

Spatiotemporal changes of cropping structure in China during 1980–2011

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Abstract: Understanding the spatial and temporal variations of cropping systems is very important for agricultural policymaking and food security assessment, and can provide a basis for national policies regarding cropping systems adjustment and agricultural adaptation to climate change. With rapid development of society and the economy, China's cropping structure has profoundly changed since the reform and opening up in 1978, but there has been no systematic investigation of the pattern, process and characteristics of these changes. In view of this, a crop area database for China was acquired and compiled at the county level for the period 1980–2011, and linear regression and spatial analysis were employed to investigate the cropping structure type and cropping proportion changes at the national level. This research had three main findings: (1) China's cropping structure has undergone significant changes since 2002; the richness of cropping structure types has increased significantly and a diversified-type structure has gradually replaced the single types. The single-crop types—dominated by rice, wheat or maize—declined, affected by the combination of these three major food crops in mixed plantings and conversion of some of their planting area to other crops. (2) In the top 10 types, 82.7% of the county-level cropping structure was rice, wheat, maize and their combinations in 1980; however, this proportion decreased to 50.7% in 2011, indicating an adjustment period of China's cropping structure. Spatial analysis showed that 63.8% of China's counties adjusted their cropping structure, with the general change toward reducing the main food types and increasing fruits and vegetables during 1980–2011. (3) At the national level, the grain-planting pattern dominated by rice shifted to coexistence of rice, wheat and maize during this period. There were significant decreasing trends for 47% of rice, 61% of wheat and 29.6% of maize cropping counties. The pattern of maize cropping had the most significant change, with the maize proportion decreasing in the zone from north-eastern to southwestern China during this period. Cities and their surroundings were hotspots for cropping structural adjustment. Urbanization has significantly changed cropping structure, with most of these regions showing rapid increases in the proportion of fruit and vegetables.

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