Recent civil unrest in the Middle East and North Africa (MENA) has threatened oil and gas production and exports in specific countries, raising concerns about a broader regional conflict that could affect energy exports from other MENA nations. This has helped drive a global surge in fuel prices, and in turn food prices, prompting worry at the International Monetary Fund that if the spike in food prices continues, hundreds of thousands of people could be at risk of starvation and malnutrition. Such an outcome would not only undermine development gains made over the past decade in MENA, but could further fuel social unrest in the region and potentially lead to war.

This project seeks to identify the energy-exporting MENA countries whose food staples are at most risk to insecurity. We will then identify and quantify the supply chains for these staples to determine their structure, size and scope, the players involved in them, and the drivers governing their operation. With this understanding, specific risks to the supply chains can be determined and explored in scenario analyses, allowing for the development and prioritization of defensive and/or proactive strategies to deal with problems arising from food shortages in these countries.

The population of MENA countries tripled over the past 50 years to over 300 million and is projected to continue to increase at 1.7% per year. This increase in food demand coupled with rising food prices has created significant instability in the region. Another factor creating volatility is competition for food and water. Arable and agricultural lands are limited in most of the MENA nations as is fresh water access.

Threats to MENA may potentially be far reaching, including multi-national wars, establishment of terrorist strongholds, massive numbers of refugees, shortages in world humanitarian aid and shortages of energy supplies. Therefore, we will identify the energy-exporting MENA countries whose food staples are at most risk to insecurity. We will then identify and quantify the supply chains for these staples. Our approach will also provide a framework for conducting similar security analyses involving food and other types of supply chains elsewhere in the world.

At this stage of the project we are conducting an extensive literature review, compiling data, analyzing the database and loading data into GIS for geographic analysis and mapping.

A focus was placed on obtaining the most accurate and recent data for each country in the MENA region. Additionally, time series data was explored for trend analysis to aid development of a ranking scheme. An example of socioeconomic trends in Syria can be seen here (Figure 3). Use of Diva-GIS, ESRI, WAGDA, and WRI to explore GIS data aids in the spatial analysis of global value chairs for the region as well commodity flow diagrams, such as those pictured below (Figure 4).

Database and GIS development will continue for MENA countries, allowing for spatial analysis of data and effective ranking schemes. Global value chain models will be created for each country, focusing on the organizations involved, domestic infrastructure, global relations, trading and potential "leverage points" and/or bottlenecks in the chain. The bottlenecks will be studied further and a strategic risk analysis will be completed.

The risk analysis will include development of both qualitative and quantitative metrics and will emphasize food imports, energy, and security (Figure 8). These risks will be modeled in the context of the global value chain, indicating the most vulnerable and dynamic parts of the chains and the organizations/countries most influenced. The modeling framework created will be applicable to other countries and regions around the globe that may face similar food and energy security issues in the future.