

CMI REPORT

R 2014: 1

Food security and social conflict

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January 2014

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Commissioned by: The Research Council of Norway on behalf of the R. Norwegian Ministry of Agriculture and Food.

CMI Project number: 13057

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Summary

Following rising food prices violent ‘food riots’ took place in about 40 countries around the globe in 2007-2008. And at the end of 2010 and the start of 2011, as protests erupted first in Tunisia and then in Algeria, Bahrain, Yemen, Jordan and Egypt, the price of food was widely seen as a significant factor underlying unrest and the train of events of the Arab Spring. These developments have led to renewed interest among both scholars and policymakers in the role of food insecurity and food-price related grievances as catalysts for conflict.

This report, which is based on a desk review of current literature, discusses the relationship between failing food security and social unrest. It also provides a summary of developments related to global and local food security that have made the issue increasingly relevant and important. This includes an analysis of factors behind the food crisis such as

- the new challenges presented by changing consumption patterns in developing countries
- the rapidly growing expansion of biofuel production and competition for agricultural production capacity
- the issue of food waste
- the role of markets and the international food trade
- the prospects and preconditions for further agricultural intensification and growth
- the problems related to ‘land grabs’ and land dispossessions in many developing countries.

Based on the review of literature as well as analysis of case material from the Middle East (Arab Spring) and Sahel (Sudan), one important conclusion to be drawn is that

- civil conflict is rarely grounded in single grievances or simple causes but commonly represents the accumulation of a complex set of interrelated factors.

A growing body of research makes both direct and indirect links between food insecurity and conflict – as proxied by environmental scarcity or access to water resources.

- Food insecurity can be a motivation for political mobilization as well as a risk multiplier, but the links are context-specific: they are contingent on existing political institutions, levels of economic development, social safety nets and demographic pressures; and the effects are played out in interaction with other conflict-promoting factors.

These general conclusions correspond to conclusions drawn in the literature with regard to the relationship between climate change and conflict.

1. Introduction

Food security is still a major and persistent concern in many developing countries. Food security challenges are fundamentally linked to poverty and the distribution of food security problems closely follow the distribution of poverty. There has been tremendous progress, particularly in East Asia, with respect to poverty reduction, but there is still approximately 1.4 billion people living on less than USD 1.25 a day (defined as the indicator of extreme poverty) and close to 1 billion people suffering from hunger. At least 70% of the very poor people in the world live in the rural areas. Although there is great variation in the livelihoods of the poor across regions and countries, over 80% of the rural population is engaged in agriculture, with the poorest households being most dependent on farming and agricultural labour. But while the rural sector is home to the largest poverty and food security problems, the key to improvements are also found here. Growth in agriculture usually generates the greatest improvements for the poorest people – and particularly in the poorest, most agriculture-based economies. One study shows, for example, that a 1 per cent growth in GDP originating in agriculture increases the expenditures of the poorest 30 per cent of the population at least 2.5 times as much as growth originating in the rest of the economy¹. Another study shows that agricultural growth is up to 3.2 times better at reducing US\$1/day poverty than growth in the non-agriculture sectors². Despite mounting evidence to support these arguments³, agriculture has received little attention in most developing countries in the past few decades. Even in many of the poorest countries agricultural development has been neglected. Equally, agriculture has received limited interest from the international development community.

The vulnerable and exposed food security situation of the poor, in particular, was starkly revealed when world prices of common food staples like wheat, maize and rice suddenly tripled between 2007 and 2008. The prices dropped the year after, but in 2010 they were climbing again, and since 2011 global food prices have **been** back at the level they reached in 2008⁴. The food crisis pushed the number of hungry people in the world back up towards one billion, temporarily reversing the progress in reducing world hunger. The price increases hit the poorest parts of the population particularly hard, since they spend a proportionally high part of their income on food.

Following the food price spike, food protests, sometimes developing into violent ‘food riots’, took place in about 40 countries around the globe. And at the end of 2010 and the start of 2011, as protests erupted first in Tunisia and then in Algeria, Bahrain, Yemen, Jordan and Egypt, the price of food was widely seen as a significant factor underlying unrest and the train of events of the Arab Spring. These developments have led to renewed interest among both scholars and policymakers in the role of food insecurity and food-price related grievances as catalysts for conflict.

This report, which is based on a desk review of current literature, discusses the relationship between failing food security and social unrest. While the evidence that conflict often causes food insecurity is well established, the focus here is on the extent to which food insecurity causes conflict. While this

¹ Ligon, E., and E. Sadoulet: Estimating the effects of aggregate agricultural growth on the distribution of expenditures. Background paper for the World Bank World Development Report 2008: Agriculture for development. Available at: <http://go.worldbank.org/GLF6HRYFI0>

² Christiansen, L., L. Demery, and J. Kuhl: The (evolving) role of agriculture in poverty reduction: An empirical perspective. Working Paper 2010/36, United Nations University – World Institute for Development Economics Research, Helsinki (2010)

³ Both studies quoted in IFAD: New realities, new challenges: new opportunities for tomorrow’s generation. World Poverty Report, 2011. International Fund for Agricultural Development, Rome, 2010

⁴ The FAO Monthly Grain Price Index (using 2002-2004 as a base) reached 274.1 points in April 2008; the annual index for 2011 and 2012 has remained above 240 points.

seems intuitively reasonable, an examination of the research that has been carried out after the 2007/08 food crisis indicates that the relationship between food security and violent protest and conflict is both complex and ambiguous. There is, however, an emerging consensus that food insecurity often joins with other factors to worsen political instability. Food insecurity can be a motivation for political mobilization as well as a risk multiplier. The effects, however, are played out in interaction with other conflict-promoting factors, and other aspects of the political, economic and social environment affect the degree to which failing food security, and grievances more generally, are expressed violently.

Before discussing the issue of attribution any further, we will first sketch some developments that have made the issue increasingly relevant and important.

2. The many aspects of food security

Food security is notionally a simple enough concept⁵, but on closer examination it reveals several layers of complexity. The officially adopted definition of food security (since the 1996 World Food Summit) says that *food security exists when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.*

Hence, there are four important dimensions to food security, which must all be present. These are:

- *Availability of food*, which is determined by the level of food production, reserve stocks and net trade.
- *Access to food*, which concerns the ability of individuals and households to secure sufficient food. This is often a matter of household income, food markets and prices. Historically, famine and loss of food security has been a matter of access rather than availability.
- *Utilization of food*, which concerns the ability of individuals and households to maintain a healthy diet that meets human requirements in terms of nutrition, including energy and micro-nutrients.
- *Stability*, which concerns the stable presence over long periods of time of all the three dimensions listed above.

Availability of food is perhaps the most commonly considered dimension of food security, and until the 1972-74 global food crisis food security concerns were to a large extent limited to the question of whether or not there was enough food available in a region to meet the needs of the population there. Focus was on the supply side of food and on the many different sources of food, either from local agricultural production in the country in question, or through food markets or even food aid. The 'green revolution' which resulted in massive productivity increases, particularly in the 1960s, was primarily motivated by this attention to the supply side of food security.

More recently, and after the influential works of Amartya Sen, who analyzed why famines occur⁶, more attention has been shifted to factors governing access to food. Sen showed compellingly that famines were not primarily caused by absence of food at the national or regional level, but by denial, through various means, of what Sen referred to as *entitlements* to food. The idea that all human beings have a right to food was mentioned already in the Universal Declaration of Human Rights in 1948 and has since then become codified in a number of international conventions, most recently in the FAO Right to Food Guidelines (2004) and the Declaration of the World Summit on Food Security (2009). Food entitlements and the right to food do not mean that national governments, as duty holders in this rights-based perspective, are under an obligation to provide *free* food to the rights holders, but rather that they must ensure the availability of food under the circumstances governing the situation of the people. Under disaster conditions it may be necessary to provide free food aid as disaster relief, but that is another issue.

The concern with utilization of food and adequate diets is even more recent. Over the past ten years the question of 'hidden hunger', which refers to the lack of micro-nutrients (vitamins, minerals, etc.)

⁵ One should note that food security is conceptually different from food safety. The issue of food safety has received increasing attention over the past few years, both as an aspect of the GMO debate as well as in connection with policy concerns over the 'hidden hunger', discussed below. Food safety concerns are an integral part of e.g. Norwegian food security policies.

⁶ Sen, A.: *Poverty and Famines : An Essay on Entitlements and Deprivation*, Oxford, Clarendon Press, 1982

has been given increasing attention⁷. It is estimated that as many as 2 billion people suffer from nutrition deficiencies⁸, causing stunting in children, increased exposure to disease and reduced productivity among adults. A number of initiatives have been introduced, focusing on supplementation programs and fortification of a range of common food staples. Traditionally, fortification occurs at the preparation and distribution stage for staples, where the required minerals or vitamins are added to the product. This is well-known but cumbersome and expensive technology. More recent solutions involve bio-fortification, which aims at increasing or adding to the nutrient contents of plants, either through conventional selective breeding of staple crops or through genetic modification (GMO). Bio-fortification shows great promise as an effective new strategy to deal with micronutrient deficiencies in the developing world, in particular. The GMO aspects of bio-fortification are controversial, however, even in the case of quite spectacular success stories like e.g. the development of Golden Rice, where common rice strains are genetically modified to produce sufficient levels of beta-carotene to deliver adequate contents of Vitamin A to meet normal human dietary needs. There is increasing acceptance, though, that biotechnology will provide an essential tool in attaining food security, even if this is still highly contentious.

2.1 Food security policy goals

Food security is closely tied to poverty and listed as one of the main Millennium Development Goals, as part of the goal to halve world poverty by 2015. MDG 1.C, as it is known, is formulated as a goal to reduce by half the proportion of people who suffer from hunger. The Millennium Development Goals address a broad range of problems of poverty and development: food security issues are linked to many of them. The concern with food security from the international community has been part of the world development agenda since the food crisis in 1972-74, which caused the World Food Conference to be called in 1974, at which Henry Kissinger, the US Secretary of State, made a now famous statement that within 10 years no child would go hungry to bed. This conference also established the ill-fated World Food Council. After its demise in 1993, the World Food Summit (WFS) was called in 1996 to renew the commitment to fight hunger. The WFS established a goal of halving the number of hungry people in the world between 1990 and 2015. Because of population growth, which is high in many of the hunger-affected countries, the WFS goal was more ambitious and more difficult to reach than the MDG food security goal (expressed as a proportion rather than in absolute numbers) formulated five years later.

In general terms and at the global level, the MDG goal now seems considerably more reachable than the WFS one: in 1990 there were 995 million undernourished people in the world, or 23.6% of the world population. The proportion of hungry people has now been reduced to 14.3% in 2012 and it is generally believed that the MDG food security goal can (almost) be met by the 2015 deadline if current efforts are sustained. The number of hungry people, however, was estimated at 827 million in 2012⁹, which is 83% of the 1990 number of hungry people. In relation to the WFS target (which would be approximately 500 million by 2015) the number of hungry people in the world is still unacceptably high. It is particularly disturbing that a disaggregation of the data shows that over 100 million children were underweight in 2011. None the less, the number is in fact being gradually reduced (in spite of temporary set-backs caused by the food price spikes) and in a number of individual countries the WFS goal of halving the number of hungry people has actually been met. Still, in the discussions of the post-2015 development goals (to be announced in 2014) food security

⁷ IFPRI: 2012 Global Food Policy Report, International Food Policy Research Institute, Washington, 2013.

⁸ <http://www.micronutrient.org/> (accessed 20/10/2013).

⁹ FAO: The State of Food Insecurity in the World, Rome 2013

concerns are reiterated, and now an even more ambitious goal of completely ending hunger by 2030, for the first time in human history, will probably be raised as realistic and achievable¹⁰.

Still, achieving world food security is a formidable challenge. The population of the world is still growing and although the growth rate is actually slowing down, it is expected that the world population will reach 9 billion in 2050. By that time, it is estimated, it will be necessary to produce between 60 and 70% more food than we do today.

2.2 The era of cheap food

After the Second World War, we saw a long period where the price of food steadily decreased and consumers, particularly in the industrialized world, were spending a progressively smaller proportion of their income on food. Agricultural development in this period has been a great success that dramatically reduced poverty in a large number of countries and improved global standards of living. Investments in research and policy reforms (most of which is collectively referred to as the ‘green revolution’) resulted in massive productivity increases, with rapid improvements in the efficient use of land and water resources. The volume of agricultural production has kept pace or surpassed the growing demand for food, at the same time as there has been a steady reduction of the real price of food. The most successful adoption of the technologies of the ‘green revolution’ has been in the populous countries of Asia. Prior to the Second World War, both India and China were, for a diversity of reasons, prone to food security problems and wide-spread famines. Now, hundreds of millions of people have been lifted out of poverty.

However, the success of the ‘green revolution’ seems to have caused a level of complacency, by which the availability of cheap and plentiful food had come to be taken for granted. Agricultural development and food production dropped off the international development agenda, with the result that the rate of growth in food output has slowed down since the turn of the century. There are many underlying causes for this stagnation, but the long-term global decline in the rate of public investment in agricultural research and development since the 1980s has clearly played an important role. Since the turn of the century a large number of developing countries have in fact experienced negative growth rates in terms of such investments¹¹. In the period after the crisis, however, a number of large-scale programs have been initiated, and some of these are discussed below. Food production and food security have now been put firmly on the agenda again, and the challenges of meeting current and future needs for food are given renewed attention.

There have been occasional price spikes in this period of progressive agricultural growth. The largest global and system-wide crisis was caused by the oil crisis (coinciding with unfavorable climatic conditions in some major grain-producing countries) in 1973-74, but otherwise price fluctuations have been caused by particular, and easily understandable events in the large grain-producing areas (such as a flood in India, a drought in Ukraine, or a heat wave in USA); prices would then return to their ‘normal’ level once the next harvest came on the market.

¹⁰ Cf. Conway, G & Wilson, K: *One Billion Hungry: Can we feed the world?* Cornell University Press, Ithaca N.Y. 2012

¹¹ Beintema, N and Elliott, H: *Setting meaningful investment targets in agricultural research and development: challenges, opportunities and fiscal realities.* Paper presented at Expert Meeting on *How to feed the World in 2050*, FAO 2009

2.3 The 2007/08 food crisis

Many observers claim that the 2007/08 food crisis was different, partly because of its magnitude, but also because it cannot be explained by any particular incident. This time around the crisis was caused by more deep-rooted structural change¹². The proximate cause was a regular market response to the mismatch between supply and demand on the world market. World staple grain production had been lower than consumption for seven of the eight years prior to 2008, and the grain stocks were being depleted. One should note here the distinction between carry-over stocks and grain reserves. Most governments have abandoned grain reserves over the past 20 years, for various economic and commercial policy reasons, including WTO regulations¹³. Maintaining grain reserves is expensive, particularly when the international trade system seems to provide abundant and cheap food. Carry-over stocks, however, described as the amount left in the bin when the next harvest begins, are the most basic measure of food security. There seems to be historical evidence that whenever stocks drop below 60 days of consumption, prices begin to rise.¹⁴ During the 1972-74 crisis the carry-over stocks dipped below 30 days of consumption.

The dramatic food price increases in late 2007 and early 2008 revealed that many different factors were at play. Some of them were related to the agricultural commodities markets, where food trade was manipulated by various governments in response to domestic production shortfalls (a number of grain-producing countries, for instance, banned exports when the food shortages became evident), and where financial investors found opportunities for speculation by treating food stocks as any other commodity that could be traded. There were also financial factors, related to the sharp depreciation of the US dollar at the time. While some argue that all in all, the 2008 food crisis was primarily a matter of low supply against high demand for food, or the culmination of a number of years with global food consumption exceeding global production, others see the global food crisis and the financial crisis as intimately connected, through the impact of financial speculation on the world trade prices of food.¹⁵

None the less, the growth rate of food production has over the past few years shown signs of lagging behind the growth in demand. This is partly driven directly by continued population growth, but also by alternative patterns of the uses of the agricultural production. Between 2000 and 2008 global production of major food staples was lower than consumption¹⁶ and the grain stocks of the world were being rapidly depleted; in 2007 alone the carry-over stocks were reduced with 58 million tons. These low stocks, which were sufficient for 62 days of global consumption only,¹⁷ are seen as the immediate cause of the tripling of world grain prices that took place between 2007 and 2008.

Food prices dropped after the spike in 2008, but then started to rise more gradually. By 2011 the grain prices again exceeded the price level reached in 2008, and remained high throughout 2012 before dropping back slightly in 2013¹⁸. Many observers see the volatility of the food markets as an

¹²Headey, D and Shenggen Fan: Reflections on the Global Food Crisis. How Did It Happen? How Has It Hurt? And How Can We Prevent the Next One? IFPRI Research Monograph 165, Washington 2010

¹³IATP: Grain Reserves and the Food Price Crisis: Selected Writings from 2008–2012, Institute for Agriculture and Trade Policy, Minneapolis, June 2012

¹⁴ <http://www.resilience.org/stories/2006-06-16/world-grain-stocks-fall-57-days-consumption-grain-prices-starting-rise> (accessed 2013-10-19)

¹⁵Jayati Gosh 2010: The unnatural coupling: Food and global finance. *Journal of Agrarian Change*. Vol.10 (1), pp. 72-86.

¹⁶MacMahon, Paul: Feeding Frenzy; The new politics of food, London 2013 (p.51)

¹⁷Brown, Lester: The New Geopolitics of Food, Foreign Policy, May/June 2011

¹⁸FAO: FAO Food Price Index (<http://www.fao.org/worldfoodsituation/foodpricesindex/en/> accessed 16/10/13)

indication that global agricultural production, which up to now has been spectacularly successful in meeting the increasing demand from a growing population, is failing.

2.4 Growth and demand

The 2007/08 crisis has been a wake-up call to policy makers and to the public in general, that the food system of the world has been thrown out of balance by a diversity of factors that must be addressed if agricultural productivity and food security are to be restored. After a period of neglect, there are now a number of new initiatives in the international community to boost investments and give increased attention to food production.¹⁹ These initiatives are based on the assumption that there are technological solutions available to increase food production. But there are also many who believe that the slowing down of growth of agricultural production over the past decade is an indication that we have consumed the finite resources of the world, that we have reached the bio-physical limits for food production and that we are approaching an ecological collapse²⁰.

The relationship between population growth and food production has been a major concern since the days of Thomas Malthus, whose famous *Essay on the Principle of Population* (published in 1798) argued that population and the demand for food, which grows exponentially, always will outrun growth in food production. The outcome of these two processes is an imbalance that eventually will be corrected by disease, famine or war. Although the logic of Malthus' thinking is impeccable, a Malthusian collapse of this nature has not yet been documented. The world population is more than 7 times larger now than it was when Malthus lived, but this has not resulted in the massive disasters predicted. On the contrary, people in general live longer and are better fed than before. Unforeseen technological and organizational innovations have time and again intervened to prevent a Malthusian outcome. Food production has grown more rapidly than anybody could imagine and population growth is slowing down too. There is still positive growth, but the population growth rate has slowed down from the peak rate of 2.19% per annum in 1962 to 1.14% in 2013, and is expected to drop to below 1% p.a. by 2020 and down to 0.5% before 2050. It is expected, therefore, that the world population will stabilize at around 10 billion in approximately 2060²¹.

The argument between the Malthusians/neo-Malthusians (who now tend to put main emphasis on the need for population control) and the so-called 'Cornucopians', who believe that technological advances will provide a way out of the food security quandary, is still on-going. Up to now and in the most general terms, the Cornucopians have been proved right - the technology of the 'green revolution' has provided enough food to meet the needs of the growing population. None the less, there are no doubt limits to growth²², as was the title of the report prepared in 1972 to review the situation. The neo-Malthusian outlook of this book has been criticized on the basis of the quality of the data used, for faults with the models employed and for the conclusions reached, in particular since they ran counter to the prevailing view at the time that economic growth is tied to population growth, and more importantly, that economic growth would be necessary to solve the problem of poverty. Mention should also be made of the work of Ester Boserup²³, who saw population growth as a precondition for and major driver of agricultural innovation, social re-organization and technological progress.

¹⁹Examples are *Feed the Future*, The US Government's Global Hunger & Food Security Initiative, and *New Alliance for Food Security and Nutrition*, which harnesses private sector approaches to achieving food security.

²⁰ Brown, L. R.: *Full Planet, Empty Plates: The New Geopolitics of Food Scarcity*, Erath Policy Institute, New York 2012

²¹ UN Department of Social and Economic Affairs: *World Population Prospects: The 2012 Revision*

²² Club of Rome: *The Limits to Growth*, 1972

²³ Boserup, E.: *The conditions of agricultural growth*, 1965

In retrospect, the optimistic Cornucopian view has prevailed, even if there are notable differences between the situation in East Asia and for instance sub-Saharan Africa with respect to the trajectories of population growth and the consequences it has produced. However, the current debate on how climate change is related to the aggregate effects of continued population growth, and continued consumption along the lines established, has given neo-Malthusian perspectives a new relevance. Still, the debate is largely over whether the glass is half full or half empty. There is no easy answer to that question, particularly not when there is no agreement on how large the glass actually is.

3. New challenges to achieving food security

The demand for food is driven by a number of factors. Population growth is obviously one important factor but as has been pointed out above, food security depends also on the many structures, mechanisms and choices that govern access to food. It is therefore necessary to examine how new developments relate to the demand for food. Three important features stand out, all of them related to alternative uses of food.

3.1 New consumption patterns

First, an increasing proportion of the food grain produced in the world is now being used for animal feed. Economic development and growth of an increasingly prosperous middle class in many countries drive the demand for a changed diet, particularly with a shift towards more meat, dairy and poultry products. It is estimated that about 3 billion people worldwide are moving up the food chain in these terms, although not all of them are moving as quickly as the Chinese middle class. In 1985 meat consumption in China was 20 kilos per person, while in 2007 this had grown to 53 kilos per person. The demand for animal feed reflects these changing consumption patterns. It partly implies utilizing human food grains for animal feed, but also using parts of the agricultural production capacity to produce crops specifically intended as animal feed. In the western hemisphere, for instance there is now more land planted with soybean than with wheat, and less than 10% of this crop is used directly for human consumption. The rest is used as animal feed.

Consumption patterns are changing in accordance with what economists call Bennett's Law²⁴: as people become wealthier, they switch from starchy plant-dominated diets to a more varied food input that includes a range of vegetables, fruit, dairy products, and especially meat. The food types consumed by well-off people tend to require more resources to produce. Thus it takes 3 kg of high-quality grain to produce one kg of meat, and 4 kg of marine wild fish to produce one kg of salmon in an aquaculture plant. Meat consumption in China, for example, has increased dramatically over the past two decades. China has a history of being self-sufficient in food grain, but with the growing demand for animal feed China has had to start importing both feed grain and soybeans. India, with religious and cultural restrictions on meat consumption, did not follow the same pattern, but other populous South-East Asian countries, many of which attained food self-sufficiency because of the 'green revolution', are again becoming increasingly dependent on the world market for animal feed, in particular. Worldwide, approximately 35 - 40% of the 2.3 billion tons annual grain harvest is now used for non-food purposes such as animal feed or biofuel feedstock.

3.2 Food waste

A second, frequently overlooked factor that drives up the demand for food is food waste. It is estimated that approximately 1/3 of all food produced globally for human consumption is wasted at some point in the food chain. If this food had been properly utilized, it would to a large extent have solved the problem of food security for the 800-1000 million people suffering from hunger. But this aspect of the food system receives little attention because very often the cost of recovering and preserving waste exceeds its value on the food market. It is yet another indication of how the world has got used to cheap food. In Europe and the US, consumer food waste is estimated at between 95 and 115 kg per person per year. In the developing countries the consumer food waste is down to between 6 and 11 kg per person per year²⁵, but here, food waste is largely due to post-harvest losses,

²⁴ Barrett, C.R.: The Global Food Security Challenge in the Coming Decades, Sydney Ideas Lecture, May 2012

²⁵ FAO: Global Food Losses and Food Waste; Extent, causes and prevention. FAO, Rome, 2011

during storage, transport and processing. It is estimated that as much as 25% of the harvested food grain in sub-Saharan Africa, for instance, is lost due to various preventable causes²⁶. Investments in public research and development in the field of post-harvest losses have followed the general pattern for agricultural development: since the 2007 food crises there is a renewed interest in the field. As far as the question of consumer food waste is concerned, and where the largest gains can be made, the effort is to a large extent left to civil society and various interest groups who are working on changing public perceptions and attitudes. To date there has been limited support from public agencies and public policy to this effort.

3.3 Biofuels

A third factor is biofuel production. Legislation and rapidly increasing oil prices between 2005 and 2007 made the processing of corn into ethanol a highly profitable business in the US, which is the largest grain exporter in the world. By 2008 about one quarter of the American maize crop was used as feed stock for bio-fuel. The grain that was turned into ethanol in 2011 could have provided food, at average global consumption levels, for 400 million people²⁷. Biofuel production, driven by elevated oil prices as well as environmental concerns, is important in a number of other large food-producing countries as well. Both sugar-cane (Brazil) and oil palms (Indonesia, Malaysia) are much more efficient sources of fuel than maize²⁸, which is the main bio-fuel feed stock in the US. In terms of volume of ethanol per unit area, sugar-cane yields twice the volume of maize, and in terms of net energy yield (energy output less energy required for production and distillation) sugar-cane ethanol is 5 times more efficient than maize ethanol.

Obviously, growing biofuel feed stock on cropland that alternatively could have produced food, or converting harvested grain into biofuel, is controversial, in particular with regard to how much competition from biofuel production contributes to price increases for food. Studies carried out in the aftermath of the 2008 food price crisis however, were not conclusive.²⁹ A recent study carried out by FAO recognized the challenges posed by biofuel development but did not come out with a clear-cut rejection of it, arguing that biofuel production can have positive contributions³⁰ and recommended that governments should develop policies so that biofuels shall not compromise food security and therefore should be managed so that food access or the resources necessary for the production of food, principally land, biodiversity, water and labor are not put at risk.

The suggestion has been made that food prices could be stabilized and food security problems be averted by diverting the grain now used for animal feed and for the biofuel industry to human consumption. Research into this issue³¹ indicates that while this diversion no doubt is technically possible, since most animal feed grain can be processed or directly used for human food, there are a number of other factors that make it difficult. Policies towards these ends are likely to work in countries where a lot of grain is used for these alternative purposes, where the diet is to a large extent cereal-based and where public institutions have the capacity to actually implement such a diversion scheme. These conditions, however, seem to rule out most developing countries.

²⁶ http://www.sdc-foodsecurity.ch/en/Home/Focus_areas/Post_harvest (accessed 20/10/2013)

²⁷ Brown, L.R., *op.cit.*, p.38

²⁸ Brown, L.R.: Plan B 4.0: Mobilizing to Save Civilization, Earth Resources Institute, Washington, 2009

²⁹ IFPRI: Biofuels and food security; balancing needs for food, feed, and fuel, Washington 2008

³⁰ HLPE: Biofuels and food security. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome 2013

³¹ Locke *et al.*: Diverting grain from animal feed and biofuels: can it protect the poor from high food prices? ODI, London, March 2013

3.4 Urbanization

Increasing urbanization is also a growing challenge. In 2008, the world's urban population outnumbered its rural population for the first time in history. It is expected that 60 % of the population of the world will live in cities by 2030. The urban population of the developing countries is expected to overtake the rural population within the next 10 years and in terms of numbers, all population growth in the developing countries will be absorbed by the urban centers. This process often implies increasing urban poverty and decreasing food security. Urban dwellers do not, as a rule, grow their own food and depend on the market for their food supply, either from the rural areas or from imported food. There may be various forms of competition over resources between the urban and the rural populations. It has been pointed out how urban growth affects cropland³² and increases the demand for water, but perhaps the most significant competition takes place in terms of the political attention the urban populations receive and the way this attention gives a bias to policy and public investments, which may work to the detriment of national food production. Particularly in many countries in sub-Saharan Africa there is a history of suppressing the prices of agricultural commodities to avoid urban unrest, to the detriment of agricultural growth and the welfare of the rural population.

Urban consumers are almost exclusively dependent on food purchases and rising food prices may effectively undermine food security. The urban populations have been among the hardest hit by the food price increases since 2008 and the urban poor are usually worse off than the rural poor. Urbanization rates also push up the demand for processed food and, by implication, the rate of food wastage.

3.5 Other sources of food

The discussions about food security to a large extent revolve around the supply of grain, sometimes including other agricultural crops like fruits and vegetables, and the increasing consumption of meat. However, world fisheries (including aquaculture) contribute approximately 10% of the world's calorie intake³³. The annual catch of 154 million tons in 2011³⁴ is either destined to be consumed (131 million tons) or used as raw material for fishmeal (23 million tons): it is believed that between 20 and 30% of the catch is usually wasted or discarded, but since this often happens at sea, figures are uncertain. The generally accepted figures (e.g. FAO statistics) do not adequately reflect the situation of the small-scale and artisanal fisheries, which could add 40 million tons of fish for human consumption³⁵. The world marine capture fisheries have been stagnating since the 1980s, while inland fisheries, on the other hand, have been growing. However, the impressive growth in aquaculture since the 1970s is unlikely to be sustained due to the restricted supply of wild marine fish suitable for aquaculture feed. One should also keep in mind that this is not a very efficient use of a high-quality protein source, since it takes approximately 4 kg of wild marine fish to produce 1 kg of salmon under aquaculture, in addition to all other financial investments required. All in all, aquaculture today produces food mainly for the rich.

³² UNEP: The Environmental Food Crisis: The environment's role in averting future food crises, GRID-Arendal 2009

³³ UNEP: The environmental food crisis – The environment's role in averting future food crises. A UNEP rapid response assessment, GRID-Arendal 2009

³⁴ FAO: The State of the World's Fisheries and Aquaculture, Rome, 2012

³⁵ Kolding, Béné & Bavinck: Small-scale fisheries – importance, vulnerability and deficient knowledge in Garcia, Rice & Charles: Governance for Marine Fisheries and Biodiversity Conservation. Wiley-Blackwell (in press)

3.6 Malfunctioning markets?

An open, rule-based food trade system has been the dream of mainstream economists for decades, because restrictions on trade are seen to lessen efficiency and welfare. Free trade can increase food availability, make food more affordable for the poorest populations, and increase food diversity. This is also the position of organizations like FAO, the World Bank and the World Trade Organization (WTO). But as Paul McMahon writes, ‘trade in food has never been free; governance of the global food system has been especially weak; and nations have pursued food policies according to their own interests, with little regard for the impact on other countries’.³⁶ The food price rises have made several countries even more determined to go their own ways. Among food importers, there is renewed emphasis on self-sufficiency, and populous, middle income countries are also building up their food reserves to unprecedented levels. There is growing fear that markets can no longer be relied upon and while developing countries have been obliged to decrease their import tariffs and change the nature of their import distortions, developed countries still maintain high farm subsidies.

Seen from the perspective of those most vulnerable to food insecurity, the volatility of prices is an important issue. Markets can be viewed as institutions for mediating the mutually beneficial exchange of goods and services, but also as arenas where parties with different bargaining powers interact. Poor people tend to be net food buyers in local markets dominated by a few wealthy traders with connections in other markets and links with rural and urban elites. Poor and indebted farmers often have to sell their products at low price periods and are buyers in the ‘hungry’ season when food supplies are scarce and prices high. Liberalization has often meant that local traders, wholesalers and powerful private importers have increased their dominance and food-price stabilization mechanisms have been removed. Deregulated markets typically cause food supply fluctuations from one season to another.

Thus the main cause of the 2002 famine in Malawi was a sudden shock that devastated vulnerable food buyers. There was an exponential increase in the price of all food crops, especially maize, to a level more than six times higher than the year before. The increase in maize prices severely affected local non-maize producers. It also indirectly created severe imbalances in local labor markets, as more people desperately sought casual jobs to cope with the crisis, while fewer people were able to employ them. In this case, local markets and private traders were closely linked to developments in markets at the national level and the failure of both government and private agents to maintain sufficient stocks.

Steven Devereux points out that prior to the famine the Agricultural Development and Marketing Corporation (ADMARC), the Malawi government marketing agency, had sold most of its grain reserves to comply with advice from the International Monetary Fund to reduce market disincentives and reduce debt. Given the importance of this agency for the national market, private traders responded by buying early, which left ADMARC with no alternative supply source at the time of the crisis. The famine could have been avoided if ADMARC had been able to sell maize at affordable prices.³⁷

Significant deregulation of the financial system and commodity exchanges in the United States in the early 2000s paved the way for the integration of the financial and agricultural commodity markets. Moreover, unregulated commodity trading rapidly led to a dramatic increase in financial transactions, which attracted a growing number of financial speculators. They, in turn, sought to profit from short-term changes in prices. Hedge funds became major players in the futures exchanges of oilseeds, maize and wheat, for example.

³⁶ McMahon, Paul (2013): ‘Feeding Frenzy: The New Politics of Food’. London: Profile Books, p.126.

³⁷ Devereux, S. (2002), State of Disaster: Causes, Consequences and Policy Lessons from Malawi. ActionAid, Malawi, June 2002.

On the eve of the crisis, futures prices of these commodities were driving up spot prices – the price quoted for immediate payment of a commodity – creating a spiral of price increases as long as speculators continued to gamble on higher prices. Not surprisingly, this generated massive volatility, which made poor buyers of food increasingly vulnerable, especially in situations where staples like rice, wheat and maize are being targeted by traders who buy and sell ‘risk’ for profit. While the consensus opinion among economists and institutions like FAO and the OECD seem to be that there is no clear proof that futures speculation causes higher or more volatile prices, others see the need for international commodity markets for agricultural produce to be isolated from the harmful influence of financial markets. The policy autonomy of developing countries when it comes to food security is also an issue. This can be achieved by exercising greater policy discretion regarding the protection of their food markets and more control of strategic grain reserves, although we may see negative effects such as those following the export bans by Asian countries in the wake of the food crisis.³⁸

³⁸ Oya, Carlos: Malfunctioning markets: Local and global food distribution. The Broker Online. Issue 23, December 2010/January 2011.

4. Towards peak production?

Barrett³⁹ estimates that the marginal food demand growth due to income growth in low-income countries will be 5 – 8 times that of an industrialized country like the US. There will therefore be a significant demand for more and better food as the poor countries become richer. The question is how this demand can be met. There are arguments already that the agricultural system has been pushed to the biological limits of its potential performance and that ‘green revolution’ research cannot push the rate of growth in the yield of important crops like wheat, rice and maize any further. Further growth, then, will have to come through expansion into new areas. It is recognized that globally there is no shortage of land for agriculture, mostly in sub-Saharan Africa and in Latin America, and most of the expansion is actually expected to take place in these two regions. There have been some spectacular success stories of how new investments in technology and research have boosted food production in areas previously believed to be worthless for agriculture, such as the expansion of soybean and beef production in the Brazilian ‘*cerrado*’ region, but in many cases expansion has implied inappropriate land use and soil mining, with subsequent loss of soil nutrients and regenerative capacity.

There is a belief that agricultural production will soon be peaking and that we are approaching the biophysical limits to how much productivity can be increased. One argument that was forwarded some years ago, but which quickly disappeared since it was found untenable, was that the human civilization was approaching a photosynthetic ceiling. In his book *Collapse*⁴⁰, Jared Diamond argued that we are using 70% of the sun’s energy received on earth to feed humans and in the near future we will need all of the sun’s energy for this purpose, leaving no room for natural vegetation, rainforests and coral reefs. In the ensuing debate there was general consensus that a photosynthetic ceiling exists, but no consensus about how quickly we are approaching it. There was, in fact, no robust research on this concept and the argument quickly disappeared. The discussion of other, more well-known agricultural resources, however, is still ongoing. One argument is that the world is due to run out of the fertilizer resources required for modern highly productive agriculture (arguments respectively known as ‘peak phosphorus’ and ‘peak potassium’; both are natural resources that exist in finite quantities and thus conceivably can run out). The energy requirements in modern industrial agriculture have also been put in question (‘peak oil’) and the disturbing problems of a major die-off of the bee population in some parts of the world has been dubbed ‘peak bees’. There has also been talk of ‘peak land’ and ‘peak water’. The main problem with these arguments and predictions is that they are based on logical models that only are as good as the assumptions and preconditions on which they are based. However, failed predictions are excellent tools for generating new knowledge, since they direct new attention to their shortcomings. So, as with Malthus’ model, or the ‘*Limits to Growth*’, the ‘peak’ predictions have been confounded time and again as new knowledge has become available, generating new technologies, new solutions and new discoveries. None the less, this should not distract from the realities of these warnings, - that there are finite quantities of various critical, and for the time being irreplaceable, resources that conceivably will run out at some point in time.

4.1 Water

The most basic resources for agricultural production are land and water. Both resources are intensively used - it is estimated that 70% of all fresh water in the world is already used for agricultural production. The demand for water will continue to grow - by some projections demand may double by 2050. There is great pressure to arrive at more efficient ways of using available water, since the

³⁹ Barrett, C.B.: The Global Food Security Challenge in the Coming Decades

<http://sydney.edu.au/sidney-ideas/lectures/2012/professor-chris-barrett.shtml> (accessed 20/06/2013)

⁴⁰ Diamond, J: *Collapse: How Societies Choose to Fail or Survive*. Penguin, 2005. (p. 491)

availability of water is probably the most limiting factor to increased food production. At the global level, water is a renewable resource delivered by the hydrological cycle. While systems that rely on the pumping of fossil water are depending on a finite resource, the world will not run out of water; the main problem is the distribution of the demand and supply of water across the globe, which is highly unequal. The most common way of increasing the availability of water for agricultural production is through the expansion of irrigation. Surface-water irrigation has been the common technique, while borehole irrigation is a more recent development. Traditional irrigation techniques (bucket irrigation, basin irrigation, furrow irrigation, etc.) were quite wasteful and a lot of work has gone into developing more efficient ways, with controlled drip irrigation at the pinnacle as an efficient, but highly expensive way of providing precise amounts of water in agriculture. The expansion of irrigation has often been a component of the 'green revolution' and approximately 40% of the grain crop of the world is now grown under irrigation. Irrigation was very quickly expanded from the 1950s to 2000, but since then the rate of expansion has slowed down. It is believed that since the 1970s most of the global expansion in agricultural irrigation has been based on boreholes and that the slowdown is primarily an indication that the amount of water in the aquifers tapped is actually being depleted. The most dramatic example is probably from Saudi Arabia, which in the 1980s began pumping fossil water from deep underground aquifers, allowing it to farm the desert. By subsidizing wheat production at several times the world price, Saudi Arabia became the second largest Arab wheat producer in the early 1990s. At its peak, Saudi Arabia harvested 4 million tons of wheat, more than twice the amount it consumed, and it was for a while a major grain exporter. But the fossil aquifers are now nearly depleted and wheat production has plummeted. Saudi Arabia has announced that it will phase out wheat production entirely in 2016⁴¹. Irrigation development from fossil aquifers under the North China Plain, the Ogallala Aquifer under the US Great Plains, both major grain-producing areas, and the Nubian Sandstone Aquifer feeding Libya's Great Man-Made River project are other interesting examples of unsustainable water use.

The 'peak water' argument that water shortages will restrict agricultural production has been given a new direction and a number of new uncertainties have been entered into the debate with the climate change discussions and the predictions of the Intergovernmental Panel on Climate Change (IPCC) of how precipitation may increase or decrease in the future. This report cannot go into the details of these predictions, which, in general, are that the growing season and the amount of suitable cropping land will be expanded in the temperate regions, while the tropics will experience even greater volatility in weather patterns, with even more extreme weather-related events. These predictions generally indicate that climate change will reinforce and accentuate the differences between the wealthier North and the poorer South.

4.2 Land

The 2007/08 food crisis, involving high food prices and restricted market availability of food, coincided with a rise in oil prices. This created a demand for agricultural land resources, partly to grow food and partly for biofuel development. Authorities and investors in food deficit countries have shown great interest in the acquisition of farmland in countries believed to hold ample land reserves to meet domestic food demands without having to trust the international market. Part of the problem during the food crisis in 2007/08 was the failure of the world trading system to provide the food required, due to market manipulations and export bans by some of the main grain-producing countries. Investments in biofuel projects seem to have had a different background, primarily involving commercial investors. The focus of attention on these processes has been on land deals in the

⁴¹ Rasmussen, S: Arab Grain Imports Rising Rapidly

http://www.earthpolicy.org/data_highlights/2012/highlights28 (accessed 26/10/2013)

developing countries, particularly in sub-Saharan Africa, but similar large-scale land acquisitions also took place in Australia, Brazil, Ukraine, Russia and Turkey⁴².

While these land acquisitions have been surrounded by considerable political turbulence, there is a lack of accurate data on transactions and implementation. The situation does not seem to have changed much between 2009 when the IFPRI policy paper referred to above was produced, and 2013 when ODI examined the situation with regard to biofuel production⁴³. The IFPRI report suggests that land tenure transactions covering perhaps 20 million hectares took place between 2005 and 2009, while a World Bank report released a year later sets the figure at 45 million hectares⁴⁴. The Land Matrix database of the International Land Coalition, a global civil society alliance protecting the land rights of marginalized and poor people, reports land deals covering more than 70 million hectares up to 2012⁴⁵.

There is high variation across various sources of data on the extent of these large-scale transactions - a number of projects that have been announced have never got off the ground, partly, it seems, because the reduced price of oil has put the economics of biofuel production in doubt and partly because investors have come to experience that agricultural development requires institutional and infrastructure support lacking in many countries. More detailed inventories are being prepared for several countries, showing at times large discrepancies between the transactions reported in the media and the amount of land actually put under cultivation. It is also a fact that large-scale transactions involving international stakeholders attract more attention than more common, much more moderate land deals involving e.g. national elites. The more detailed national inventories show much smaller, and fewer, projects than what is reported in the media; there are also considerable delays in many countries in actually signing leases and initiating projects. Some high-profile cases have in fact been discontinued all together in the face of bureaucratic difficulties and political protest, such as the much-publicized attempt by a South Korean company to acquire 1.3 million hectares in Madagascar for maize production in 2008.

None the less, land acquisitions by foreign investors are going on in a number of African countries. Initially, many of these land deals were seen as vehicles for agricultural development, and with the renewed attention to agriculture after the food crisis, this should in principle be welcomed⁴⁶. Often these land transactions are presented as opportunities for national governments to increase investments in agricultural development, with a number of benefits for the rural poor, including the creation of jobs and new opportunities, the expansion of road and irrigation infrastructure and the extension of social services like education and health services. Depending on the specifics of the transactions, projects could also contribute to national food security safeguards by producing food, or at least add to foreign currency earnings from increased exports, in the case of cash crops and biofuel feedstock.

Information from land deals that have actually taken place often shows that this development optimism has been unwarranted. A 2010 World Bank study shows clearly that the investments 'have taken place largely in places where buyers could exploit corrupt or indebted governments with little ability to regulate the transaction or prevent buyers to target the poorest rural communities, expelling

⁴² von Braun, J & Meinzen-Dick, R: 'Land Grabbing' by Foreign Investors in Developing Countries: Risks and Opportunities, *IFPRI Policy Brief 13*, April 2009. Washington DC: International Food Policy research Institute.

⁴³ Locke, A & Henley, G : Scoping report on biofuels projects in five developing countries, ODI, May 2013.

⁴⁴ World Bank: *Rising global interest in farmland: can it yield sustainable and equitable benefits?* Washington 2010

⁴⁵ <http://www.landcoalition.org/> (accessed 28/10/2013)

⁴⁶ Cotula, Vermeulen, Leonard & Keeley: *Land grab or development opportunity? Agricultural investments and international land deals in Africa*, IIED/FAO/IFAD, London/Rome 2009

people with non-traditional land title from their land'.⁴⁷ It is not surprising, therefore, that the initially positive but apprehensive designations of these transactions have changed from 'agricultural investments' to 'land grabs'.

The land transactions to date appear not to have produced the benefits originally envisaged, whether due to bureaucratic delays, physical barriers, operational problems or market problems. A recent report from a large agricultural project in Western Ethiopia, for instance, indicates that only 5000 hectares out of a 100.000 hectare concession were planted in 2012, after the site was flooded in 2011⁴⁸. On the contrary, there has been a swiftly growing supply of reports from civil society groups on a wide range of abuses arising from the land grab situation, including dispossessing local people of their customary rights to pasture, farmland and water, resulting in violent conflicts and deaths⁴⁹.

In view of such massive criticism, international agencies have attempted to introduce safeguards to mitigate abuses. The proposed safeguards, initially referred to as 'principles of responsible agricultural investments' (World Bank) or 'code of conduct' (IFPRI) address the technical and policy challenges involved in these transactions, with the purpose of smoothing the progress towards positive outcomes. They finally crystallized into the 'Voluntary Guidelines on Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security', endorsed by the UN Committee on World Food Security in 2012. These are voluntary guidelines, however, referred to as 'soft law', which are meant to guide national tenure legislation and national policies in the direction of greater respect for the human rights of affected people.

In any country where the bulk of the domestic food supply originates from small-holder farmers, as is the case with several developing countries, access to land is the overriding precondition for the welfare and livelihood of large parts of the population. Land is the most valuable and therefore most coveted asset in agrarian societies. Access to land is central to livelihood since land is the factor of production in agriculture that is most difficult to replace. Control over land is the foundation of many political and social systems and history is full of examples of agrarian revolt and peasant wars directly motivated by land issues.

Land tenure arrangements are often very rudimentary in many of the countries that have received the most attention in connection with the initiatives from foreign investors to secure land rights. There are few states that fully accept traditional or customary tenure arrangements, and equally there are few states with a well-functioning tenure system based on individual freehold title⁵⁰. Most users gain access to land through some kind of local land tenure system, often characterized by multiple and overlapping rights to the same resource. Customary systems have in many cases been undermined by social, economic, cultural and political change, and modern government often has an ambition to modernize the tenure system. And government intervention may often be needed to provide effective land management. Furthermore, customary systems are by no means equitable and government intervention may be required to secure the resource claims of weaker and more vulnerable groups.

None the less, states often assume sovereign rights to land held under customary tenure and enter into land transfer agreements in disregard of local arrangements. This is probably the most common shared characteristic of the land grab examples that now are documented in the reports from various interest

⁴⁷ Borras, Hall, Scoones, White & Wolford: Towards a better understanding of global land grabbing: an editorial introduction. *The Journal of Peasant Studies* Vol. 38 (2011)No.2: p.210

⁴⁸ <http://farmlandgrab.org/post/view/22086-when-the-levee-breaks> (accessed on 28/10/2013)

⁴⁹ <http://www.oaklandinstitute.org/land-deals-africa/ethiopia> (accessed on 28/10/2013)

⁵⁰ Cotula, L (ed.): Changes in "customary" land tenure systems in Africa. IIED/FAO, 2007

groups⁵¹. A recent report from the newest state in Africa, and one with considerable land resources, sums up the situation quite well:

*'The government's support for land investments is predicated on the myth that large-scale development projects are the quickest way to improve food security and stimulate the economy in South Sudan. Evidence from land-based investments over the past six years, however, suggests that these projects are far more likely to undermine food security by dispossessing people from land and natural resources that are indispensable to their daily livelihoods. The country also lacks a regulatory framework for managing this influx of investment, reducing the likelihood that it will provide sustainable benefits to local economies.'*⁵²

Companies involved in large-scale land investments rarely consult with residents in affected communities, or conduct environmental and social impact assessments. Nor do they feel pressure from government institutions to abide by "good practice" social and environmental protections. This greatly increases the risks of adverse impacts for host populations; it also increases the chances of local opposition arising when the companies come to begin project operations. By prioritizing private sector interests over those of the rural poor, initiatives such as these may inadvertently undermine the new social contracts that would provide the foundation for a sustainable peace. An effective food security strategy must therefore consider the situation of smallholders and create an enabling, bottom-up rather than a one-sided top-down environment that provides them with opportunities, tools, skills and incentives to participate in agricultural production.⁵³

⁵¹ Oakland Institute: Special Investigation Phase Two: Understanding How Land Deals Contribute to Famine and Conflict in Africa, 2011

⁵² Oakland Institute: Understanding Land Investment Deals in Africa. Country Report: South Sudan, (n.d.).

⁵³ Muiderman, Karlijn and Evert-jan Quak: "Food for thought: A synopsis of the food security debate". The Broker Online, February 21, 2013.

5. Food security as a catalyst of conflict

When discussing the links between failing food security and conflict, it may be useful to focus attention on regions of the world that are more vulnerable to food insecurity than others and where food insecurity has been claimed to be a catalyst of conflict. These include the Middle East and North Africa (MENA) and the Sahel as well as the Horn of Africa. In 2011, several MENA countries were seriously affected by conflict and remain so in 2013. Most of them are also affected by failing food security. Six of the nine Sahelian countries are currently involved in armed conflicts, and undernourishment and food security have been implicated as either a cause or a consequence of several of them. This applies as well to Somalia on the Horn.

5.1 The Arab Spring

The MENA region has been experiencing deteriorating parameters for both food production and consumption for some time. Agricultural output is constrained by limited water resources, diminishing arable land, and poor public policy. Consumption is driven by high population growth, urbanization and subsidies. A serious problem facing the region, particularly the non-oil states, is the matter of affordable food. About a fifth of the region lives under USD 2 a day.⁵⁴

Egypt saw an increase in the prevalence of food insecurity to 17.2 percent (13.7 million people) in 2011 from 14 percent of the population in 2009. The increase was driven largely by rising poverty rates and a succession of crises from 2005, including the avian influenza epidemic in 2006, the food, fuel and financial crises of 2007-09, further global food price increases from late 2010 and a challenging macroeconomic context in the wake of the 2011 revolution. As a result, twice as many households were pushed into food insecurity than those moving out of it in 2011. While the highest poverty rates remain in rural Upper Egypt, significant pockets of poverty and food insecurity are emerging in urban areas, where poverty increased by nearly 40 percent between 2009 and 2011, which means that Greater Cairo had 3.8 million poor people in 2011.⁵⁵

When food prices increase, the impact on household spending is enormous, and its effect is magnified politically and socially in two ways. The first is that higher prices are felt disproportionately by the urban population, which may enjoy higher incomes than the rural poor but do not share the extra income growers receive from rising food prices. The second is the less severe, but politically more critical, vulnerability of the MENA region's middle class which is more sensitive to changes in food prices than their rich-economy peers.

Food subsidies have been an important element of the MENA economies since the 1950s. In 2010, Egypt spent about USD 3 billion on bread subsidies. Larbi Sadiki sees the subsidies as the heart of a social contract, "the democracy of bread", between the regimes and their citizens to ensure peace and stability.⁵⁶ Food, or more specifically its price, has played a recurring role in the domestic politics of the region. Since the 1970s, food inflation and/or reductions in subsidies prompted violent protests in Egypt in 1977, Morocco in 1981, Tunisia in 1984, Jordan in 1996, and across the Middle East in 2008. The latter was in response to the rapid acceleration of food prices on the eve of the global financial crisis.

⁵⁴ Rosenberg, David: Food and the Arab Spring, IDC Herzliya, October 2011.

⁵⁵ World Food Program: "The Status of Poverty and Food Security in Egypt". WFP, Rome May 2013.

⁵⁶ Sadiki, Larbi: 'Towards Arab Liberal Governance: From the Democracy of Bread to the Democracy of the Vote', *Third World Quarterly*, Vol. 18, No.1 (March 1997), pp. 127-148.

At the end of 2010 and the start of 2011, as protests erupted first in Tunisia and then in Algeria, Yemen, Bahrain, Jordan, and Egypt, the price of food was widely seen as a significant, if not principal, factor in the prompting the unrest. The Food Price Index had been rising since the beginning of 2009, and by the time it peaked in February 2011, the index had registered a 68.3 percent increase. The Cereals Price Index rose an even sharper 75.5 percent in a shorter period of time, from a low in June 2010 to a high in April 2011.⁵⁷

The result of rising food prices, along with other socio-economic factors, such as high levels of unemployment, especially amongst educated youth, was a steady increase in the cost of living and an erosion of living standards. Sharp rises in domestic food prices from 2007 onwards contributed to an unravelling of the social contract whereby the regimes offered cheap subsidized food, housing, utilities and fuel, often along with employment in a bloated public sector in exchange for political loyalty.

Governments across the region—including those that were not immediately threatened by protests—sought to alleviate pressure by the customary method of increasing subsidies and raising public sector salaries and pensions. The measures suggested that those in power believed that stated political grievances either masked underlying economic problems or at least could be assuaged by addressing those problems. However, subsidies provide only partial protection because they do not cover all foods and even in categories where they do, their impact is mitigated by corruption and black market sales.

A review of the relationship between food security problems and social unrest in the Middle East and North Africa⁵⁸ concludes that ‘the price of food was widely seen as a significant, if not principal, factor in prompting the unrest’ and ‘rising food prices played a role in fomenting Arab Spring unrest but appear to have been quickly overtaken by other grievances’. In the run-up to the uprisings, both living standards and food security deteriorated, but a wide array of factors precipitated the Arab Spring. It is true that food prices rose fairly rapidly in Egypt, but Algeria and Jordan also experienced rising prices while containing political unrest. Tunisia, with smaller changes in food prices, was the first country to erupt. In Egypt, though, food played an important symbolic role as ‘Tahrir Square in Cairo became the epicenter for people’s demands for bread, dignity and justice’.⁵⁹

5.2 The Sahel

The Sahel, spanning across Africa from Mauritania and Senegal in the west to Eritrea, Ethiopia and Sudan in the east, has figured prominently in discussions on food insecurity as a catalyst of social and political unrest, mainly proxied by natural resource scarcity. In this section, we use Sudan as an example.

A ‘post-conflict environmental assessment’ made by UNEP in 2007 argued that there were strong linkages between environment and conflict in Sudan, and that these linkages are twofold. On the one hand, Sudan’s long history of conflict has had significant impacts on the environment, through population displacement, lack of governance, conflict-related resource exploitation and underinvestment in sustainable development. On the other hand, it is argued that environmental issues are contributing causes to conflict. Land issues are important causative factors, and confrontations

⁵⁷ FAO, World Food Situation, September 8, 2011.

⁵⁸ Rosenberg, David: Food and the Arab Spring, IDC Herzliya, October 2011

⁵⁹ Naguib, Nefissa, 2013: “The Compassionate Brother: A Note on Islamic Food Activism”. *Food, Culture & Society*, Vol. 16 (3), pp. 348-353.

over rangeland and rain-fed agricultural land in the drier parts of the country are ‘a particularly striking manifestation of the connection between natural resource scarcity and violent conflict’.⁶⁰

While the Sudanese conflicts contain many ingredients, it is notable that most of the violence has taken place in pastoral and agro-pastoral areas. They include the areas struck by drought and famine during the 1970s and 1980s, and the areas that saw an expansion of mechanized, rain-fed farming during the same period. Land is a central issue for both rural and urban communities in Sudan, as a means for livelihoods and survival, and with profound cultural and socio-political dimensions. Land is also fundamental to understanding the way in which the Sudanese conflicts and humanitarian crises have evolved and has been fought over in many different ways.

Since the colonial period, the Sudanese state has owned, managed or effectively controlled the modern economic sector. State resources have been concentrated in the central Nile areas in the North, reflecting the longstanding political dominance of groups from this area. A process of uneven development and economic dislocation began during the colonial period and became particularly massive in the 1970s. The shift from subsistence agriculture to export-oriented, mechanized agricultural schemes had its greatest impact in the so-called ‘Transition Zone’ between North and South – along Southern Kordofan, Southern Darfur, Blue Nile and the Sudan-Ethiopian border region, resulting in the dispossession of small-holding farmers from their customary rights of land, the erosion of land-use rights by pastoralists, and the creation of a large force of agricultural wage-labourers, whose numbers were increased through displacement by drought and war in the 1980s and 1990s. While the transfer of assets, which began before the war, was accelerated after 1989 when the current regime came to power through a military coup, the development strategy has essentially been the same.⁶¹

A vital factor was the passage of laws undermining the control that local authorities and local people were able to exert over land. The 1970 Unregistered Land Act abolished customary rights of land use and the authority vested in native administration with respect to land allocation, thereby allowing for the leasing of land to large farms by the state.

From the 1970s onwards, the agricultural growth model adopted in Sudan gave little or no consideration to those who were displaced or otherwise affected. The strategy also caused serious problems. Yields were hit by falling fertility, which in turn reflected continuous cropping and the expansion of semi-mechanized farming into increasingly marginal areas. Since the 1970s, there have been massive population flows out of the ailing traditional sector into urban centres. When the Islamist movement came to power in 1989, they launched the ‘civilisation project’ which advocated self-sufficiency in food production and manufacturing. However, the agricultural sector continued to decline and unsustainable policies within rain-fed farming continued as before.

Thus, the very serious conflicts that have spread throughout so many parts of Sudan since the 1980s can be seen as part of a pattern of violence where the Sudanese state – as a vehicle for special interest groups – has played a major role. In brief, the country continues to suffer from two sets of crises that are closely interrelated: (a) a crisis of governance, and (b) a livelihoods crisis. The conflicts that result from these crises take place on different levels and are also interrelated.

Darfur provides an instructive example. The crisis in Darfur has often been talked about as being caused, at least partly, by climate variability or even climate change. It is argued that declining rainfall

⁶⁰ UNEP (2007), Sudan – Post-Conflict Environmental Assessment. Nairobi: United Nations Environment Programme.

⁶¹ Sørbo, Gunnar M. and Abdel Ghaffar M. Ahmed (eds.): “Sudan Divided: Continuing Conflict in a Contested State”. NY: Palgrave Macmillan, 2013.

and land degradation intensified struggles over access to pasture, farmland and water, culminating in civil war and humanitarian crisis in 2003. A similar narrative has been adopted by the Sudan government, attributing the conflict in Darfur to environmental change and increased pressure on natural resources. The corollary would seem to be that had there been more rain there would not have been war.

A sequence of droughts in the 1970s and 1980s clearly contributed to destabilize an already conflict-prone region, especially when environmental pressures were compounded by unequal access and politicization of access to scarce resources. Darfur, however, remained fairly stable until the late 1980s, mainly because there was an agreement among the major ethnic groups regarding access to natural resources (land, water and pastures).

One of the early warning signs of conflict was a dramatic increase in violent incidents between farmers and herders. One cause for these incidents was the droughts, which forced herders to encroach on the lands of farmers. These clashes did not necessarily pit Arab versus non-Arab but they did lead, in 1987-1989, to a wide-ranging conflict between the sedentary Fur and a broad coalition of both cattle- and camel-herding Arab tribes. For the first time, nearly all the Arabs of Darfur came together, united by a new pro-Arab ideology which was backed by Libya and successive governments in Khartoum from 1986 onwards.⁶²

By the time the two main rebel groups, the Sudan Liberation Army (SLA) and the Justice and Equality Movement (JEM) appeared in early 2003, widespread intercommunity violence over land had already begun taking place across Darfur. While they made regional, and even national, claims that aimed at transcending ethnic cleavages with demands for a more equitable distribution of power and wealth for all of Sudan, their base was for the most part non-Arab.⁶³ Over time, the fault-lines of conflict became increasingly complex, and political and livelihood landscapes changed dramatically.

These snapshots indicate a connection between droughts and conflict in Darfur, mainly through the impacts of movements and migration on access to resources and livelihoods. The effects, however, are played out in interaction with other conflict-promoting factors. To a large extent, the factors which pushed Darfur over the edge were external and include impacts of the Chadian wars, Libyan meddling, destructive interventions by the Khartoum government, and severe drought leading to migrations. One important point to be made, then, is that events and developments in Darfur must be understood in the context of a number of factors at different levels of scale.

Climate variability has always been an important feature of the environment in Sudan (and Sahel more generally), to which different production systems have traditionally tried to adapt more or less successfully. Because of the developments discussed above, including a lack of environmental governance, vulnerability to environmental hazards has generally increased and growing competition between different livelihood groups promotes conflict as well as environmental degradation. However, the interaction effects are complex. Thus, the most vulnerable areas in terms of environmental hazards and food security do not harbor more conflict than others.⁶⁴

While conflict and livelihoods are inextricably linked to one another in places like Darfur, the vulnerability of people's livelihoods remains deeply embedded in the policies, institutions and processes that influence their access to means of production, and the power relations between different livelihood groups and production systems. An important message, therefore, is that while many

⁶² Tubiana, J. (2007), "Darfur: A Conflict for Land?" in: Alex de Waal (ed.): *op.cit.*

⁶³ Tubiana *op.cit.*

⁶⁴ IIED (2009), "Adaptation to Climate Change: A Vulnerability Assessment for Sudan". Gatekeeper 142, London: International Institute for Environment and Development.

conflicts have serious environmental and food security dimensions, ways out of the livelihoods-conflict cycle that is experienced by a growing number of people in Sudan will require the support of wider systems of good governance that simply do not exist today.

5.3 Causal chains

Is food security a cause of conflict? Based on a review of recent research, the answer by Brinkman and Hendrix is a qualified yes: 'Food insecurity, especially when caused by higher food prices, heightens the risk of democratic breakdown, civil conflict, protest, rioting, and communal conflict'.⁶⁵

Conflicts come in many forms. Hendrix and Brinkman makes a distinction between (a) civil conflict between the state and an opposition group; (b) communal conflict between two or more distinct communities that neither targets nor directly involves the state; and (c) urban unrest.⁶⁶

They argue that food insecurity may motivate participation in armed civil conflict at the individual level, but acute food insecurity may also diminish conflict because it diminishes the resources available to militants; it can hinder active political participation; and food denial is often part of counterinsurgency operations. The causal link, therefore, between food insecurity and civil conflict is both complex and ambiguous, while the reciprocal relationship (civil conflict causing food insecurity) is well established.

Communal conflicts tend to cluster in areas where land and water are scarce, such as the regions of the Sahel. Recurrent droughts have undermined cooperative relationships between pastoralists and sedentary farmers, as pastoralist encroachments on farmlands have increased, like in Sudan. Because herding activities occur in marginal lands, these conflicts often take place against a backdrop of chronic or frequent food insecurity and are exacerbated by poverty and political exclusion. However, some studies have found that communal conflict is more prevalent during times of both relative food security and abundance.⁶⁷

Urban protests and riots have attracted particular attention after the food crisis and during the Arab Spring. A study from 2011 shows that violent and mostly urban protest (of varying degrees of intensity) took place in 14 out of 53 African countries⁶⁸ in connection with the 2007/08 food crisis. The analysis tentatively concludes that food riots are more likely to occur in authoritarian states with few political freedoms and a high incidence of economic and human poverty. Low rates of urbanization reduce the likelihood of food protest, however, as does the presence of social protection programs. These rather general conclusions are also supported in a global review carried out by Christopher Barrett⁶⁹ in 2012, which only goes as far as stating that 'food security worries can spark public protest when mixed with a sense of broader injustices'.

⁶⁵ Brinkman, Henk-Jan and C.S. Hendrix: *Food Insecurity and Violent Conflict: Causes, Consequences, and Addressing the Challenges*. Rome, World Food Programme, July 2011.

⁶⁶ Hendrix, Cullen S. and H-J. Brinkman: «Food Insecurity and Conflict Dynamics: Causal Linkages and Complex Feedbacks». *Stability: International Journal of Security & Development*, 2 (2): 26, pp.1-18.

⁶⁷ Theisen, O M (2012): 'Climate Clashes? Weather Variability, Land Pressure, and Organized Violence in Kenya, 1989-2004', *Journal of Peace Research* 49 (1): pp. 81-96.

⁶⁸ Julia Berazneva and David R. Lee: *Explaining the African Food Riots of 2007-2008: An Empirical Analysis* (MS) Cornell University March 2011.

⁶⁹ Barrett, C.B: *Food or Consequences: Food Security and Its Implications for Global Sociopolitical Instability* Seminar presented to Weatherhead Center for International Affairs Harvard University October 23, 2012

An interesting hypothesis was formulated by Lagi et. al⁷⁰, to the effect that in food importing countries with widespread poverty, political organizations may be perceived to have a critical role in food security. Failure to provide food security undermines the very reason for existence of the political system. Once this occurs, the resulting protests can reflect a wide range of reasons for dissatisfaction, broadening the scope of the protest and masking the immediate trigger of the unrest. Thus food price increases seem particularly likely to lead to large-scale unrest in regimes where the government has actively intervened in food prices in the past via price controls and consumer subsidies (like in Egypt and Tunisia). As argued by Hendrix and Brinkman, ‘these interventions create expectations that food price interventions will continue, and encourage consumers to evaluate the government explicitly in terms of their ability to stabilize consumer prices’.⁷¹

5.4 Food security and conflict

One conclusion, then, to be drawn from the discussion above is that civil conflict is rarely grounded in single grievances or simple causes but commonly represents the accumulation of a complex set of interrelated factors. Thus while food insecurity and poverty may be contributors to political instability and conflict, neither hunger nor poverty exist in a vacuum: other aspects of the political, social and economic environment affect the degree to which failing food security, and grievances more generally, are expressed violently. These include demographic and social factors. Brinkman and Hendrix find that, in general, countries with proportionately larger numbers of 15-24 years old experience more protest and rioting, civil conflict and terrorist attacks, especially in countries where job opportunities are few; conflicts are more likely when ethnic groups are made the basis for exclusionary rule; and urbanization has crosscutting impacts on political violence: When rural populations move to cities, they lose traditional coping mechanisms for dealing with higher food prices, yet are often protected by better food distribution networks, safety nets and, generally, an urban bias in most countries. The type of political regime may also have complex effects on political violence. Civil conflict, protest, rioting and social conflict are more prevalent during periods of slow or negative economic growth. Societies with greater economic inequality experience more civil conflict, though the type of inequality matters; and economic shocks are strongly correlated with conflict.⁷²

While more scholarly research needs to be done, the links between food insecurity and conflict are clearly context-specific: they are contingent on existing political institutions, levels of economic development, social safety nets and demographic pressures. And while a growing body of research makes both direct and indirect links – as proxied by environmental scarcity or access to water resources – food insecurity is clearly neither a necessary nor sufficient condition for acute political violence and conflict. A Norwegian study by Buhaug⁷³ draws some cautious conclusions in the same direction: there are weak indications that failing agricultural production will lead to increased political violence. He emphasizes, however, that this does not mean that drought and food scarcity never can become a significant source of conflict.

⁷⁰ Lagi, M, Karla, B. Z. & Y. Bar-Yam: The Food Crises and Political Instability in North Africa and the Middle East,

New England Complex Systems Institute, August 2011

⁷¹ Hendrix and Brinkman, op.cit.: 8.

⁷² Brinkman and Hendrix, op.cit.

⁷³ Buhaug, Halvard: Food Insecurity and Political Violence in Sub-Saharan Africa (and the MENA Region), PRIO/EWACC, December 2012

These general conclusions also correspond to conclusions drawn with regard to the relationship between climate change (that provides the basis for food production) and conflict. In another article⁷⁴, Buhaug discusses a contribution from Burke⁷⁵ et al which asserts that the damages from climate change in the form of increased risk for civil war will annul possible positive effects of economic growth and democratization in Africa. He concludes that climate change offers poor explanations for armed conflict and that African civil wars require other forms of analysis.

Two other contributions from PRIO point in the same direction. In a special issue of the *Journal of Peace Research* from 2012, Koubi et al. show that it is difficult to demonstrate any direct link between climate change and conflict, even when climate change directly undermines the preconditions for economic growth⁷⁶. The examination shows weak support for a hypothesis that civil conflict is more likely in non-democratic countries when economic conditions deteriorate. The second contribution⁷⁷ investigates whether conflicts are caused by the changes in the resource base in the complex agro-pastoral adaptations of the inland delta of the Niger river. Again, it is difficult to use climate as an explanation: collapse of the local political system which governed settlement, movement patterns and resource exploitation, coupled with corruption and other negative interferences from the local administration are pointed out as far more significant causes.

However, climate change will often result in a reduction of resources for livelihood, i.e. affect food security, which can lead to competition and conflict for remaining resources, or to migration, displacement or increasing number of refugees. As we have seen for Darfur, when migrants encroach on the territory of others who may also be resource constrained, the potential for violence rises. Thus climate change is likely to increasingly undermine both food security and human security more generally, by reducing access to, and the quality of, natural resources that are important to sustain livelihoods. Climate change is also likely to undermine the capacity of states to provide the opportunities and services that help people to sustain their livelihoods. In certain circumstances, therefore, these direct and indirect impacts of climate change on food and human security may in turn increase the risk of violent conflict.⁷⁸

In sum, then, food security can trigger, fuel or sustain conflict in many different ways; sudden food price rises can trigger conflict; competition for food production resources can catalyze recurrent conflicts; inequities affecting food security can exacerbate grievances and build momentum toward conflict; food insecurity may give individuals incentives to join or support conflicts and rebellions; and food insecurity may help sustain conflicts. The effects, however, are always played out in interaction with other conflict-promoting factors that are often more important.

⁷⁴ Buhaug, Halvard: Climate not to blame for African civil wars, PNAS (www.pnas.org/cgi/doi/10.1073/pnas.10055739107 accessed 18/06/2013)

⁷⁵ Burke, MB, Miguel E, Satyanath S, Dykema JA, Lobell DB: Warming increases the risk of civil war in Africa, PNAS 106:20670-20674, Washington 2009

⁷⁶ Koubi V, Bernauer T, Kalbhenn A and G Spilker: Climate variability, economic growth and civil conflict, *Journal of Peace Research* 49(1) 113 – 127, Oslo 2012

⁷⁷ Benjaminsen TA, Alinon K, Buhaug H & JT Buseth: Does climate change drive land-use conflicts in the Sahel? *Journal of Peace Research* 49(1) 97 – 111, Oslo 2012

⁷⁸ Barnett, J. and Adger, N (2007): Climate change, human security and violent conflict. *Political Geography*, 26(6), pp. 639-655.

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Following rising food prices violent 'food riots' took place in about 40 countries around the globe in 2007-2008. These developments have led to renewed interest among both scholars and policymakers in the role of food insecurity and food-price related grievances as catalysts for conflict. This report, which is based on a desk review of current literature, discusses the relationship between failing food security and social unrest. It also provides a summary of developments related to global and local food security that have made the issue increasingly relevant and important.

A growing body of research makes both direct and indirect links between food insecurity and conflict. Based on the review of literature as well as analysis of case material from the Middle East (Arab Spring) and Sahel (Sudan), one important conclusion to be drawn is that civil conflict is rarely grounded in single grievances or simple causes but commonly represents the accumulation of a complex set of interrelated factors.