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The Energy Basis of Food Security

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Title: The Energy Basis of Food Security

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Abstract:

Food security includes elements of food availability, access and use. In the complex system that is our global food system, many variables influence an individual’s ability to achieve food security, but given that many people access food through economic markets food prices have come to be a vital component of food security. Food prices are influenced by many factors, but among these are fuel prices. For the last decade trends in food prices have tracked those of fuel prices consistently, and just as fuel prices have generally increased since 2005 food prices have done the same. Rising and increasingly volatile food prices have hampered the access to food for millions of people worldwide, and led to food riots and social unrest the world over.

Fuel prices are important drivers of food prices because food production in our global, industrial food system is incredibly energy intensive. Data from the United States Department of Agriculture suggests that in the United States it requires 15-20 kilocalories of energy to deliver a single kilocalorie of consumed food once losses due to wastage and spoilage are accounted for. Most people assume that most energy is ‘spent’ in agriculture and long distance transportation of food, but this is grossly inaccurate. In 2002 in the United States, agriculture only used 1.6 kilocalories of energy for each kilocalorie of food consumed, while long-distance transport used less than 0.5 kilocalories per kilocalorie of food consumed. Most energy used by the US food system is used by food processing companies, food distributors at the wholesale and retail stages to power buildings, and within households. Other countries’ food systems are somewhat less energy intensive, but as industrial food production methods and a taste for heavily processed food spread around the globe the energy intensity common to the US food system will become the norm rather than the exception.

In the United States and increasingly around the world, the energy needed to produce, process, distribute, store and prepare food comes overwhelmingly from fossil fuels such as coal, oil and natural gas. These primary energy resources are not renewable, and evidence is mounting that limits in supply growth may emerge within the next decade or two. If this occurs, reduced supplies of fossil fuel-derived energy will drive energy prices higher, and if food systems remain as energy intensive as they currently are these rising fuel prices will trickle through to show up in rising and more volatile prices of food. Food prices that rise ever further could increase the strain on our global food system beyond a tipping point, and the end result of surpassing that tipping point is both challenging and frightening to envision.

Every stage within food systems must be explored for potential reductions in energy intensity, including production, processing, distribution and household use. All foods are not identical with respect to their energy intensities, so as researchers illuminate which types of food tend to be the most energy intensive consumers’ eating patterns can shift to adopt those that are naturally less energy intensive to produce and consume. Within specific types of food, management practices used in production, processing and distribution stages vary widely in their energy intensity, and best management practices can be developed, perhaps along with food labels that parallel the US Environmental Protection Agency’s Energy Star label, to educate consumers at the point of sale so that foods produced more efficiently are favored over those that require higher energy inputs. The challenge of the 21st century is to sever the link between food prices and fuel prices via radical efficiency and conservation measures implemented throughout food systems.