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"Bridging the gap between increasing knowledge and decreasing resources"

How to Reduce Greenhouse Gas Emissions from Crop Production in the North China Plain – A Farmer's Perspective Analysis

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Abstract

Input intensification has for a long time been China's strategy to increase crop production and satisfy its people's growing food demand. However, in recent years excessive input levels have been reached, resulting in an ever increasing emission of greenhouse gases (GHG) by China's agricultural sector and increasing cost of crop production for farmers. To be able to develop suitable strategies to decrease both GHG emissions and costs of crop production a life cycle assessment approach was applied on a primary farm data set of 65 wheat and maize producing households from Hebei province in northern China. On average 4107 and 3185 kg CO_2-equivalent GHG-emissions per hectare were released into the atmosphere from wheat and maize production, respectively. The life cycle cost (LCC) accounted for 1176 US$ per hectare in wheat and 1190 US$ per hectare in maize production. Distinct farming practices of the 65 households caused a wide range in the environmental and economic LCA results. Stepwise multiple linear regression (SMLR) was adopted to identify input factors of production systems which explain the variances on environmental and economic performance of crop production among sampled households. The two factors nitrogen (N) input and electricity used for irrigation explained 78 % and 80 % of the difference in GHG emission in wheat and maize production, respectively. Electricity for irrigation and labour were the most significant factors explaining the differences on LCC. To improve crop production with regard to GWP and economic costs it is therefore recommended focusing on N input, electricity for irrigation and labour as key target areas.

Keywords: China, crop production, greenhouse gas emission, life cycle assessment, regression analysis

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