Chinese Drought, Wheat, and the Egyptian Uprising: How a Localized Hazard Became Globalized
By Troy Sternberg. Originally published in The Arab Spring and Climate Change http://climateandsecurity.files.wordpress.com/2012/04/climatechangearabspring-ccs-cap-stimson.pdf

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Chinese drought, global wheat prices and revolution in Egypt appear unrelated yet became linked by a series of events in winter 2011. As the world's attention focused on protests in Tahrir Square political and socio-economic motives were discussed while significant indirect causes of the Arab Spring received little mention. In what could be called 'hazard globalization' a one-in-a-hundred year winter drought in China contributed to global wheat shortages and skyrocketing bread prices in Egypt, the world's largest wheat importer. Government legitimacy and civic society were upset by protests focused on poverty, bread and political discontent. A tale of climate disaster, market forces and authoritarian regimes helps to unravel the complexity surrounding public revolt in the Middle East. This article examines the link between natural hazards, food security and political stability in two developing countries and reflects on the links between climate events and social processes.

In Egypt citizen protests represented political and economic dissatisfaction, including the high cost of food - recall the days of waving bread as a protest symbol. Bread provides one third of the caloric intake in Egypt, a country where 38% of income is spent on food. Thus the doubling of global wheat prices (from $157/metric ton in June 2010 to $326/metric ton in February 2011) had significant impact on food supply and availability. The world wheat harvest was affected by changing weather patterns in 2010 that led to supply shortages. Climate factors curtailed production in Russia (down 32.7%) and Ukraine (down 19.3%) due to drought, heat waves and fires whilst cold and rain in Canada (down 13.7%) and excessive rain in Australia (down 8.7%) resulted in reduced global supply and major price increases (2). At the same time China's wheat production fell 0.5% while consumption increased 1.68%.

China, the largest wheat producer and consumer in the world, was hit by drought in the growing region of eastern China in November, 2010. Fears of potential crop failure and the spectre of historical famines, most recently in 1958-61, led the government to purchase wheat on the international market. A fraction (6-18%) of annual wheat production is traded across borders; thus any decrease in world supply contributes to a sharp rise in wheat prices and serious economic impact in countries such as Egypt, the biggest wheat importer in the world (9.8 million

metric tons in 2010).

Climate conditions created market pressure on international wheat prices; these were further exacerbated by a lack of precipitation in China. This threatened the 2010-2011 winter wheat crop that accounts for 22% of the country's harvest. Examination of the drought record at 12 sites in China's eastern wheat belt (including Shandong, Henan and Anhui Provinces – population >300 million) using the Standard Precipitation Index (SPI) (3) tracks the dramatic extenuation of drought. With data from the China Meteorological Administration the SPI was used to calculate drought on a monthly timescale: findings documented extreme drought across the region reaching 100-year event levels (Table 1). Drought severity affected domestic and agricultural water supply, closed parts of the Yangtze River to shipping, dried reservoirs and reduced hydropower generation, prompting a strong government response to the disaster in China. The rarity of the event contributed to its potentially significant agricultural and socio-economic impact and prompted dramatic photographs of Chinese Premier Wen Ji Bao watering the wheat fields with a garden hose and military rocket launchers 'shooting the clouds' to bring rain.

Table 1. Drought at 1 to 6 month timescales.
SPI drought values:

(Table currently missing)

Note the extent of drought at all sites throughout the region.

Discussion
The 2011 extreme drought in the Chinese wheat-growing region exemplifies how a regional climate event can have impact at regional and global scales. Potential wheat crop failure contributed to a series of government actions that influenced economic and political conditions in other regions of the world. China's drought mitigation effort, including $1.9 billion in new water infrastructure and the purchase of wheat from external markets, contributed to the skyrocketing cost of wheat for importing countries. This is particularly pertinent to Egypt, a country that spends 3% of GDP on wheat subsidies and has a recent history of the 1977 'bread intifada' that killed 77 people and bread riots 2008. Higher wheat prices affected the cost and availability of bread in Egypt, influenced citizen protests and indirectly led to regime change in Egypt. The chain of events and actions highlight how government effectiveness, or lack thereof, in two autocratic regimes resulted in opposite outcomes. This reflects how in today's interconnected

world natural hazards can influence economic (price), political (government stability) and human (food supply) systems on an international scale.

a. Climate
We have reached the point where a regional climate event can have a global extent. Impact is no longer limited to physical damage at a disaster's epicentre. Rather, it can be social and economic as hazards affectglobalized systems. Recent disasters, including tsunamis in Asia and volcanic eruptions in Iceland, reflect the cross-border affect of natural hazards. Hydro-meteorological disasters predominate today and occur at a greater rate than geo-physical events. Future shifts in climate patterns (cooling or warming), seasonality (fluctuation in precipitation/temperature patterns and occurrence), intensity and volatility can have a significant impact on the environment, agriculture, water supply and livelihoods.

In this study a series of droughts and rain episodes in 2010-11 had economic and then political effects thousands of kilometres away. Such unfolding progressions are more commonly evaluated when events affect oil prices, famine, migration or terrorism (conflict, the Iraq war, drought in the Horn of Africa) but similar scenarios are likely to be repeated as climate volatility, expanding populations and competition for resources disturb global markets and possibly national stability.

b. Geography
The geography of the two countries contributes to their dependence on climate factors as both Egypt and China are predominately arid nations. In Egypt this limits the ability to expand grain production to satisfy the requirements of an expanding population. Throughout the Nile region there is competition for farm land and water between urban centres and agrarian interests as well as between high value exports crops (flowers, mangoes) and staple foods such as wheat. Failing to meet domestic demand leaves the country exposed to external forces (climate, economics) and reliant on changing international commodity markets. In China western and northern regions are predominately drylands; the country's large population and agricultural production is centred in the eastern and southern regions. Currently this area has enough land, water and technology for domestic wheat production to be self-sufficient in most years. Yet water resources are concentrated in the south – strong finances and continued government effort is required to develop agricultural resources and mitigate hazards. In the two countries governments have attempted to balance agriculture, finances and food supply with public needs - in 2011 China succeeded at whilst the former Egyptian regime failed.

c. Future implications
The effect of climatological hazards on wheat production in 2010-11 is a striking case of how

hazards, agriculture, economics and politics can become intricately linked. As protests spread across North Africa and the Middle East it is interesting to consider the world's major wheat importing countries per capita (Table 2). One instantly notes that the top nine importers are all in the Middle East; seven had political protests resulting in civilian deaths in 2011. Countries in the region experiencing political unrest spend >35% of their household budget on food supplies. This contrasts starkly with developed countries such, as the US and UK, that spend