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Extreme weather endangers food security

2010-11: A grim foretaste of future suffering and hunger?

This month's special report on extreme weather and climate change[1] by the International Panel on Climate Change presented a stark warning: extreme weather events are on the rise and failure to take urgent action to reduce emissions will likely lead to an increase in the intensity and frequency of such events in future. This Oxfam media brief documents some of the devastating impacts that extreme weather events have had on global, regional and local food security in 2010-11, and the severe consequences for the lives and livelihoods of people in poverty. Our failure to cope with the climate variability and shocks of today presents a daunting outlook for food security tomorrow. For governments around the world this serves as an urgent call to act at the UN climate talks in Durban if the extreme weather events witnessed in 2010-11 are not to be a grim foretaste of future suffering and hunger.

EXTREME WEATHER AND FOOD SECURITY IN 2010-11

> *"Extreme weather like the droughts in Russia, China and Brazil and the flooding in Pakistan and Australia [in 2010] have contributed to a level of food price volatility we haven't seen since the oil crisis of 40 years ago. Unfortunately, this could be just a taste of things to come because in the next few decades the build-up of greenhouse gases already in the atmosphere could greatly increase the risk of droughts, flooding, pest infestation and water scarcity for agriculture systems already under tremendous stress."*
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> **John Beddington, UK Government Chief Scientific Adviser** (March, 2011)[2]

Climate change is likely to have a pernicious effect on food production in two main ways. Firstly, the slow onset changes in mean temperatures and rainfall patterns are expected to put pressure on average yields. Secondly, more frequent and intense extreme weather events will cause more crop losses.

Researchers have focused almost exclusively on the first impact so far, modeling the extent of long-run average price rises in the absence of volatility. The International Food Research Policy Institute and others say that temperature increases and changing rainfall patterns are expected to contribute to a structural increase in average food prices.[3] Oxfam-commissioned research earlier this year suggested that the average price of staple foods such as maize could more than double in the next 20 years compared to 2010 – with up to half that increase due to changes in average temperatures and rainfall patterns.[4]

But this paints only a partial picture. More frequent and extreme weather events will compound things by creating food shortages and price spikes and destabilizing markets, worsening the structural price rises that the models already predict.[5] One need not rely on imagination to understand how this could play out for the world's poorest people.

In 2010-11, a series of extreme weather events hit local production and availability of food, contributing to soaring food prices and destroying livelihoods. These events at times shocked global markets, causing prices

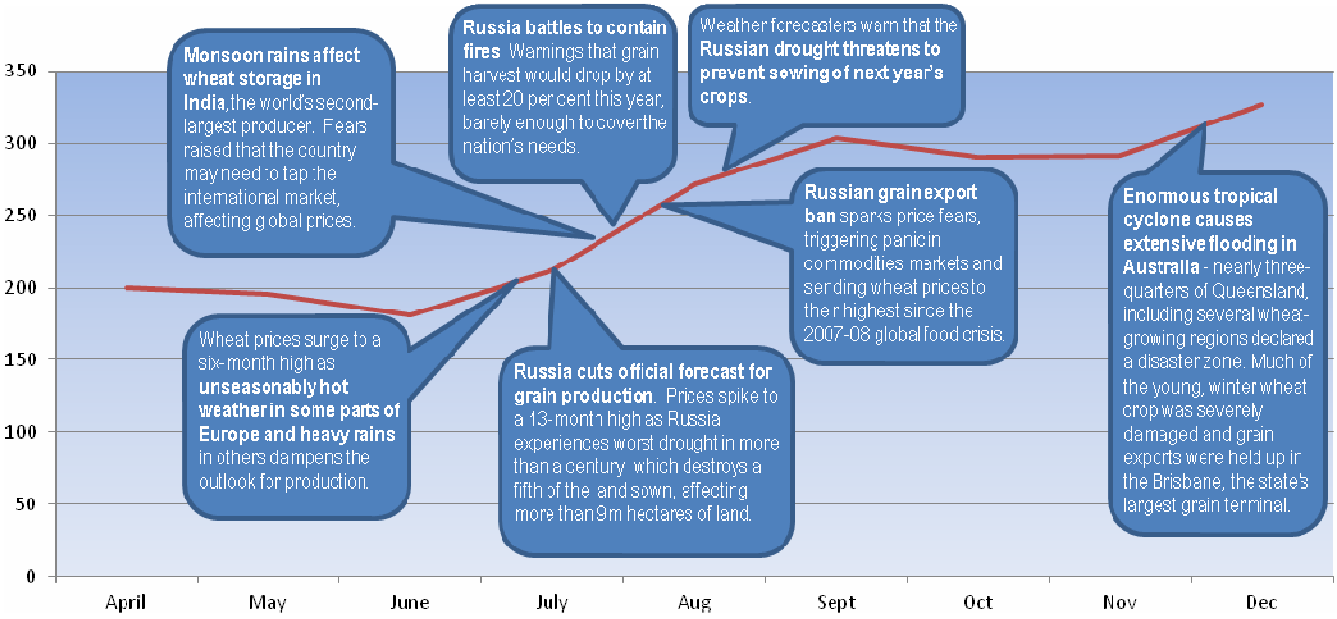
to escalate, and destabilizing global food security. From the Russian heat wave in 2010, which triggered a major global wheat price spike, to one of the worst droughts in decades in the Horn of Africa this year, extreme weather events have pushed millions of people into hunger.

Adverse weather in some major exporting countries was a significant trigger of food insecurity and increasing food prices in 2010 and 2011.[6] Tight conditions in the world market meant that prices were already highly sensitive to supply disruption.[7] So when a series of weather-related shocks hit over ten months from June 2010, markets reacted in turmoil.[8] Weather in many places was unseasonal, either too dry, too wet, too hot or too cold. It hit crop production, causing reduced food availability and higher prices.[9] These were significant factors in the 2010-11 food price spike. The FAO Food Price Index hit an all-time high in February 2011.[10] Thankfully, there has been a partial respite in global food prices since this peak. Good harvests are now expected in many regions while demand has slowed because of economic uncertainties.[11]

Grain production was hit hard in this period. There was an eight percent fall in production in developed countries as a result of a number of weather events in 2010. They account for about 70 percent of world trade in cereals, therefore this drop in production contributed significantly to the price hikes.[12] However these price increases were far out of proportion to the decline in supply. Some governments were panicked by grain shortages into slapping on export controls, which amplified the price spike.[13] The price of wheat increased by 60 to 80 percent between July and September 2010 and by April 2011 it hit $364 per tonne – 85 percent higher than a year before.[14] As a result of weather-related events, cereal stocks held by traditional exporters fell by an estimated 25 percent in 2010, leaving markets more vulnerable to future weather events.[15]

The poorest people spend as much as 75 percent of their income on food. To them, price rises on this scale can be catastrophic. Families are forced into desperate trade-offs to feed themselves.[16] According to World Bank estimates, food price spikes between June and December 2010 may have put 44 million more people into poverty.[17] This is on top of the 1.2 billion people already living below the extreme poverty line of $1.25.[18] High food prices not only reduce poor households' purchasing power and reinforce poverty traps, but they hit poor food producers too. Higher price volatility increases uncertainty and deters the investments essential to increasing food production and reducing vulnerability.[19]

2010: A year of erratic weather and wheat price spikes[20]



By mapping a series of extreme weather events in 2010 against price movements for wheat we can see how price increases have followed hot on the heels of extreme weather events and the exacerbating effects of market and government panic.

A HARBINGER OF WHAT IS TO COME

World food production is struggling to keep up with increasing demand for a number of reasons: land and water are being put under more competitive stress; food crops are being switched to biofuels; rising population and income growth are changing demand dynamics too. The IPCC report on extreme weather and climate change is a stern reminder that climate change is likely to bring hotter temperatures, heavy downpours and heat waves. This will increase the risk of production shocks, local food availability and price volatility. Climate change will exacerbate the uncertainty and unpredictability of global food security too.[21]

2010-11: FOUR EXTREME EVENTS IN FOCUS

The examples of extreme weather events in 2010-11 below show how climate extremes have contributed to increasing food insecurity at global, regional and local levels.[22] Beyond the debate over man-made climate change's role in these events, one thing is clear. If nothing is done, climate change will in future make a bad situation worse.

July-August 2010: Russia's worst heat wave on record

In July and August 2010, temperatures exceeded 104 degrees Fahrenheit (40 degrees Celsius) in Russia. The drought and fires that followed caused many deaths and slashed the summer harvest in south western Russia where most of the country's grain is produced.

- **43 regions were affected and 13.3 million acres of crops destroyed**. This was **17 percent of the total crop area and included almost 25,000 farms**. Russia's main grain producing region, the Volga, was most severely hit, seeing its annual harvest drop by more than 70 percent.
- Overall **Russia's wheat production in 2010 was down 30 percent on the year before**.
- Drought-affected production in neighboring countries too, such as the **Ukraine where wheat production in 2010 was down 20 percent on the year before**.[23] The impact of these reductions was felt globally as the former Soviet Union countries were expected to account for 27 percent of global wheat exports.

News of these Russian harvest losses in 2010 caused international grain prices to increase dramatically. The market panicked. In an effort to protect local consumers and meat producers, the Russian government instituted a grain export ban that pushed prices on international markets even higher.[24] Ukraine followed with export quotas and Pakistan with export bans for wheat, while India kept in place a two-year ban for non-basmati rice exports. Resulting higher global wheat prices fed into sharp increases in domestic wheat prices in many countries:

The costs of Russia's heat wave felt in Azerbaijan

"*Recent price increases are much higher than previous ones; flour used to cost 14 AZN last year, now it is 22 AZN. We have cut down on other food items, and increased bread consumption*" says Shakir Hasanov.

Tayyub Ahmadov who is married with three children says "*On average 70 percent of all income is spent on food, the rest on education of my kids, transportation and heating. If the food prices were lower, I would afford sending my elder daughter to college or university as she is so keen to continue her education, but with these prices, it is hardly possible for us*".

April, 2011

Tayyup's wife, Gulnara, and son, Farhad, eat breakfast

- The resulting supply shock sent wheat prices on international markets soaring. **International prices of wheat increased by between 60 to 80 percent between July and September 2010, and by April 2011 were $364 per tonne - 85 percent higher than a year earlier.**[25]
- This fed into sharp increases in domestic wheat prices in many countries. **Between June 2010 and December 2010, the price of wheat increased by large amounts in Kyrgyzstan (54 percent), in**

Tajikistan (37 percent), in Mongolia (33 percent) and in Azerbaijan (24 percent). For all of these countries, wheat is a very significant staple food, particularly for the poor.[26]

The November 2011 IPCC report on extreme weather events indicates that heat waves and temperature extremes are likely to become more common by the end of the 21st century:

"It is *virtually certain* that increases in the frequency and magnitude of warm daily temperature extremes and decreases in cold extremes will occur in the 21st century on the global scale. It is *very likely* that the length, frequency and/or intensity of warm spells, or heat waves, will increase over most land areas".[27]

May 2011 – present: The Horn and East Africa experiences most serious drought in decades

The severe drought in the Horn and East Africa has led to significantly reduced local availability of food and triggered dramatic localized price increases. Some parts of the region have experienced their lowest rainfall in 60 years. In an area characterized by chronic vulnerability, precarious livelihoods and long running conflict, this has contributed to over 13 million people being pushed into crisis. Rising costs have been exacerbated by poorly developed market networks, inadequate infrastructure and spiraling fuel costs.

- **In Kenya there has been near total crop failure in some areas. The national maize output is expected to be 15 percent below average**.[28]
- **In Ethiopia the FAO estimates that 60 percent of cattle and 40 percent of sheep have died.**[29]

Most people in the Horn and East Africa grow their own food or eat local staples grown where they live or in neighboring countries, which are not traded on global markets. This means that the localized impacts of extreme weather events can be extreme.

- **In July 2011, sorghum prices in Somalia were up to 393 percent higher than the five year average.**[30]
- **Again in July 2011, maize prices in Ethiopia and Kenya were up to 191 percent and 161 percent above their five year average respectively.**[31]
- **While prices have come down, they still remain significantly above their five-year averages.**

When a weather event drives local or regional price spikes, poor people often face a double shock of having to cope with higher food prices at a time when the direct effects of the weather may have also depleted their assets i.e. their homes or crops destroyed; crops and livestock sold or gone. This toxic mix of higher prices and lower purchasing power has driven many people into crisis in the Horn and East Africa. Pastoralists in the region are one of the hardest hit groups – tens of thousands of them have lost their livestock which they depend on for their income which means that they have no money to buy food, even where it is available.

30 day walk to reach help

"Alot of people left the village. Some people were still there when we left. People came here and other places in Ethiopia. We arrived around four weeks ago. It took 30 days to get here. We have a household of 20 people, including children and grandchildren.
"We left due to hunger and drought. We used to have livestock. They all died - thirty-five cattle and fifteen sheep. When the last one died that is when we decided to leave. We left our houses and came here.
"Before there were droughts but not like this. I don't know when the drought will end.
"On the way we were very dusty and hungry. We had a little maize that we prepared on the way. We walked with our children on our backs...the children are small and couldn't walk by themselves."

Hussain Aden in his shelter at the refugee transit centre nr Dolo Ado. Juwari village, Ethiopia, July, 2011

All climate models reflect an inevitable level of uncertainty, but currently we can say that in the absence of urgent action to slash global greenhouse gas emissions, temperatures in the region will likely increase by 3℃-4℃ by 2080-2099 relative to 1980-1999.[32] Rainfall trends, on the other hand, are currently unclear.[33]

The IPCC report on extreme weather states with *medium confidence* that droughts will intensify in the 21st century in some seasons and areas due to reduced rainfall. This applies to regions including southern Africa, southern Europe and the Mediterranean region, central Europe, central North America, Central America and Mexico, and northeast Brazil.[34]

August – October 2011: Heavy monsoon rains hit South East Asia

Heavy monsoon rainfall and multiple typhoons have inundated large areas including rice lands in South East Asia – in Thailand, Cambodia, Vietnam, Laos, Myanmar, and the Philippines – resulting in some 1,100 deaths and affecting nearly 10 million people across the region.[35]

- The **floods in South East Asia affected an estimated 2.6 million hectares, or 6 percent, of the region's rice area**.

Fortunately the impacts were to some extent offset by favourable conditions unaffected areas where yields are forecast to have increased from last year. There also exist large reserves of rice.[36] Nonetheless, the impacts of the flooding on local food prices, livelihoods and purchasing power of some of the most vulnerable people are serious.

- **Prices of rice in Thailand were about 25 percent higher in September 2011 than a year earlier. In Viet Nam prices were about 30 percent higher in October 2011 than in October 2010** due to harvest losses, disruption of markets and higher transport costs after the floods.[37]
- **In Cambodia, the retail price of rice shot up in October 2011 by up to 19 percent in just one month** due to crop losses, increased transport costs over flood-damaged roads, procurement of rice for food aid and suspected hoarding by private traders.[38]

Compounding things, the loss of crops is expected to have a severe impact on the livelihoods of the most vulnerable too. Many families affected by the floods rely on farming for their food and income.[39] In Cambodia for example, where perhaps 11 percent of the 2.5 million acres of rice planted this season has been destroyed,[40] it is reported that many farmers will have to borrow to make good their losses which is commonly done at exorbitant rates. Farm-based, landless laborers who have lost their livelihoods are the most vulnerable.

Meanwhile, the wages earned by unskilled urban workers have not kept pace with the sharp increase in rice prices. The purchasing power of poor households, including those not necessarily directly affected by the floods, has been severely diminished.[41]

The recent IPCC report on extreme weather states that the frequency of heavy rainfall is likely to increase in the 21st century in many parts of the world, in particular in the high latitudes and tropical regions, and in winter in the northern mid-latitudes. Moreover, heavy rainfalls associated with tropical cyclones are *likely* to increase with continued warming.[42] There is less certainty over the impact of climate change on frequency of flooding due to the many factors that determine whether an area floods at a particular time.[43]

2011 - Afghanistan suffers severe drought

More than two million people in Afghanistan now face food shortages as this winter approaches after a serious drought earlier in the year. Poor rains meant that families in drought-affected provinces were unable to grow enough wheat to last the winter. Snow is already falling and many mountainous areas are likely to be cut off within weeks. Villagers who are used to hardship are telling Oxfam that this year the drought has destroyed everything. Their food stocks are already low and they are worried about how they will get through the coming months.

- **Poor rains earlier this year destroyed up to 80 percent of rain fed wheat crops in drought-affected areas scattered across the country's north, northeast and west**, leaving affected communities with little food to eat.[44]
- **Afghanistan's wheat harvest in 2011 is estimated to be 28 percent less than in 2010**.[45]

According to FAO, the national price of wheat – the country's staple food – has been rising since June 2010, partly due to the reduced harvest and partly the rise in the international prices.[46]

- **WFP estimates that prices of wheat increased by 19 percent between June 2010 and December 2010** in response to higher international wheat prices.[47]
- **In July 2011 prices of wheat and wheat flour in drought-affected areas may have increased by up to 79 percent over their levels a year before**.[48]
- Of Afghanistan's poorest people, **up to 60 per cent work in agriculture and are estimated to devote more than half their income to food.** This crisis will hit both wallets and stomachs in many of the poorest households in affected areas.[49]

The situation is worsened by the impact that the drought has had on people's livelihoods. Crop losses are compounded by loss of pasture and escalating prices of fodder, leading people having to sell the animals they rely on for income – because they cannot feed both them and themselves. A recent UN-led assessment gave a snapshot of the grave impacts the drought is having on communities: school closures; forced migration to find food and work; already vulnerable families forced deeper into debt to get through the winter.[50] To survive, vulnerable families are selling all rather than just some of their livestock. Meanwhile even younger children are forced into more work and for less money.[51]

The drought experienced in Afghanistan in recent months is a foretaste of what is projected to become more common and more severe as a result of climate change in the coming decades. The IPCC Fourth Assessment report states that this region of central Asia is projected to experience a decrease in average rainfall, accompanied by an increase in the frequency of very dry spring, summer and autumn seasons.[52] According to the UN, Afghanistan has experienced eight slow onset droughts since 2000 "that were large enough in area to have significantly reduced agriculture production, [and] increased acute food insecurity".[53]

RECOMMENDATIONS FOR THE COP 17 CLIMATE TALKS

The extreme weather of 2010/11 has contributed to increasing food insecurity at all levels. It is always the poorest and most vulnerable people who suffer the worst consequences. The countless human tragedies that lie behind the headlines offer only a glimpse of what climate change may hold for the future if left unchecked. Increasing frequency and severity of extreme weather events could leave many poor countries with potentially overwhelming food security challenges. This must add urgency to the need for immediate action to reduce emissions and to fund adaptation if a calamitous future is to be avoided.

Governments at COP 17 must:

On finance:

- **Take strides to get the Green Climate Fund up and running by 2013**, with provisions to ensure developing countries are in the driver's seat, at least 50 percent of resources are directed to adaptation, and strong representation of women and civil society in the decision making processes and policies of the Fund.

- **Commit to scaled-up long-term finance 2013-20 to ensure the global Green Climate Fund is not an empty shell and that developed countries meet their commitments to mobilize at least $100bn per year by 2020.** This should include:
    - A commitment that there shall be no financing gap after the "Fast Start Finance" period ends in 2012, and a progressive scaling-up thereafter to meet the $100bn commitment as soon as possible;
    - A commitment to ensure a substantial initial funding of the Green Climate Fund in time to see that it is fully up and running by 2013.

- A clear and ambitious work program in 2012 to assess sources of long-term climate finance - including scaled-up budgetary contributions and specific supplementary innovative sources - leading to comprehensive decisions on long term finance at COP-18.

- **Agree the key principles of a fair deal on shipping emissions that both reduces emissions and raises climate finance.** This must provide guidance to the International Maritime Organisation to design a carbon pricing instrument for international shipping which takes account of the principle of "common but differentiated responsibilities" by ensuring that revenues are directed both as compensation to developing countries for the marginally increased transport costs they will face, and to the global Green Climate Fund. At least $10 billion per year for the Green Climate Fund should result.

On mitigation:

- **Recognize the 'Emissions Gap' and start a process to close it.** Governments must quantify the size of the ambition gap, identify options to close or minimise loopholes in emissions accounting, and resolve to increase their individual mitigation targets. This is especially true for developed countries whose proposed emission cuts lead to, at best, 12-18 percent reductions below 1990 levels by 2020, instead of the 40 percent needed.

- **Commit to contribute their fair share to the global long-term mitigation effort** needed to keep global warming to well below 2℃, while keeping within reach the chance to limit warming to below 1.5℃. This requires that global emissions peak no later than 2015 and are cut at least 80 percent below 1990 levels by 2050.

On legal form:

- **Recognise that an effective global climate regime must be embedded in international law and commit to build on and not roll back, the existing international legal architecture for the fight against climate change.** This should include:
  - A commitment by all Parties to the Kyoto Protocol to new targets under a second commitment period.
  - Agreement that all countries will increase their mitigation targets before 2020, and capture them as legally binding commitments in a new international framework.

Oxfam's GROW campaign is calling for global action to fix a broken food system where 925 million people already go hungry every day. This could get worse in the face of dwindling natural resources, like land, the gathering pace of climate change and increasing food price volatility. Find out how we can help prevent this from getting worse at www.oxfam.org/grow

NOTES

[1] IPCC (2011) Managing the risks of extreme events and disasters to advance climate change adaptation
[2] http://af.reuters.com/article/commoditiesNews/idAFLDE7291Q020110311
[3] Nelson, Gerald C. et al (Dec 2010) Food security, farming and climate change to 2050: Scenarios, Results, Policy Options, IFPRI; van der Mensbrugghe, D., I. Osorio-Rodarte, A. Burns, J. Baffes (2011) 'Macroeconomic environment and commodity markets: a longer-term outlook' in P. Conforti (ed) Looking Ahead in World Food and Agriculture: Perspectives to 2050. FAO: Rome; Hertel, T.W., Burke, M.B., Lobell, D.B. (2010) 'The Poverty Implications of Climate-Induced Crop Yield Changes by 2030' Global Environmental Change 20, 577–585 also projects agricultural price increases as a result of climate change and population growth in combination with low agricultural productivity growth.
[4] Willenbockel, D. (2011) Exploring Food Price Scenarios Towards 2030 with a Global Multi-Region Model. Oxfam Research Report. The food price scenarios outlined are based on trend prices for 2010, rather than on actual observed prices. For more information see: http://www.oxfam.org/sites/www.oxfam.org/files/note-food-price-scenarios-research-211111-en_3.pdf
[5] Beyond their immediate impact on yields, extreme weather events can trigger market panic which drives prices even higher (for a good analysis, see Ward, Karen, et al., 'Wheat's Up', HSBC Global Research,9 August 2010). Farmers may be hesitant to plant if they think their crops might be wiped out. Traders might hoard food thinking that there might not be more available in the future. And exporters might impose export restrictions in an attempt to guarantee supply for their own populations. All contributing to greater food insecurity for the most vulnerable.
[6] See for example: FAO (June 2011) Food Outlook: Global Market Analysis; Development Committee (2011) Responding to Global Food Price Volatility and Its Impact on Food Security. Joint Ministerial Committee of the Boards of Governors of the Bank and the Fund on the Transfer of Real Resources to Developing Countries; and Trostle et al. (2011) Why Have Food Commodity Prices Risen Again? A report from the Economic Research Service, USDA
7 While food stocks had somewhat recovered since 2008, they remain low; the fine balance between supply and demand means that supply shocks have an immediate impact on prices.
8 The main long-run factors leading to tight market conditions were the combination of (i) demand pressures associated with population and per-capita income growth with (ii) a decline in global average yield growth rates as a result of sluggish investment in agricultural research and development, (iii) rising energy prices that not only pushed up agricultural production and transportation costs but also created incentives for (iv) a strong rise in biofuel production, and (v) a decline in the value of the US dollar against other major currencies.
[9] Trostle et al. (2011) Why Have Food Commodity Prices Risen Again? A report from the Economic Research Service, USDA p17
[10] See FAO http://www.fao.org/giews/english/gfpm/GFPM_03_2011.pdf
[11] FAO (Nov 2011) Food Outlook: Global Market Analysis
[12] Development Committee (2011) Responding to Global Food Price Volatility and Its Impact on Food Security. Joint Ministerial Committee of the Boards of Governors of the Bank and the Fund on the Transfer of Real Resources to Developing Countries.
[13] Ibid.
[14] FAO Crop Prospects and Food Situation September 2010: http://www.fao.org/giews/english/cpfs/index.htm; and FAO Global Food Price Monitor June 2011: http://www.fao.org/giews/english/gfpm/
[15] See Trostle et al. (2011) Why Have Food Commodity Prices Risen Again? A report from the Economic Research Service, USDA
[16] Hossain N. and Green D. (2011) Living on a Spike: How is the 2011 food price crisis affecting poor people? Oxfam Research Report
[17] World Bank, Food Price Watch, February 2011, Box 1: Estimating the Poverty Impact of Recent Food Price Rises http://www.worldbank.org/foodcrisis/food_price_watch_report_feb2011.html
[18] Living below the poverty line in 2008 according to World Bank Poverty Analysis Poverty Overview: http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTPOVERTY/EXTPA/0,,contentMDK:20040961~menuPK:435040~pagePK:148956~piPK:216618~theSitePK:430367~isCURL:Y,00.html#_ftn1
[19] CFS (Oct 2011) CFS 37th Session, Policy Roundtable, Food Price Volatility, Rome Oct 2011, p.3
[20] Analysis drawn from: 'What's driving the wheat price spike?' Financial Times http://www.ft.com/cms/s/0/ef6b05e8-ac47-11df-a532-00144feabdc0.html#axzz1c00nzLpS; Fears grow over global food supply, September 2 2010, Financial Times; Queenslands floods - http://www.ibisworld.com.au/common/pdf/QLD%20floods%20special%20report.pdf.
[21] Development Committee (2011) Responding to Global Food Price Volatility and Its Impact on Food Security. Joint Ministerial Committee of the Boards of Governors of the Bank and the Fund on the Transfer of Real Resources to Developing Countries
[22] These were not the only extreme weather events affecting harvests to occur in 2010-11 – other events include floods in Australia, Sri Lanka and Pakistan, and drought in Argentina.
[23] All figures reported by USDA. Russian wheat yields were 61.8 million tonnes in 2009 and 41.5 million tonnes in 2010 according to official figures. Ukraine's wheat yields were 20.9 million tonnes in 2009 and 16.8 million tonnes in 2010 according to official figures http://www.pecad.fas.usda.gov/2009
[24] For more information see Welton G. (2011), *The Impact of Russia's 2010 Grain Export Ban*, Oxfam Research report
[25] FAO Crop Prospects and Food Situation September 2010: http://www.fao.org/giews/english/cpfs/index.htm; and FAO Global Food Price Monitor June 2011: http://www.fao.org/giews/english/gfpm/
[26] World Bank (Feb 2011)Food Price Watch
[27] IPCC (2011) Managing the risks of extreme events and disasters to advance climate change adaptation, p10: "It is very likely (90-100% probability) that the length, frequency and/or intensity of warm spells, or heat waves, will increase over most land areas. Based on the A1B and A2 emissions scenarios, a 1-in-20 year hottest day is likely (66-100% probability) to become a 1-in-2 year event by the end of the 21st century in most regions, except in the high latitudes of the Northern Hemisphere, where it is likely to become a 1-in-5 year event. Under the B1 scenario, a 1-in-20 year event would likely become a 1-in-5 year event (and a 1-in-10 year event in Northern Hemisphere high latitudes)."
[28] FSNWG, 'Emergency in the Horn of Africa', Horn and Eastern Africa, September 2011
[29] OCHA (Sept 2011) 'Horn of Africa Drought Crisis, Situation Report No. 12, 2 September 2011
[30] WFP (July 2011) "The Market Monitor: Trends of staple food prices in vulnerable countries" Issue 12
[31] WFP (July 2011) "The Market Monitor: Trends of staple food prices in vulnerable countries" Issue 12
[32] IPCC (2007) Fourth Assessment Report: The Physical Science Basis Chapter 11, p 868
[33] Gore T. and Hillier D. (Aug 2011) Briefing on the Horn of Africa Drought: Climate change and future impacts on food security, Oxfam briefing, p3
[34] IPCC (2011) Managing the risks of extreme events and disasters to advance climate change adaptation, p 11

[35] USAID (2011) South East Asia – Floods, Factsheet #3
[36] USDA – FAS (2011), Circular Series WAP 11-11, November 2011
[37] FAO (Nov 2011) Global Food Price Monitor
[38] WFP (Oct 2011) Cambodia Food Price and Wage Bulletin. Added to this is the recent implementation of a new rice producer subsidy scheme in Thailand, which has raised Thai export prices and increased regional demand for cheaper Cambodian rice, putting upward pressure on the price of rice in domestic markets – See FAO (Nov 2011) Global Food Price Monitor
[39] See impacts in Cambodia for example: USAID (2011) South East Asia – Floods, Factsheet #3
[40] UN in Cambodia, 18 November 2011, Flood Season Situation Report #7: http://reliefweb.int/sites/reliefweb.int/files/resources/SITREP%237_181111.pdf
[41] WFP (Oct 2011), Cambodia Food Price and Wage Bulletin
[42] IPCC (2011) Managing the risks of extreme events and disasters to advance climate change adaptation, p10
[43] IPCC (2011) Managing the risks of extreme events and disasters to advance climate change adaptation , p12
[44] UN led Emergency Food Security Field Assessments, second round, Nov 2011
[45] USAID (June 2011) Afghanistan Food Security Alert, 20 June 2011 and http://unama.unmissions.org/Default.aspx?tabid=1741&ctl=Details&mid=1882&ItemID=15380
[46] FAO brief on Afghanistan, 12 August 2011: http://www.fao.org/giews/countrybrief/country.jsp?code=AFG
[47] World Bank (Feb 2011) Food Price Watch. It should be noted that reliable data on prices in Afghanistan is notoriously difficult to obtain
[48] FAO brief on Afghanistan, 12 August 2011: http://www.fao.org/giews/countrybrief/country.jsp?code=AFG
[49] As reported by the UN http://unama.unmissions.org/Default.aspx?tabid=1741&ctl=Details&mid=1882&ItemID=15380
[50] UN led Emergency Food Security Field Assessments, second round, Nov 2011
[51] Oxfam programme staff reports
[52] IPCC (2007) Fourth Assessment Report: The Physical Science Basis, section 11.4.3.2
[53] United Nations (2011) Afghanistan: 2011 Consolidated Appeal Emergency Revision in Response to Drought