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DIFFERENTIAL RESPONSES OF RICE YIELD TO CLIMATE CHANGE BETWEEN RECLAMATION AND GENERAL AGRICULTURAL AREAS IN THE HEILONGJIANG PROVINCE OF CHINA FROM 1951 TO 2011

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Abstract

Rice is one of the main staple foods in China and plays an extremely important role in ensuring the country's food security. Therefore, the impacts of climate change on rice yields have garnered considerable attention. In this study, meteorological and rice yield records during 1951-2011 from the Reclamation area (RA) and general agricultural area (GAA) in the Heilongjiang province of Northeast China were used to assess the impacts of climate change on rice yield trends using multiple regression models during the pre- (1951-1981) and post- (1982-2011) Household Responsibility System Reform (HRSR) periods. The results demonstrated an observable warming, but the precipitation and solar radiation changes were not statistically significant in the Heilongjiang province. The temperature during the growing season positively correlated with the rice yields in the RA and GAA over the past six decades. The rice yields increased by 4.69% in the RA and 6.85% in the GAA for each degree increase in the growing season (GS) minimum temperature from 1951 to 2011. The positive effects of warming on the rice yields decreased significantly in the RA from the pre-HRSR (1951-1981) to the post-HRSR (1982-2011) period but increased in the GAA from the pre-HRSR to the post-HRSR period. This result indicated that the increased RA rice yields may benefit more from non-climatic factors than GAA yields. Our findings uncover the potential impacts of climate change on rice production under different crop production modes and thus provide evidence-based suggestions for government policy on adaptive strategies.

Key words: China, climate change, general agricultural area (GAA), Household Responsibility System Reform (HRSR), Reclamation area (RA), rice yields

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