

[PAPER/POSTER TITLE]

AIR QUALITY CO-BENEFIT OF CLIMATE MITIGATION IN 30 PROVINCES OF CHINA

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This study was supported by the Environmental Research and Technology Development Fund (S-12-2) of the Ministry of the Environment, Government of Japan

Overview

Climate mitigation can reduce greenhouse gas emission and air pollutants emission, which can bring co-benefit to the air quality, health and macroeconomy. This study evaluates the health and economic benefit of air pollutants emissions reduction from climate mitigation at 30 provinces in China to 2050.

Methods

We developed an integrated approach that combines GAINS model from IIASA, a health assessment model, and a macro economic model (CGE model). This integrated approach can simulate PM_{2.5} and ozone concentration, and evaluate the health impact and economic benefit of climate mitigation in China in WEO2016_NPS and WEO2016_450 scenario from IEA.

Results

The climate mitigation can improve air quality significantly in China. We find that greenhouse gas mitigation avoids roughly 0.01 million air pollution-related premature death in 2030 and 0.03 million air pollution-related premature death per year in 2050. Climate mitigation saves 2.4 billion CNY in 2030 and 11.67 billion CNY in 2050 health expenditure. Using willingness to pay method, the value of statistical life is about 422.26 billion CNY in 2030 and 1687.92 billion CNY in 2050 in China. Air quality improvement brings 0.03% GDP benefit in 2030 and 0.06% GDP benefit in 2050 from increasing work time, including work day loss from morbidity and cumulative labor loss from premature death between 15 to 65 years. At the provincial level, Hubei, Henan, Shandong, Hebei, Tianjin, Hunan and Sichuan experience higher benefit than other provinces.

Conclusions

Climate mitigation not only reduces greenhouse gas emissions but also reduces air pollutant emission. Air quality improvement brings significant benefit for health and the economy in China. The provinces with higher GDP and higher population density have more benefit from climate mitigation, such as Shandong, Tianjin, Hebei, Hubei, Henan and Sichuan. The co-benefit may offset some of the climate mitigation cost in China. Climate mitigation in China can reduce greenhouse gas emission and air pollutants emission. The air quality improvement brings significant benefit to health and the economy. Developed provinces have higher benefit from climate mitigation.