sites in the two years, 2013 and 2014 were on the increase. However, although yields of some crops in the Sedjnane increased, they were affected by the water shortage in 2014, and it was low in yield compared to the other two areas (Ex-post Evaluation) - Nefza: Although the yield of tomato remained flat, that of melon, watermelon, and pepper steadily increased. Yields thus increased on the whole. - Sedjnane: Yield of tomato almost doubled, and that of watermelon significantly increased. Pepper on the increase. Melon broadly flat. - Fernana: All four crops generally on the increase. The reasons for the stable increase in yield (production) are the introduction of new crops, grafting, fertilization programs, and the use of guidelines elaborated in this Project for irrigation facility management.
(Overall Goal) Suitable irrigation is practiced and efficient agricultural production in 4 target irrigated areas (Nefza, Sedjnane, Fernana, and Hammam Bourguiba)) is achieved with desirable irrigation farming. (Note: as above-mentioned in "Constraints on Evaluation," with regard to Hamam Bourgiba, not verifiable.)	(Indicator 1) The proportion of irrigated cultivation areas is increasing to 50% *It was impossible to verify the status of Hammam Bourguiba as no data was collected.	(Ex-post Evaluation) Partially achieved Table 1: Proportion of Irrigated Cultivation Area in Three Target Areas (%)

Irrigated area	2013/14	2014/15	2015/16	2016/17	2017/18
Nefza	38	38	39	44	41
Sedjnane	32	53	33	29	50
Fernana	29	28	17	28	29
Average	33	40	29	33	40

(Indicator 2)
Yield per ha of agricultural field practicing irrigated agriculture is increased.
*It was impossible to verify the status of Hammam Bourguiba as no data was collected.

(Ex-post Evaluation) Partially achieved
Table 2: Yield per 1 ha of the Four Main Crops (tomato, melon, watermelon, pepper[1]) by Irrigated Agriculture in the Target Areas (t / ha)

	2013/14	2014/15	2015/16	2016/17	2017/18
Nefza					
Tomato	50	50	50	52	40
Melon	31	31	33	35	30
Watermelon	53	50	55	58	53
Pepper	30	31	31	33	-
Sedjnane					
Tomato	48	59	68	63	78
Melon	26	27	24	19	25
Watermelon	27	31	35	33	39
Pepper	24	21	25	25	-
Fernana					
Tomato	64	66	68	67	70
Melon	21	21	24	27	30
Watermelon	64	66	68	67	70
Pepper	21	25	29	28	-

Note: Due to the heavy rainfall in early September 2018, the yield of tomato, melon, and watermelon decreased by 15% in Nefza in 2017/18 (in comparison to the yield in 2016/17). The yield data of pepper was ascertained after harvest (December 2018), so it was not confirmed. Therefore, the data of the year 2017/18 is not used for judgment because the decreased crops and the crop of incompleted data were evidently caused by the external factors.

Source : field survey

3 Efficiency

The project period and cost exceeded the plan (both of the ratio against the plan: 147%). The outputs were produced as planned. Therefore, the efficiency of the project is fair.

[1] Pepper yield in 2017/18 could not be confirmed at the time of the ex-post evaluation survey, since the field survey was conducted before December, its harvest season.

4 Sustainability

<Policy Aspect>

Promotion of irrigated agriculture has remained one of the major thrusts of Tunisia's development. The national plan, "Development Plan" (2016-2020) specifies the programs to strengthen the local administration capacity, such as the development of GDAs' function to lead a self-directive dissemination of irrigated agriculture in local communities, and the training of rural development workers who support the dissemination activity by GDAs, in parallel with the establishment of a central government monitoring system by MARHP.

<Institutional Aspect>

The basic arrangement including Governorates remains unchanged at the central level. The Directorate General of Rural Engineering and Water Management (DGGREE) has promoted the use of irrigation facilities, and the Division for Extension and Promotion of Agricultural Production (DVPPA) has formulated the policy with regard to the dissemination of irrigated agriculture and supervises its implementation in MARHP. As for irrigation facilities in Governorates, the CRDA's Section on Management of Irrigated Areas (AEPI) has been assigned to deal with irrigation management, planning, and engaged in irrigation water management for GDAs at the Governorate level. In addition, the Section of Maintenance and Hydraulic Equipment (AMEH) has been in charge of operation and maintenance of irrigation equipment in each Governorate. Each GDA in irrigated areas has also engaged the operation and maintenance of irrigation equipment as well, however, it has been apportioned the type of equipment as Governorate for the main distribution pipe while GDA for the branch pipe.

The dissemination of irrigated agriculture in Governorate has been managed by the CRDA's Section of Plant Production (APV), while CTVs and Agricultural Extension Center (CRA) of the irrigated areas play its practical roles.

With regard to the staffing in the use of irrigation facilities in the three areas, according to the answers to the questionnaire, there has been sufficient technical staff in the CRDA (10 persons) of Béja Governorate and the four GDAs (13 persons) in Nefza. There has not been not enough technical staff for the CRDA (11 persons) of Bizerte Governorate and the four GDAs (11 persons) in Sedjnane. In Fernana, the CRDA (7 persons) of Jendouba Governorate is understaffed at technical staff level for operating and maintaining of irrigation, while its GDA (four persons) under the CRDA was reported to suffice. Regarding the dissemination of irrigated agriculture, CTV and CRA (5 persons) insufficient in Nefza; CTV (2 persons) insufficient in Sedjnane; CTV (11 persons) sufficient in Fernana. The main reason for the understaffing was deemed that no replacement was made for post-retirement due to fiscal austerity in the post-revolution.

As a trend of GDAs concerning the use of irrigation facilities, unionization rates are rising with the increase in the number of member farmers. It was 37% (the fiscal year of 2016/17) for the three areas on average. With regard to CRDA's activities for the establishment of the Mutual Society for Agricultural Services (SMSA) for farm management, such as the improvement of access to the market. In Nefza, although it is limited to livestock food sale and was not yet extended to activities related to irrigated agriculture, SMSA has been active to some extent. In Sedjnane, there is no SMSA yet, and its establishment is under consideration. SMSA in Fernana by contrast, it has been active that the various services have been provided to member farmers; for the promotion and investment of irrigated agriculture under the support of a donor agency of Germany, GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH), to provide agricultural materials and equipment (tractors, trailers, tanks, olive harvesting equipment, forage crop seeds, etc.).

<Technical Aspect>

According to the survey results, knowledge and practical skills have been generally retained in terms of the maintenance management plan, financing, organizational management and monitoring of irrigation facilities. The manuals made by the Project have been kept in relevant organizations and used for their study, while CRDAs and GDAs share the knowledge and experience through the on-the-job-training. In this regard, however, maintenance plans have not been smoothly promoted in Fernana due to the budget constraint of the operation and maintenance in the GDAs (the CRDA carries out the operation and maintenance of the water supply and distribution network on behalf of the GDAs). By the same token in Sedjnane, It is particularly crucial to expedite the installation of water taps as proposed in the water supply and distribution network plan in the area. With regard to the knowledge on the promotion of irrigated agriculture and dissemination training to farmers, CRDAs and CTVs / CRAs generally retained it through the use of materials, manuals, and training. However, because of the technician shortage, the amount of water requirement for farming has not been able to be properly estimated in the CRDA in Bizerte Governorate. Furthermore, as for the dissemination training for farmers, the CRDA in Béja Governorate and CTV/CRA in Sedjnane have had difficulty to continue the relevant activities after completion of the Project due to the budget constraints and limited numbers of personnel capable of conducting the training.

<Financial Aspect>

Although some of CRDA's activity budget has been allocated from the National Budget of the Government of Tunisia, the total budget for GDAs in the project sites was limited only to 10,952 dinars in 2017/18. Only a few budgets from the Central Government is allocated for the GDAs because their activities are supposed to be financed by the water charges collected from farmers. A budget of CTVs/CRAs is underpinned by income from crop trading in irrigated areas and from other activities, but there is no detailed information available in this regard.

Table 3: Government Budget Allocated to CRDA/GDA for Operation and Maintenance of Irrigation Facilities by Target Governorate and Area (Unit : Dinar)

		Funded facilities	2013/14	2014/15	2015/16	2016/17	2017/18
CRDA	Béja	Water supply network	36,374	31,235	35,966	39,650	42,300
		Pumping station	28,650	27,650	30,600	73,000	75,000
	Bizerte	Water supply network	30,000	35,000	30,000	30,000	50,000
	Jendouba	Water supply network	2,500	3,000	4,000	27,800	4,200
		Pumping station					120,000
		Water tank	80,000			117,000	
		Water intake				98,000	
GDA	Nefza	Water supply network	1,488	1,829	4,266	12,928	9,281
	Sedjnane	Water supply network	9,555	1,132	1,728	625	1,500
	Fernana	Water supply network	1,483	5,186	1,248	32	171

Both the CRDA and GDAs have sufficient budget for the operation and maintenance in Nefza. The budget for the GDAs has been insufficient due to the limited water charge collection in Sedjnane. In Fernana, the constraint of GDAs budget may have entailed some

challenges in its operation because the water charges have not been billed to the farmers for two years from 2016 to 2018. Further, in Fernana, although GDAs are supposed to maintain the water supply network in the irrigated area, the CRDA has undertaken that role. The amount of water charges collected from farmers is also varied by Governorates, of which Jendouba and Bizerte Governorates faced some difficulties. Water charges were collected relatively well in Nefza, Béja Governorate, where the latest payment ratio exceeds the average of 80%. On the other hand, in Sedjnane, Bizerte Governorate, it averaged only 32% according to the data collected in 2016/17 and areas have been accumulated. This is because there was no clear consensus between the local farmers and GDAs on the cost-sharing of water consumption during the cultivation period. Water charge collection in Fernana, Jendouba Governorate increased steadily from 2013/14 (35%) to 2015/16 (54%). However, as the water charge calculation policy is not agreed between the CRDA and GDAs, GDAs are unable to collect water charges from farmers since 2016/17.

<Evaluation Result>

Therefore, the sustainability of the effects through the project is fair.

5 Summary of the Evaluation

The project partially achieved the Project Purpose and the Overall Goal. As for sustainability, although there are variations among areas and Governorates, there is a constraint of technical staff for irrigation facilities. Further, some areas faced the challenges to collect water charges which are the source of the budget for GDA's operation and maintenance of irrigation facilities. As such, the operation and maintenance of irrigation facilities and the dissemination of irrigated agriculture were deemed insufficient. On the other hand, technique and knowledge strengthened by the project have been generally retained and utilized, except for the dissemination training for the farmers. As for efficiency, the project cost and project period exceeded the plan. Considering all of the above points, this project is evaluated to be partially satisfactory.

III. Recommendations & Lessons Learned

Recommendations for Implementing Agency:

(1) MARHP and the CRDA in Bizerte Governorate need to promote the installation of water taps as proposed in the water supply and distribution network plan and duly build a consensus between the farmers and GDAs to ensure water intake under the management of the GDAs. Furthermore, by the same token, the CRDA in Jendouba Governorate should promote the installation of water taps in the plan.

(2) Likewise, regarding the sustainability of this Project, the CRDA in Bizerte Governorate needs to carry out the following organizational reform of the GDAs in Sedjnane as the following points. Also, for the matter in Fernana, it is imperative that the CRDA in Jendouba Governorate and GDAs need to agree over water charge calculation policy.

- Define the GDA's role clearly and empower it accordingly
- Capacity development of the constituent members of the GDAs (re-training on technical aspects such as irrigated agriculture and irrigation water volume, etc.) and enhance transparency in the management
- More assignment of technicians and personnel
- Strengthening the financial base
- Procure sufficient materials and equipment for operation and maintenance of irrigation facilities
- Promote collaboration between the CRDAs and CTVs/CRAs

Lessons Learned for JICA:

(1) The project should have defined the agriculture as the value chain consisting of production-distribution-sales, and thus elaborated the project activities with more focus on the main actors of distribution and sales such as the mutual society of agricultural services. By doing so, more farmers would have proactively engaged in crop production, as the profitability improves, even after the completion of the project. Therefore, in order to establish the value chains of local agriculture, it was desirable if the project had given more focus on support for the improvement of the distribution and marketing system in its activities duly deployed by the farming management expert, on the lines of the farming management plan underpinned by proper surveys. For instance, the project component related to the SMSA was limited to the assistance at the launching phase such as to establish an SMSA and other initial start-up activities, but technical transfer on distribution and sales in the subsequent phase should have been provided, as in the exemplary case of GIZ's assistance for the SMSA in Nefza.

(2) The project should have selected the project sites prospective and appropriate for irrigated agriculture, after taking into consideration the local farmer's needs and initial conditions of each site. Then, it was desirable to propose the materials and equipment, as well as the contents and approaches of activities appropriate for each site. If such measures had been properly taken, some unfavorable outcome found in ex-post evaluation survey would have been avoided such as; considerable disparity in the degree of achievement between target areas and the almost no irrigated crops in some areas.

(3) At the period of implementation of the project, farmers would have taken a more accommodating view of the project, if the project had launched to expand irrigation by the improvement of irrigation facilities such as the installation of water taps needed by farmers. In addition to the dispatch of experts of irrigation facility development, it was deemed desirable if it had assigned experts of farming management in accordance with the needs and challenges of the project sites in order to ensure the project effect. It may have been smoothly facilitated if the initial arrangement of experts and Implementing Agency had discussed with deliberation and agreed on a set of procured equipment and the above-mentioned issue in a more expeditious manner. As for this project, in order to respond the matter, re-selection and re-dispatch of experts were taken place during the implementation. That may have caused part of the reason that the outcome of the project was less effective. Thus, it can be pointed out as an important lesson to select qualified experts whose knowledge and aptitude meet the local requirements, the expected results, and specific project activities in the stage of the project formulation.

Interview with farmers engaged in irrigated agriculture in Sedjnane

Interview with CRDA, CTV and GDA staff at CTV office in Nefza