

Mini Series: Irrigation and Water Saving in Arid Land – Case Study from Field Work

Part 1: State of irrigation by farmers

We have dealt with the issue of irrigation in arid areas in previous volumes of the AAI News. In this mini series, we would like to present our thoughts on irrigation and water saving in arid land, focusing on case studies in the Middle East / Syria. In order to effectively utilize limited water resources and to ensure healthy growth of crops, it is important to estimate an appropriate volume of water and irrigation schedule and implement this. Basically, according to the crop water requirement (CWR) of a particular crop, an appropriate amount of water should be fed bearing in mind the amount of effective rainfall (where there is rainfall). There are many different methods of measuring the CWR such as a method to calculate using climatic data (Penman method and others), a method to calculate based on actual evaporation volume (Pan method) and a method to actually measure the CWR with a soil moisture meter and lysimeter. In Syria, one of the methods based on climatic data, the Blaney-Criddle method is relatively often used. CWR of each month is calculated by multiplying reference crop evapotranspiration (Eto) by crop coefficients (Kc), and considering irrigation efficiency.

In theory, the necessary amounts of water can be calculated in this way however it is very interesting to know how farmers irrigate their land in reality. According to the survey of farmers in Daraa Prefecture in the southern part of Syria, which produces crops such as tomatoes and water melons and where drip irrigation is widely operated, the main reason for introducing water saving irrigation systems is cost reduction along with water saving. As to the advantages of water saving irrigation methods, 72 % of the respondents said labour force reduction was important and 46% indicated water saving (multiple answers were permitted). This shows that those farmers tend to value the reduction of irrigation cost and labour rather than the saving water.

In relation with this survey, we investigated the actual irrigation schedules and volume of irrigation water used by tomato farmers through interviews and physical measurement, with an aim to better understand the actual state of use of irrigation by farmers. The table on the right proves that farmers tend to provide more water than theoretically necessary through irrigation, which reinforces the earlier point of valuing cost reduction over water saving. Generally, it is often said that farmers tend to irrigate excessively, however, these remarks had seldom been substantiated quantitatively. This survey, although in rough figures, revealed the fact that water saving quality of introducing drip irrigation was not fully achieved. However, considering some information regarding irrigation schedules and others obtained from interviews may not be accurate, it is necessary to obtain more data to increase accuracy.

Comparison between CWR as calculated and actual amount of irrigated water (m³/ha)

Month	Mar	Apr	May	Jun	Jul	Aug	Total
ETcrop	193	663	1,451	1,930	1,142	1,091	6,470
Farmer A	548	1,920	2,400	1,920	2,060	2,060	10,908
Farmer B	-	424	1,060	1,908	2,226	3,392	9,010
Farmer C	-	447	894	1,788	2,436	2,384	7,949

Moreover, it is important to review the frequency of water provision in irrigation schedules. With the traditional channel irrigation, farmers irrigate their lands once a week and do not irrigate frequently because of the amount of work required. However, because drip irrigation can be operated relatively easily by just opening and closing valves, it is possible to irrigate more often. It is considered that this can lead to improvement of soil moisture conditions around roots of crops, resulting in better crop growth. There is a need to further investigate the relationship between different irrigation methods and frequency of irrigation, taking into account the specific situations in each area. In this issue, we introduced the state of irrigation by farmers. In the next issue, we will deal with water saving measures.



Furrow irrigation



Laying drips and mulching



Measuring amount of water fed by drip irrigation system