

Country Name	The Project on Horticulture Technology Improvement and Extension
Republic of Iraq	

I. Project Outline

Background	Iraqi agricultural sector was the second most important industry, but the productivity of agriculture had remained low due to aging agricultural production infrastructure, salt accumulation in irrigated farmland, and lack of knowledge and technology in agriculture. With high annual rainfall, Kurdistan region-Iraq of northern Iraq (Erbil, Duhok, and Sulaymaniyah Governorates) had high potential agricultural productivity, but the repression and destruction of farming villages during the civil war and the recent drought had led to a decline in agricultural production. As one of the approaches to revitalizing rural areas, the Ministry of Agriculture and Water Resources (MoAWR) of the Kurdistan Regional Government (KRG) had been working to promote production by introducing facility cultivation of vegetables and new varieties of fruit trees. However, an appropriate technology had not been updated properly, the capacity development of government officials involved in agriculture had not been promoted, and thus an extension system had not been firmly established. As a result, the old methods of cultivation were continuously used and the quality of crops declined. To expand the production of horticultural crops that would lead to rural development, it was necessary to introduce and disseminate appropriate horticultural technologies with a view to promoting marketing based on market needs.												
Objectives of the Project	<p>Through the baseline survey and demonstration field activities, the preparation of the detailed plan for the extension activities, and training to extension workers and farmers, the project aims to disseminate suitable horticultural technologies to farmers to respond to market needs, thereby contributing to increasing the income of farmers in Kurdistan region-Iraq.</p> <ol style="list-style-type: none"> Overall Goal: Income from horticultural crops of farmers in the Kurdistan region is increased through introduction and dissemination of suitable horticulture technologies and promotion of marketing. Project Purpose: Horticulture technologies suitable to local agricultural conditions are disseminated to target farmers to respond to market needs. 												
Activities of the Project	<ol style="list-style-type: none"> Project Site: Three Governorates (Erbil, Duhok, and Sulaymaniyah) in the Kurdistan region Main Activities: <ol style="list-style-type: none"> To conduct baseline surveys and demonstration field activities to determine the actual conditions of farmers and suitable horticulture technologies. To prepare the detailed plan for the extension of suitable horticulture technologies To conduct the extension activities by providing training to extension workers and farmers Inputs (to carry out the above activities) at the time of Terminal Evaluation <table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">Japanese Side:</td> <td style="width: 50%;">Iraqi Side:</td> </tr> <tr> <td>1) Experts: 6 persons (long-term)</td> <td>1) Staff allocated: 32 persons</td> </tr> <tr> <td style="padding-left: 20px;">5 persons (short-term)</td> <td>2) Land and facilities: Project Office, demonstration field, etc.</td> </tr> <tr> <td>2) Trainees received: 1 person in Japan and 15 persons in the third country (Jordan)</td> <td></td> </tr> <tr> <td>3) Equipment: closed-nursery system sets, water tanks, computers, etc.</td> <td></td> </tr> </table> 			Japanese Side:	Iraqi Side:	1) Experts: 6 persons (long-term)	1) Staff allocated: 32 persons	5 persons (short-term)	2) Land and facilities: Project Office, demonstration field, etc.	2) Trainees received: 1 person in Japan and 15 persons in the third country (Jordan)		3) Equipment: closed-nursery system sets, water tanks, computers, etc.	
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Project Period	(ex-ante) August 2011– July 2016 (actual) August 2011 – August 2016	Project Cost	(ex-ante) 480 million yen, (actual) 702 million yen										
Implementing Agency	Ministry of Agriculture and Water Resources (MoAWR), Kurdistan Regional Government (KRG)												
Cooperation Agency in Japan	Ministry of Agriculture, Forestry, and Fisheries												

II. Result of the Evaluation

<Constraints on Evaluation>

• Due to the effects of COVID-19 and security issues, data and information obtained during the field survey were limited. They were collected only through telephone interviews with a limited number of extension workers, farmers, and MoAWR officials.

<Special Perspectives Considered in the Ex-Post Evaluation>

[Evaluating the continuation status of the Project Effects]

• In order to examine the status of the project effects, it is also important to examine whether the dissemination by the extension workers has been continued. Therefore, “Have the extension workers continued disseminating the technologies introduced by the project?” is used as supplementary information 1.

• In order to examine the effectiveness of the new techniques introduced by the project, “How have researchers who worked on the project evaluated the effectiveness of appropriate horticulture technologies by MoAWR?” is used as supplementary information 2.

[Evaluating the achievement of Overall Goal]

• To examine the achievement status of the Overall Goal “Income from horticultural crops of farmers in the Kurdistan region is increased through introduction and dissemination of suitable horticulture technologies and promotion of marketing”, the only indicator “Farmers’ income increases through adopting suitable horticulture technologies after 5 years of the completion of the project” is set. Since it is also important to examine the direct outcome brought by the dissemination of suitable horticulture technologies and the promotion of marketing, in this ex-post evaluation study, “Have the crop production increased through adopting suitable horticulture technologies after 5 years of the completion of the Project?” is used as supplementary

1 Relevance/Coherence

[Relevance]

<Consistency with the Development Policy of Iraq at the Time of Ex-Ante Evaluation >

The project was consistent with the development policy of Iraq at the time of ex-ante evaluation. The Iraqi National Development Plan (NDP) (2010-2014) sets out a vision for the agricultural sector that includes the promotion of domestic production for food security, reduction of poverty in rural areas through increased agricultural production, and economic diversification away from oil dependence. KRG states in its Agricultural Sector Strategic Plan (2009-2013) that the mission of the agricultural sector is to achieve food self-sufficiency in the Kurdistan region-Iraq by utilizing natural, budgetary, and human resources as well as advanced technology and knowledge.

<Consistency with the Development Needs of Iraq at the Time of Ex-Ante Evaluation >

The project was consistent with the development needs of Iraq to disseminate the horticulture technologies suitable to local agricultural conditions to target farmers to respond to market needs at the time of ex-ante evaluation as stated in “Background” above.

<Appropriateness of Project Design/Approach>

As described below, it is judged that the effectiveness/Impact and sustainability of the project are low. The project design/approach was considered as appropriate as described in the Ex-ante Evaluation Sheet in that the introduction and dissemination of appropriate horticultural technologies were appropriate to the revitalization of rural areas and poverty reduction since horticultural crops (fruits and vegetables) served as a means of earning cash income even on a small scale. With no prior accumulation of agricultural technology as the first technical cooperation in the agricultural field in the Kurdistan region-Iraq, and with political instability tending to bring activities to a halt, it was difficult to give sufficient consideration to sustainability. Under such severe circumstances, it should be well noted that local cultivation of broccoli, which had only been imported, was rapidly accelerated, and the broccoli was even available in local grocery stores by the time of project completion.

After the completion of the project, the project activities were adversely affected by two other external factors, such as financial difficulties and no effective measures taken by the authority to stabilize the market. Since the project’s completion, there was no continuation of publicity activities, including the introduction of cooking methods for broccoli, nor ongoing research on broccoli cultivation due to financial difficulties. Authority failed to take effective measures to control the influx of inexpensive vegetables and fruits from outside, and the price of broccoli plummeted. This phenomenon has been observed in other vegetables, and farmers who no longer see potential in agriculture have been leaving the industry at an accelerating pace. These external factors were beyond the scope of the assumption for the project to cope with.

<Evaluation Result>

In light of the above, the relevance of the project is ③. (④ : very high, ③ : high, ② : moderately low, ① : low. *To be the same afterwards.).

[Coherence]

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

The project was consistent with Japan’s ODA policy to Iraq at the time of ex-ante evaluation. According to the economic cooperation policy for Iraq as of 2011, Japanese assistance aimed to support the areas in line with NDP (2010-2014) from the viewpoint of respecting the ownership of the Iraqi side and improving the effectiveness of the assistance. One of the four priority areas focused on by this policy is strengthening the infrastructure for economic growth in the oil and gas sector, agriculture, and mining, etc.¹

<Collaboration/Coordination with other JICA’s interventions>

Although the collaboration/coordination between the project and the Japanese ODA loan project namely the “Irrigation Sector Loan (Loan Agreement in January 2008)” was planned at the time of ex-ante evaluation and was implemented, any effects were not confirmed at the time of ex-post evaluation.

<Cooperation with other institutions/ Coordination with international framework>

Any cooperation/coordination with other institutions was not clearly planned at the time of ex-ante evaluation.

<Evaluation Result>

In light of the above, the coherence of the project is ②.

[Evaluation Result of Relevance/Coherence]

In light of the above, the relevance/coherence of the project is ③.

2 Effectiveness/Impact

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

At the time of project completion, the Project purpose was achieved beyond the plan. The project conducted a baseline survey in the target area, and based on the results of the survey, the Researcher took the initiative to verify several appropriate technologies for horticultural crops that meet market needs. Vegetable and fruit tree test cultivation, as well as promotion cultivation in demonstration plots, were also conducted. To disseminate appropriate cultivation technologies, training for extension workers was conducted and field days were held to provide guidance to farmers. Appropriate technologies were also compiled into horticultural technology guidelines. Through these activities, broccoli cultivation was selected as suitable for local agricultural conditions² to respond to market needs and disseminated to target farmers. It was confirmed by the telephone sample interviews conducted at project completion with 41 farmers who participated in the Field Day, 30 farmers (73.2%) already told other farmers about the new techniques of broccoli cultivation for dissemination (Indicator 1). Through these activities, a system of the Researchers-Extension Workers-Farmers Cycle, in which problems and solutions for the cultivation are shared, was established. The system was the first of its kind in the Kurdistan region and proved to be an effective way for the dissemination of new techniques. The role of extension workers in disseminating the technology was also clearly recognized.

¹ Source: The Ministry of Foreign Affairs, “ODA Country Data Collection” (2011)

² Having considered several horticultural crops, the project selected broccoli for reasons, such that broccoli was considered a new crop that was nutrient and could be sold at a high price in the market. Most importantly, the farmers embraced broccoli cultivation, which was disseminated at Field Day.

Considering that the project often faced difficulties due to political unrest, it should be well noted that the project achieved favorable results.

<Continuation Status of Project Effects at the Time of Ex-Post Evaluation>

By the time of the ex-post evaluation, the project effects have not continued. According to the telephone interviews with 17 farmers, only three farmers (18%) continued to grow broccoli by applying the technologies introduced by the project. Interviews with farmers revealed that for about two years right after the project completion, many farmers started broccoli cultivation. However, the more farmers produced broccoli, the fewer prices were given in the market under the circumstances that no price control was being installed by the authority. As a result, most of the farmers gave up cultivating broccoli by the time of ex-post evaluation and some farmers went back to growing crops, such as tomatoes and cucumbers with a conventional method.

The unavailability of the same seed variety in the local market and that of a good heating system in case of cold areas are other issues that made it difficult for farmers to continue growing broccoli, either. Telephone interviews with two extension workers for Erbil and Duhok Governorates revealed that no budgetary support from MoAWR made it difficult for them to continue disseminating the technologies (Supplementary Information 1). As for how researchers who worked on the project evaluated the effectiveness of appropriate horticulture technologies by MoAWR, there was no information obtained during the study. (Supplementary Information 2).

<Status of Achievement of the Overall Goal at the Time of Ex-Post Evaluation>

At the time of ex-post evaluation, it was not possible to examine the achievement status of the Overall Goal since the quantitative data was not available. The resulting decline in market prices forced farmers to give up broccoli production because they could no longer make a profit from broccoli cultivation. Therefore, it is most likely that farmers' income did not increase through adopting suitable horticulture technology for broccoli cultivation. The broccoli production data were not available, either (Supplementary Information 3).

<Other Impacts at the Time of Ex-Post Evaluation>

According to the telephone interviews with farmers and extension workers, local broccoli was seen at vegetable shops all over KRI for about two years after the project. This indicates that broccoli cultivation was well accepted by farmers and became popular among them until the market price fell. According to the interviews with farmers, the guideline for broccoli production technologies in the local language was used in the Syrian refugee camp through the project by other development partners.

It was also identified by the telephone interviews with farmers and extension workers that most of the people concerned with the project realized the "Researchers-Extension Workers-Farmers Cycle" was important to continue to improve agriculture in the Kurdistan region, however, the situation did not continue since the extension workers could not visit the farmers because of the lack of budget for activities.

<Evaluation Result>

In light of the above, the effectiveness/impact of the project is ①.

Achievement of Project Purpose and Overall Goal

Aim	Indicators	Results	Source																																				
(Project Purpose) Horticulture technologies suitable to local agricultural conditions are disseminated to target farmers to respond to market needs.	Indicator 1 More than 60 % of the farmers who attended Filed Day tell other farmers about the new techniques.	<p>Status of the Achievement (Status of the Continuation): Achieved beyond the plan (not continued) (Project Completion)</p> <ul style="list-style-type: none"> For those who participated in the Field Day, the telephone sample interviews were conducted with 41 farmers (half of those who participated in the Field Day) at the project completion, and 30 farmers (73.2%) of them already told other farmers about the new techniques of broccoli cultivation achieving the target of 60%. (The percentage by each governorate is unknown.) <p>(Ex-Post Evaluation)</p> <ul style="list-style-type: none"> According to the interviews with 17 farmers which represents 42% of those surveyed at the project completion, only three farmers (18%) have continued to grow broccoli by applying the new techniques introduced by the project. Others have stopped broccoli cultivation. One of the major reasons is that broccoli cultivation was no longer profitable since its market prices fell when the production increased without price controls by authority. Another reason is that it was not possible to obtain the same quality of seed variety. Furthermore, in the case of the Duhok Governorate, the production cost became high because it required a heating system when it got very cold. <table border="1"> <thead> <tr> <th></th> <th colspan="2">At the time of Project completion</th> <th colspan="3">At the time of ex-post evaluation</th> </tr> <tr> <th>Governorate</th> <th>Number of participants of Field Days</th> <th>Number of Field Day participants interviewed</th> <th>Interviewed</th> <th>Continued broccoli cultivation</th> <th>Not Continued broccoli cultivation</th> </tr> </thead> <tbody> <tr> <td>Erbil</td> <td>40</td> <td>24</td> <td>5</td> <td>2</td> <td>3</td> </tr> <tr> <td>Duhok</td> <td>18</td> <td>3</td> <td>4</td> <td>0</td> <td>4</td> </tr> <tr> <td>Sulaymaniyah</td> <td>24</td> <td>14</td> <td>8</td> <td>1</td> <td>7</td> </tr> <tr> <td>Total</td> <td>82</td> <td>41</td> <td>17</td> <td>3</td> <td>14</td> </tr> </tbody> </table>		At the time of Project completion		At the time of ex-post evaluation			Governorate	Number of participants of Field Days	Number of Field Day participants interviewed	Interviewed	Continued broccoli cultivation	Not Continued broccoli cultivation	Erbil	40	24	5	2	3	Duhok	18	3	4	0	4	Sulaymaniyah	24	14	8	1	7	Total	82	41	17	3	14	<p>Telephone interviews with farmers</p> <p>Telephone interviews with farmers</p>
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(Overall Goal) Income from horticultural crops of farmers in the Kurdistan region	Indicator 1 Farmers' income increases through adopting suitable horticulture	<p>(Ex-Post Evaluation) Not verifiable</p> <ul style="list-style-type: none"> No quantitative data is available. Telephone interviews with farmers indicated that broccoli production increased for about two years right after the project completion because many farmers started growing broccoli. However, the resulting decline in market prices forced farmers to give up broccoli production because they could no 	NA																																				

is increased through introduction and dissemination of suitable horticulture technologies and promotion of marketing.	technologies after 5 years of the completion of the project.	longer make a profit from broccoli cultivation. • It is most likely that farmers' income did not increase through adopting suitable horticulture technology for broccoli production.	
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3 Efficiency

While the project period was as planned (the ratio against the plan: 100%), the project cost exceeded the plan (the ratio against the plan: 146%). The reason for the excess of the project cost was the political instability in the region, which forced experts to use bulletproof vehicles in more areas during their regional trips or to instruct remotely from Jordan or Japan to the Kurdish region.

Outputs were produced as planned.

In light of the above, the efficiency of the project is ③.

4 Sustainability

<Policy Aspect>

Under the Iraq National Development Plan (2018-2022), the Government of Iraq sets four major objectives for the agricultural sector which include the increase in the GDP contribution of the agricultural sector as well as sustainable food security.

<Institutional/Organizational Aspect>

The organizational structure of MoAWR and the number of laboratory and extension offices for each governorate have been unchanged, however, many of the staff under the organization have been on leave due to financial difficulties. According to the interview with officers of MoAWR, it is difficult for them to carry out any activities mainly due to the lack of funds. Neither the current number of laboratory staff including researchers nor the current number of extension workers are available.

<Technical Aspect>

Due to the financial difficulties, all the activities including training, have been stopped. It has been difficult for MoAWR to create an environment to transfer the technologies introduced by the project. As for a series of technical guidelines, many staff found them useful as a source of information, especially for those manuals or guidelines of production technologies of broccoli prepared in the local language.

<Financial Aspect>

Because of the ongoing economic crisis in KRG, it is difficult for MoAWR to allocate any budget for research activity and extension service activities.

<Environmental and Social Aspect>

Telephone interviews with farmers revealed that there are high-quality products in the market imported from Iran and Turkey and it is difficult for MoAWR and KRG to control the market price and quantity of the imports from outside.

<Evaluation Result>

In light of the above, serious problems have been observed in terms of institutional/organizational, technical, financial, environmental and social aspects of the implementing agency. Therefore, the sustainability of the effectiveness through the project is ①.

5 Summary of the Evaluation

The project achieved the project purpose beyond the plan to disseminate the horticulture technologies suitable to local agricultural conditions to target farmers in order to respond to market needs. After the project's completion, the project effects have not continued. The achievement of the Overall Goal to increase the income from horticultural crops of farmers in the Kurdistan region through the introduction and dissemination of suitable horticulture technologies and promotion of marketing was not verifiable because of the unavailability of data. As for sustainability, major problems have been observed in terms of the institutional/organizational, technical, financial, environmental, and social aspects of the implementing agency. As for efficiency, the project cost exceeded the plan

Considering all of the above points, this project is evaluated to be unsatisfactory.

III. Recommendations & Lessons Learned

Recommendations for Implementing Agency:

- KRG should reactivate the "Researchers-Extension Workers – Farmers Cycle" in which farmers share problems and solutions for cultivation in order to improve agriculture in the region.

It was confirmed by the study that most of the people concerned with the project realized the "Researchers-Extension Workers-Farmers Cycle" worked well in the Kurdistan region-Iraq. However, it has not continued after the project completion due to the lack of funds for activities of extension services.

Lessons Learned for JICA:

1) In areas where the land is infertile and the market capacity is small, the project should be planned using multiple measures, such as the promotion of multiple horticulture crops, adjusting the crop schedule, and effective measures to stabilize the market by the authority. The increase in broccoli production to the point of price collapse can be evaluated as a result of the successful adoption of locally adaptable technology by the project. However, specialization in broccoli production and the lack of effective measures to stabilize the market have led many farmers away from broccoli production.

2) While it would be desirable to include diversification of extension crops, marketing, and sustainability considerations in the project plan, it would be difficult to do all these in one project in a conflict-affected area where there is no accumulated experience. Therefore, one

possible way is that the project activities should be monitored as it proceeds and evaluated once after one to two years. Then, those activities that have proven to be successful should be introduced later on in order to sustain a successful dissemination approach.

This project was the first technical cooperation in the Kurdish region, and it was not feasible to accomplish the various activities included in the project. In addition, there was a lot of political instability during the project period, which made it difficult to review and adjust the project operation midway.

3) In verifying the achievements of the Project Purpose and the Overall Goal, it is desirable to set multiple indicators (quantitative and qualitative) and verify them from multiple perspectives. This is particularly important for projects that include the capacity development of human resources, in order to see the cause-and-effect relationship between human resource development and the outcome.

This project was difficult to evaluate because only one outcome indicator was set for each individual Project Purpose and the Overall Goal, even though both of them were to be achieved through human resource development.



An unutilized greenhouse in Duhok



Green House in Bagera/Duhok showing growing Tomato and Cucumber