FAPRI-ISU 2011 Outlook Projects Continued Strong Commodity Markets, Expansion of Global Fertilizer Use, and Rising Worldwide Greenhouse Gas Emissions

Despite tepid economic recovery in many developed economies, solid economic performance in developing and emerging economies provides a bright spot for a continuing worldwide economic recovery. China and India posted growth rates of 10.3% and 8.2% in 2010, respectively.

An economic turnaround, continuing population growth and urbanization, and ever-expanding biofuel mandates are key drivers in the strength of world commodity markets over the outlook's 15-year projection. The United States is projected to import sugarcane ethanol to meet its advanced ethanol mandates at a level of 3.4 billion gallons by 2025, keeping the prices of world ethanol and sugar strong at $2.50 per gallon and 23.2¢ per pound, respectively. Per capita meat demand increases by 9.4 kilograms, a 1.2% annual increase. Demand for corn for biofuel and animal feed keeps corn prices above $191 per metric ton in 2025. Food demand and industrial biodiesel demand support an upward trend in vegetable oil prices. By the end of the projection period cropland expands by 25 million hectares, representing an increase of 3%.

This year, FAPRI-ISU developed and implemented a fertilizer model, a cellulosic ethanol model, and improved its greenhouse gas (GHG) emission accounting model. The new models are described under "Special Features." This allows FAPRI-ISU to include in its outlook projections world fertilizer use by nutrient, by country, by commodity, and by year. Also, projections of GHG emissions by source, by country, and by year are reported.

World fertilizer use in 2011/12 will reach 179 mmt, composed of 104 mmt of nitrogen fertilizers, 42 mmt of phosphorous, and 33 mmt of potassium. This increase of 2.29% relative to the 2010/11 crop season reflects the expansion of the world's cropland by 1.60% and also the more intensive use of fertilizers at the world level in most commodities (with the exception of soybeans, sorghum, sunflower, and sugarcane). All commodities except soybeans experience an increase in fertilizer consumption from 2010/11 to 2011/12. China, India, the U.S., and the EU-27 countries account for more than two-thirds (65%) of the world's fertilizer consumption in agriculture. Fertilizer use in the U.S. increases by 2.96%, dominated by higher use of fertilizers in corn, wheat, and sorghum because of expanded area and fertilizer application rates.

Global emissions from agricultural production rise by 13.6% over the projection period. These increases are mainly due to an increase in crop area and the associated emissions from agricultural soil management. Also, the increase in per capita meat demand leads to an increase in emissions from livestock products (especially enteric fermentation) but at levels still lower than emissions from cropland. The presence or absence of idle cropland is a determining factor in the extent to which the rising pressure from food, feed, and fuel demand translates into carbon emissions.

Finally, our model is able to estimate a GHG emission efficiency (GHGee) that summarizes information about market outcome, productivity improvement, and GHG emissions into a single metric for a particular country in terms of aggregate value of agricultural production per ton of GHG emission. Higher GHGee values suggest a more efficient GHG emission performance. GHGee estimates in the figure below for selected countries in 2010 show wide differentials between countries, with the EU and the U.S. having a high value of agricultural production per

ton of CO_2-equivalent emitted at $579 and $571, respectively. This is followed by Argentina at $349, India at $329, China at $324, and Brazil at $212. Productivity improvement enables these countries to gain a 9% to 21% increase in their GHGee over the projection period.