

Economic Development and Water Resource Demand in Yellow River Basin: A Model Study on Crop Irrigation Water Requirement

Hidefumi Imura, Weihua Fang

Graduate School of Environmental Studies, Nagoya University, Japan

Yellow River Basin (YRB) has witnessed severe water resources shortage and caused extensive economic losses due to climate change and fast socio-economic development during the past several decades. The average water resources in YRB is around $580 \times 10^8 \text{ m}^3$, of which around $300 \times 10^8 \text{ m}^3$ was allocated to agriculture sector according to the past 10 years water allocation practice. Agriculture sector consumes the largest portion of the available water resources in YRB and crop irrigation water requirement is the most important part in agriculture water demands.

Climate Change has heavy impact on agriculture water demand in various aspects. Differing from industry and domestic sectors, agriculture water demand is heavily influenced by climate components, such as precipitation, radiation, temperature, humidity, wind, and consequently evapotranspiration. According to past the instrument weather records, the precipitation of most areas in YRB decreased from 0.1% to 0.6% annually. Instead, the temperature increased from 0.1% to 0.9%. Results General Circulation Models (GCMs) show similar climate changing trend in the coming 30 to 50 years in YRB.

The major objective of this study is to assess the impact of climate change on crop irrigation water requirement in YRB. The objective could be achieved by the following key sub-objectives: 1) Establishing climate change scenarios from GCM (HADCM3) output results, 2) Calibrating empirical models for calculating ET in YRB, and 3) Assessing impact of climate change on irrigation water requirement with crop water requirement models.