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Climate Change
Factsheet
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Intensification Has Reduced Carbon Footprint of U.S. Crop Production

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In the scientific community, it is widely accepted that the global climate is changing, and that human activities are a principal cause of this. Many human activities produce "greenhouse gases". These transparent gases are present at trace concentrations in the Earth's lower atmosphere. However, they have the unique quality of trapping heat there. This trapped heat is driving many of the recent changes in the Earth's climate, including rising global temperatures. See the UK Extension publication, *Agriculture's Contributions to Climate Change: Not the "Top Dog"* (http://bit.ly/LrXozR) for more information on sources of greenhouse gases in the U.S.

Policymakers worldwide are seeking ways to reduce emissions of greenhouse gases, so that we can reduce the disruptive impacts of climate change on water supplies, food production, human health, and extreme weather. Since carbon dioxide is the most important greenhouse gas, policymakers often speak of reducing our "carbon footprint".

Agricultural producers sometimes feel blamed for climate change, especially in the media. However, U.S. crop producers might be pleasantly surprised to learn that recent research in the world's top science journals tells a different story.

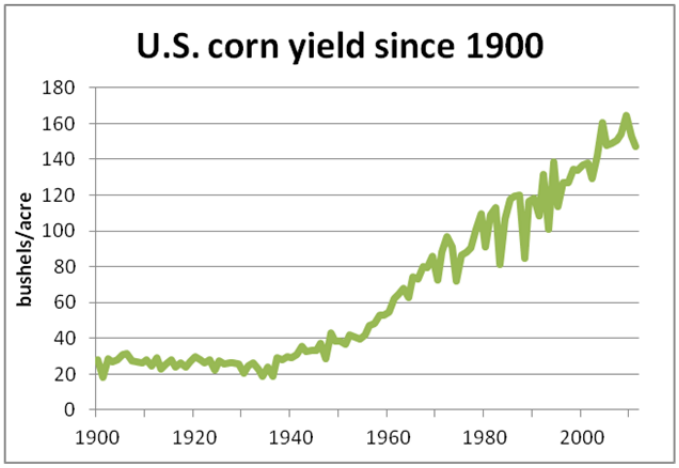

Figure 1. Trend-line for yield of field corn in the U.S. since 1900 (data source http://quickstats.nass.usda.gov/).

Recently, five prestigious research papers emphasized how crop intensification is an important way to reduce the carbon footprint of agriculture. A key point I take away from these papers is rather simple: ***For every acre of land that we cultivate, we should grow as much food as is reasonably possible, with as little carbon emission as possible.***

U.S. producers excel at crop intensification through agronomic/horticultural improvement. For example, astonishing increases in grain yields have been achieved in the U.S., yet yields continue to rise (Fig. 1). Remarkable yield increases have been achieved in horticultural crops, as well (Fig. 2).

Our high-production agriculture stands in contrast to the situation in many developing countries, where crop yields are quite a bit lower. In such countries, the path to producing more food often is to bring more land under cultivation, which can increase the carbon footprint of food production by as much as

three times. Pound-for-pound of food produced, U.S. farmers have significantly reduced the carbon footprint of food production.

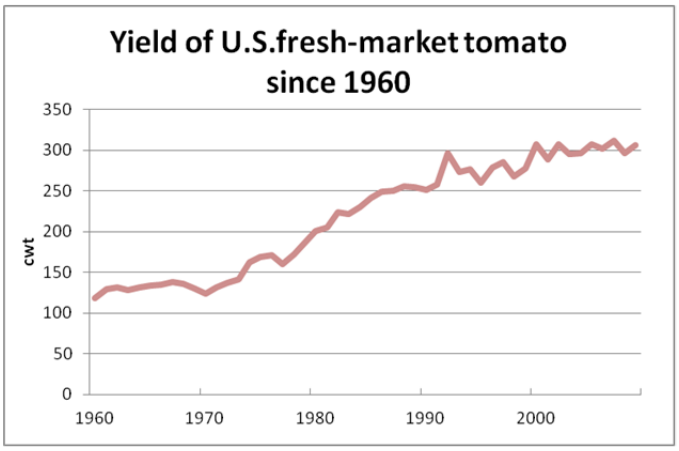

Figure 2. Trend-line for yield of fresh-market tomato since 1960 (data source http://quickstats.nass.usda.gov/).

While U.S. agriculture has served us very well over the years in providing abundant, safe food, we can do even more to reduce the carbon footprint (Extension agents can help with this).

U.S. producers would probably agree that the ultimate goal is ***sustainable intensification***: keeping the yield gains made in intensification while continuing to improve the sustainability of our agricultural production systems. But it is also worth recognizing that the success U.S. producers have had in intensifying crop production has helped to reduce climate change.

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