

# Climatic effect of irrigation over the Yellow River basin

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Irrigation in Hetao (middle section of Yellow River). Credit: Baidu Baike

As a sensitive region of global climate change, the Yellow River basin, situated in arid and semiarid regions, also plays an important role in food production. However, using water resources in the Yellow River basin is challenging due to the drought and increasing water consumption.

"Large-scale agricultural irrigation is an important process in the utilization of [water resources](#) in Yellow River basin," said Dr. CHEN Liang, an assistant researcher in the Institute of Atmospheric Physics and also the first author of a paper recently published in *Atmospheric and Oceanic Science Letters*.

"The agricultural irrigation affects the regional climate mainly through changing the surface water process. There have been studies on climate change effects incurred by the change of soil moisture, but the role of irrigation has not been sufficiently depicted in those studies," he said.

CHEN and his team developed a new irrigation scheme based on the Noah land surface model, and then coupled it with the Weather Research and Forecasting regional climate model. Two simulations (with and without irrigation) were conducted over the Yellow River basin for the period April to October 2000-2010.

The results indicated that when irrigation was induced, the mean surface air temperature decreased, and there was a corresponding increase (decrease) in latent (sensible) heat flux over the irrigated areas. The cooling effect was consistent with the changes in evapotranspiration and heat fluxes due to irrigation. Agriculture irrigation leads to a greater probability of cloud formation, which then impacted the spatial distribution of surface air temperature and precipitation.

"These studies provide scientific advice for sustainable [water](#) use development in the Yellow River basin," said CHEN. "In the future, we would like to use different irrigation methods to assess the impact of [irrigation](#) on [regional climate](#) and hydrologic cycles."

**More information:** Liang CHEN et al, Simulation of the regional climatic effect of irrigation over the Yellow River Basin, *Atmospheric and Oceanic Science Letters* (2017). [DOI](#):

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