

FAO「農業生産性向上プロジェクト」への参加
Participation in the FAO project, “Enhancement of Agricultural
Productivity Project”

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1. Introduction

The Food and Agriculture Organization of the United Nations (FAO) project entitled, “The Project for Enhancement of Agricultural Productivity”, was launched in March 2023 funded by Japanese government. The project will support the Egyptian government’s efforts to ensure food security by increasing water productivity in agriculture and resilience to climate change. It will target small-scale farmers in rural areas of Upper Egypt and the Nile Delta with the introduction of modern irrigation facilities and solar-powered pumps, and the installation of agri-voltaic greenhouses. Tottori University (TU) has participated in this project from the planning stage and has continued to participate as a partner organization in Japan after the project was approved. This report introduces TU's role in the project and some of its achievements. It should be noted that some of the work performed by TU was done in collaboration with Sanyu Consultants INC.

2. TU's role in the project

Tottori University was in charge of part of Output 1 and 2 out of the following 4 outputs.

Output 1: Irrigation modernizations are demonstrated to optimize energy use and water productivity.
→ Evaluating the impact of using modern irrigation and solar energy on the environment and financially.

Output 2: Technical knowledge and skills of small farmers enhanced to effectively promote sustainable irrigation and efficient Climate-Smart Water Management (CSWM) practices through the implementation of farmers’ field schools.

→ Providing an advanced international training in Japan in irrigation modernization.

Output 3: Capacities of smallholder farmers are enhanced to effectively promote modern irrigation technologies and CSWM practices in line with Good Agricultural Practice principles.

Output 4: Smallholder farmers engaged in sustainable income-generating activities and their income increased activities in Sustainable Agri-Business Development.

The Project’s direct target groups / beneficiaries include Ministry of Water Resources and Irrigation (MWRI) and its branches in the three targeted governorates, NGOs as well as smallholder farmers.

3. Monitoring and evaluating the impact of using modern irrigation and solar energy

Based on the following impact indicators of the project, the items for monitoring are identified and finalized after the discussion with FAO; (1) Increase in the efficiency of water use by smallholder farmers, (2) Increase in smallholder farmers’ crop yields, and (3) Increase in smallholding farming household incomes. It is concluded that the result indicators should be measured in two categories:

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one for directly measuring impact indicators such as irrigation method, crop yields, household incomes (gross income and production cost) and the other for measuring the risks for modern irrigation such as soil salinity, amount of fertilizer application, irrigation labor cost, irrigation electricity (/fuel cost), and water salinity. Soil and water chemical analyses, flow rate observations, and farmer interviews were conducted in cooperation with the National Water Research Center.

The result indicators are collected from the experimental sites and collected from similar farms using conventional irrigation methods as supplemental information.

The results of the surveys are summarized as follows: (1) The amount of irrigation water: Most farmers are not distributing the appropriate amount of water needed by their crops at different planting times. Farmers may lack knowledge about the amount of water their crops need. Smart farming through the introduction of different sensors, capacity building of agricultural extension workers, and enhancement of farmers' knowledge about crop cultivation may be necessary, (2) Soil salinity: Except for mango and fennels, either the pH value or the EC value or both are out of the appropriate values. Most of the pH values are higher than the appropriate values. The yield is assumed to increase with appropriate pH and EC values, (3) Water quality: All pH value results were within the appropriate range of values while all EC values were out of range, (4) Farm household economy: Although the result of comparative studies on the economic impact are limited in specific major crops with modern irrigation, results showed that the modern irrigation is more profitable and efficient in the production cost, than those with conventional flood irrigation.

4. Advanced training in Japan

In-Japan training course was implemented at Tottori University for 18 days from August 17, 2023 to September 3, 2023. It is aimed that participants will gain necessary knowledge and technology in proper management and effective use of land and water resources, and then, after going back to Egypt, they will disseminate what they gained in Japan among their own organizations or target areas as master trainers on irrigation modernization. The advanced training contains theoretical background and site visit to introduce the Japanese water distribution and irrigation system to the trainees as well as the latest technologies in the field of irrigation, water and land management, water distribution and solar system. The topics are, 1) Land and Water Management Acts in Japan, 2) Integrated Water Resource Management, 3) Participatory Irrigation Management, 4) Precision irrigation, 5) Climate-smart agriculture, 6) Drip / Sprinkler irrigation systems, 7) Smart irrigation systems, 8) Soil moisture sensors, 9) Irrigation scheduling, 10) Water management strategies, 11) Irrigation system maintenance, 12) Renewable energy generation on irrigation systems, 13) Irrigation water quality, 14) Sustainable irrigation practices, 15) Economic and financial considerations. Number of participants is 18 from MWRI including 3 observers. Lectures were mainly given by Tottori University faculty members, but some lectures were given by external lecturers. Although there was a postponement of the trainees' arrival in Japan due to a typhoon, the training program was successfully completed as designed and scheduled by utilizing the on-demand system. During the training, no trainees became so ill that they were unable to participate in the training. In addition, the trainees generally participated in all training programs with strong interest. Finally, this project is extended for another year. The authors will strive to achieve further results.