

Impacts of Climate Change on Agricultural Production in Arid Areas (ICCAP) The Possible Effect of Climatic Changes on the Irrigated Agriculture of Seyhan Basin

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1. Introduction

It is known that climate changes due to global warming will have negative effects on water resources. Important irrigation factors such as temperature, precipitation and evapotranspiration may change and these may adversely affect water resources. Up till now, however, impact of climate change on important irrigation performance factors such as water use, cropping pattern, water table quality and depth, and other general factors have not been studied yet. In this study, therefore, climate changes will be taken into account in evaluating the observed changes in the irrigated areas of Lower Seyhan Plain and these changes will be modeled. This study will also be undertaken to evaluate the performance of irrigation and drainage systems in Lower Seyhan Plain, and to find out problems in the effective use of water and offer solutions.

Project members have already spent almost three years out of five years' project life of the ICCAP. In the working plan, we were to spend first two years for diagnosis of present system in the Seyhan basin. We are to designate latter two years for assessment of future changes and to save the last year for summarizing. Therefore it is already a time set up a strategy for analysis of future changes. In this short report, we will explain our progress of discussions on future scenario in Turkey.

2. Some main research outcomes in last years

Researchers monitored two tertiary canals in the LSIP for the second year, Reference water budget of two canals were obtained, Transport losses from the canal were estimated. Drainage flow from

subsurface drainage was observed. The water use efficiency of each land use was calculated. Land use change by satellite image analysis is being carried out. Historical change in groundwater depth and salinity has been analyzed. Salinity group carries out monthly monitoring of soil salinity on 50 points along the east-west transect in the project IV area of the LSIP. Along the same transect DSI staff observes shallow groundwater fluctuation and EC of twelve observation wells. Satellite image analysis is being carried out for detecting changes in severely saline area.

3. Expected outcomes of the subgroup

Now the result from second year measurement is under analysis. Water use in LSP-IV area with drainage water re-cycling should also be observed.

Integrated analysis on vulnerability of present water use in the LSIP. Future prediction of water demand and possible risks in various climate change scenario. Efficiency of participatory water management for salinity prone area

a-Evaluation of the past and ongoing irrigation management in the Seyhan Basin.

b-Prediction of future changes in the irrigation system including water balance.

c-Expected measures for future negative impacts on irrigation system.

d -Analysis of the basic structure of land and water use system in the Seyhan Basin.

e.-Outlining of water balance of irrigated area in the Lower Seyhan Project area.

f.-Development of prototype model of water balance model.

4. Generation of Future scenario

- A) Possible scenarios for different responsible bodies with respective topics should be generated, which are;
- a. DSI (Development of upper basin, additional construction)
 - b. WUA (Land owner ship, efficiency of management, maintenance and renovation)
 - c. Farmers (Land use decisions, technological advance, groundwater use).
- B) We should clarify, to which extent the scenario is based on assumptions. We try to scientifically quantify changes based on qualitative assumptions.

We started to make clear the methodology for linking irrigation, groundwater and salinity issues. Also, group started the dialogue with socio-economist.

Every subgroup prepared one definition about steady variable for related with every subgroup subjects which related to climatic variables. And parameters depend on steady variable were defined. For example: amount of water resources and its quality, soil, crop pattern, topography, soil salinity, ground water level and quality, water price, irrigation efficiency, irrigation method, etc.

Discussion with other subgroup members of ICCAP has been established try to answer to them: What is the water resources development plan in national and regional levels?, what will happen, if water resources becomes much more scarce, what will happen if labor cost becomes higher, what will happen if labor cost becomes higher, what would farmers do if competitiveness of agricultural production in Adana region becomes relatively high or low compared to the rest of country or EU, weaker or stronger Integration among sub-groups what will happen if Adana becomes more industrialized, if climate changes that wheat production becomes weaker or stronger, what would happen if management cost of

irrigation and drainage canals were transferred completely to farmer's responsibility? Every group has been trying to give answer to these questions.

5. Determination of main frameworks of interactions

When we predict future changes, there are many possible scenarios. Some examples: -Shortage of water resource due to decrease of precipitation in winter. -Land use (cropping pattern) changes due to lack of labor. -Drastic change in vegetation in upper stream. -Salt water intrusion and severe salinity caused by sea level rise

However, we are not able to predict everything and we should limit our scenarios to the ones that are realistic and yet effective in causing significant changes to the Seyhan basin and its agricultural system. For this we need to find sensitivity of indices that are to be exchanged among subgroups and to determine main framework of interactions.

There are a lot of discussions about future scenario and we can not reach to a conclusion at this time.

6. References

- ICCAP, 2004. The Progress Report of ICCAP. Publication No:6.
- ICCAP, 2005. The Progress Report of ICCAP. Publication No:7.
- OZEKICI, B., 2004. 1.Progress Report. (unpublished).
- WATANABE, T., NAGANO,T.,2004. Subgroup Research Plan (2004-2005).
- WATANABE, T., 2006. Research Plan of ICCAP irrigation subgroup for 2006.