

## **Analysis of Maize Yield under Climate Change, Adaptations in Varieties and Planting Date in Northeast China in Recent Thirty Years**

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**Abstract :** The Northeast China (NEC) was the most important agriculture areas and known as the Golden-Maize-Belt. Based on observed crop data and crop model, we design four simulating experiments and separate relative impacts and contribution under climate change, planting date shift, and varieties change as well change of varieties and planting date. Without planting date and varieties change, maize yields had no significant change trend at Hailun station located in the north of NEC, and presented significant decrease by 0.2-0.4 t/10a at two stations, which located in the middle and the south of NEC. With planting date change, yields showed a significant increase by 0.09 - 0.47 t/10a. With varieties change, maize yields had significant increase by 1.8~ 1.9 t/10a at Hailun and Huadian stations, but a non-significant and low increase by 0.2t /10a at Benxi located in the south of NEC. With change of varieties and planting date, yields presented a significant increasing by 0.53-2.0 t/10a. Their contribution to yields was -25% ~ -55% for climate change, 15% ~ 35% for planting date change, and 20% ~110% for varieties change as well 30% ~135% for varieties with planting date shift. It found that change in varieties and planting date were highest yields and were responsible for significant increases in maize yields, varieties was secondly, and planting date was thirdly. It found that adaptation in varieties and planting date greatly improved maize yields, and increased yields annual variability. The increase of contribution with planting date and varieties change in 2000s was lower than in 1990s. Yields with the varieties change and yields with planting date and varieties change all showed a decreasing trend at Huadian and Benxi since 2002 or so. It indicated that maize yields increasing trend stagnated in the middle and south of NEC, and continued in the north of NEC.

**Keywords :** climate change, maize yields, varieties, planting date, impacts

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