

# Organic agriculture and food security

Mark W. Rosegrant, Timothy B. Sulser, and Niels Halberg

**Abstract – Modelling the impacts of organic production up-scaled to regional and global levels gives an initial quantification of the potential extent of changes that large-scale conversion might induce. Optimistic estimates of change with respect to organic yield potential lead to modest impacts on global commodity prices, production, and trade. Conversion in high-input regions in Europe and North America to certified organic decreases production and increases commodity prices. Hunger in this scenario slightly worsens. Transition of low-input areas in Sub-Saharan Africa to non-certified organic leads to increased production and decreased prices. Food security improves slightly in this scenario. The switch for low-input regions helps decrease trade dependency in some commodities. Achievement of productivity levels in these scenarios is dependent on many factors that introduce a significant amount of uncertainty in the results. The extent of these impacts can be improved if concerted effort in research and development for yield and productivity enhancement is supported.<sup>1</sup>**

## INTRODUCTION

Organic agriculture is on the rise across the globe. Whether to meet increasing consumer demand for certified products in developed markets or as a low-input alternative in resource poor regions, organic production is becoming more prevalent (Dimitri and Oberholtzer, 2005; Yusefi, 2006). Wal-Mart, Ahold, and Carrefour, along with many other grocery suppliers are setting company policies to increase their organic offerings to mainstream consumers who have a rising interest in these products. At the same time, many projects in developing regions—from India to China, Brazil to Uganda—employing non-certified organic production methods are enjoying some measures of success also (Scialabba and Hattam, 2002; IFAD, 2005).

Food insecurity remains a pervasive issue around the globe. More than 800 million people are suffering from hunger today and making serious improvements in this issue moving into the future is one of the greatest challenges facing the global community (FAO, 2005).

What are the potential impacts of the rise of organic agriculture on global markets and world hunger? For the two main strains of organic production, oriented either towards market-driven, certified

production in developed regions or non-certified, low-input alternatives for subsistence, will there be considerable shifts in agricultural production and trade and, in turn, hunger and poverty? In this research using a well-established model of global agricultural production and trade, we have taken a first look at quantifying the potential impacts of global organic production on agricultural markets and global hunger.

## APPROACH

### *Up-scaling localized results*

Focusing on the two main types of organic production on the rise, the basic experiment in this research was to up-scale the localized experience of organic producers to regional and global levels and implement those changes in a leading model for projections of global agricultural production and trade.

We developed two scenario themes corresponding to large-scale conversion of major commodity production practices to the two main types of organic agriculture on the rise today: (1) roughly 50% of production in Europe and North America (EU-NA) are transitioned to certified organic and (2) 50% of production in Sub-Saharan Africa (SSA) is converted to non-certified, low-input organic. These are exploratory scenarios to look at potential impacts under simplified assumptions. More research on the broad potential of organic agriculture is needed to specify rigorous scenarios. In general, organic conversion in high-input regions represents a cut in productivity while low-resource areas see improvements due to adoption. Halberg et al. (2006) describe these scenarios in detail. We present here the most conservative versions of these scenarios.

### *The IMPACT model*

The International Model for Policy Analysis of Agricultural Commodities and Trade (IMPACT) developed at the International Food Policy Research Institute is a leading model for examining alternative futures for global food supply, demand, trade, prices, and food security. The model covers 36 countries and regions (which account for virtually all of world food production and consumption), and 32 commodities, including all cereals, soybeans, roots and tubers, meats, milk, and many other food products in a partial equilibrium framework. It is specified as a set of country-level supply and demand equations where each country model is linked to the rest of the world through trade. Full details of the model are found in Rosegrant et al. (2005).

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Mark W. Rosegrant is with the Environment and Production Technology Division, International Food Policy Research Institute, 2033 K Street, NW, Washington, DC, 20006, USA, (m.rosegrant@cgiar.org).

Timothy B. Sulser is with the Environment and Production Technology Division, International Food Policy Research Institute, 2033 K Street, NW, Washington, DC, 20006, USA, (t.sulser@cgiar.org).

Niels Halberg is with the Danish Institute of Agricultural Sciences, Department of Agroecology, DK-8830 Tjele, Denmark (niels.halberg@agrsci.dk).

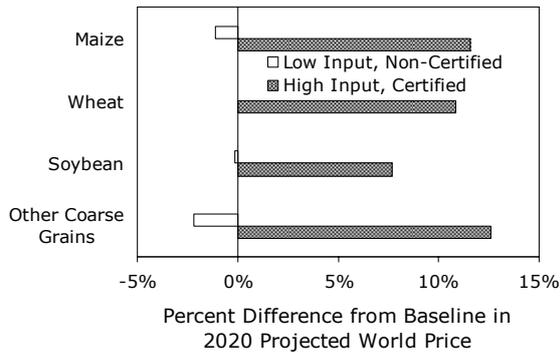


Figure 1. IMPACT projections of scenario differences from baseline in world prices for major commodities in 2020.

#### SCENARIO IMPACTS & IMPLICATIONS

Global production of commodities declines due to yield cuts in the certified scenario because of the dominance of EU-NA in global markets. This causes an increase in global prices for major commodities by 8-12%(Fig. 1).

Local production of food is stimulated in SSA in the non-certified scenario due to enhanced productivity. This is particularly true for items regionally important as both food and fodder (most roots and tubers, maize, and other coarse grains) that see 4-6% increase in total production in SSA. Because SSA is not a large supplier of commodities to global markets, price impacts are relatively muted to small declines between 0-2% (Fig. 1). This scenario results in a reduction in trade dependency for SSA in some commodities.

The impact of these scenarios on food security can be seen via changes malnutrition in the developing world. Due to global decrease in production in the certified scenario, IMPACT projects a slight increase (0.3-0.7%) in the prevalence of malnourished children in the developing world. The stimulation of local food production in the non-certified scenario improves the food security situation by reducing the number of malnourished children by 0.8-1% (Fig. 2). These are both modest impacts.

The extent of these impacts depends on how much the levels of organic productivity specified here can be achieved, which may prove a challenge. Improvements are possible only if a concerted effort in research and development for yield and productivity enhancement is supported.

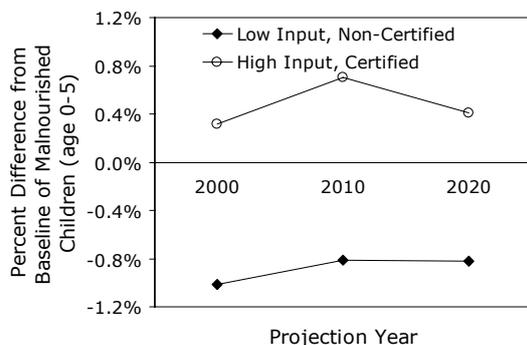


Figure 2. IMPACT projections of modelled scenarios compared with baseline on the prevalence of malnourishment of children (age 0-5) in the developing world.

#### ACKNOWLEDGEMENT

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