

Monitoring and investigating the effectiveness of crop-improvement and plant-breeding techniques on reducing the exploitation of water resources in the 3rd-phase sites of sustainable agriculture project in the Lake Urmia basin

The project “Contribution to Restoration of Lake Urmia via Local Community Participation in Sustainable Agriculture and Biodiversity Conservation” has been considered as one of the activities of Lake Urmia Restoration, in which the Department of Environment and the Ministry of Agricultural Jihad in cooperation together has tried to train and participate farmers in the region to modify traditional farming practices to increase water productivity on farms while preserving the interests and income of farmers in the region, in order to save on applied water at the farm level, it will also be helpful to provide part of Water right of Lake Urmia. In order to achieve these goals, implementation of various agricultural and management techniques conservation agriculture systems, irrigation systems correction, irrigation based on actual crop requirement, selection of suitable cultivation patterns, agronomic and horticultural cultivars, planting date, deficit irrigation, management irrigation, irrigation alternate, evaporation reduction, Optimization of the dimensions of irrigation plots and ... on the farm scale in the lands of Lake Urmia Basin in the form of sustainable agriculture project entitled “Contribution to Restoration of Lake Urmia via Local Community Participation in Sustainable Agriculture and Biodiversity Conservation” are being performed since 2014. The general purposes of the research in 2016- 2017 were continuation of capacity development in the engineering and technical companies in the project based on previous experience and the evaluation of the effectiveness of various agronomic practices implemented in the fields on reducing the water input to the farm in new villages and increasing productivity, monitoring the performance of technical and engineering companies and the implementation of training courses required in the region. In this regard, monitoring of technical and engineering companies located in Urmia, Naghda, Miandoab and Mahabad (under the name of monitoring network) and independent monitoring (under name of main monitoring) in Miandoab city included three fields at the first (autumn cultivation) and three fields at the second (spring cultivation) was done. This study was carried out in six cities of East Azarbaijan province. In autumn, two crop plots were used as well as spring crops where are in the treatment and control fields. The farms are within the boundaries of selected cities and will be subjected to full and accurate evaluate according to the description of the services. Results in Mahabad and Miandoab show that in condition of land grading as treatment, water was saved by an average of

17.8% and in water productivity was increased by 26%. Water productivity of wheat in treatment and control fields was 1.15 and 0.49 kg/m³ respectively, which was improved by average 22% in treatment fields. Also, the average yield of wheat in treatment and control fields was 6223 and 6225 kg/ha respectively, which show that yield reduction was not achieved by applying the treatment in the fields. In spring farms, some results in water saving were significant. Good results were obtained regarding to change horticulture irrigation practices. In Miandoab, water applied efficiency was increased by changing the irrigation practice from flood to loop, an average of 19% . Significant results were obtained by changing the irrigation practice and the arrangement of sugar beet cultivation. Based on one of the fields, water was saved about 40% and water applied efficiency was increased about 12% by changing the arrangement of planting and changing the irrigation practice. land grading also increased the water applied efficiency and reduced water consumption in sugar beet.

Regarding farms under monitoring of Urmia, the highest amount of water consumption is attributed to the apple garden with alfalfa with 8022 m³/ha and the lowest amount is for wheat field treatment with 3080 m³/ha. The greatest amount of water applied efficiency is related to short-length plots in the Seperghan village. The average water applied efficiency of this field in the total treatment and control was 75%. Water applied efficiency in apple is much higher than sunflower and wheat. In East Azarbaijan, the results of breeding and crop improvement techniques in wheat field AJ1 showed that water use was 25.75% (about 1168 m³/ ha) compared to control. Also, the average increase in water applied efficiency in the treatment field was 26.31% compared to the control field. Application of treatment and management irrigation increased water productivity in this field of 0.4 kg/m³ (equivalent to 17.4%). In the field AJ2, during the growing season, the average saving or reduction in water consumption of treatment compared to the control during the four irrigation of this field was about 25.75%. Also, the reduction of water consumption in treatment compared to control was approximately 26 percent (about 1190 m³/ha). Additional , the increase in water applied efficiency in the treatment field compared to the control field was about 26.46%. Application of treatments and management irrigation increased water productivity about 1.3 kg/m³ in this field. Based on the results of in the field AJ3, yield and water productivity in the potato product showed an increase of 30% in the product and water consumption decreased by 15.8%. In the field AJ4, the yield of product has increased by 30% and water consumption has decreased by 16.4%. In the apple garden AJ5, there was no

difference between yield of the treatments and the control, but water consumption in the treatment was decreased by 6881 m³/ha, which was less than water consumption in the control of 9117 m³/ha as well as water productivity has increased. Water productivity in treatment and control was 1.38 and 1.40, respectively. In the walnut garden AJ6, there was no difference in yield between treatment and control. loop leakage irrigation practice in walnut treatment gardens reduced water consumption by 19% compared to control. Also, water productivity in treatment fields increased by 58% compared to the control.