

## LOCAL, NATIONAL, REGIONAL CLIMATE CHANGE PROGRAMME

FOOD SECURITY AND CLIMATE CHANGE – POTENTIAL MITIGATION OPTIONS

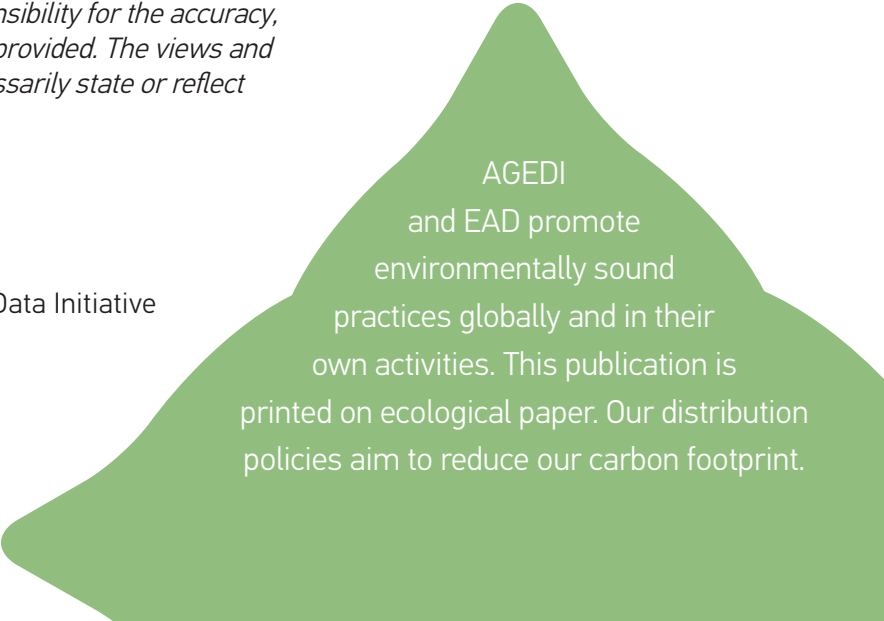
Companion Briefing

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**Local, National and Regional Climate Change Programme 2013-2016**

Socioeconomic Systems	Regional Climate Change	Environment	Coastal Zones	Water Resources
Public Health Benefits of GHG Mitigation 	Atmospheric Modelling 	Terrestrial Ecosystems 	Coastal Vulnerability Index 	Al Ain Water Resources 
Food Security 	Arabian Gulf Modelling 	Marine Ecosystems 	Sea Level Rise 	Water Resource Management 
Desalinated Water Supply 	<div>L=Local    N=National    R=Regional</div> <div>5 Thematic Areas    3 Spatial Regions    12 Sub-projects</div>			Transboundary Groundwater 

**12 Sub-projects**  
**Assess the Impacts, Vulnerability & Adaptation to Climate Change in the Arabian Peninsula**



## Introduction



The results of AGEDI's Food Security & Climate Change study pose significant implications for food security policies and measures in the UAE. The UAE is a country that is heavily dependent on food imports and would be vulnerable to food supply constraints and associated price shocks associated with climate change impacts in food-exporting countries. The study found that the combination of climate change-induced declining agricultural productivity in food-exporting countries, tightening of world food markets, and limits to local agricultural production could lead to several adverse circumstances in the UAE. These may include constraints in future food trade flows of key items

likes cereals and vegetables that could lead to recurrent retail food price spikes and/or a need for substantial food subsidies. Moreover, those households throughout the seven emirates with annual incomes at the lower end of the national range could find themselves in a position where they would be subject to spending a growing share of limited household budgets for food. While the identification and analysis of specific strategies that could improve future food security in the UAE were beyond the scope of the study, a brief review of potential strategies is offered below as a way of framing future policy dialogues.



## Potential strategies

There are numerous options and measures to reduce risks associated with volatile international food markets. These include risk-hedging food procurement strategies, virtual food stockpiles, early warning systems, and alternative food acquisition strategies (Abbot, 2010; Porter, et al. 2014; Dawe, 2010; World Bank, 2012; FAO, 2011a, 2011b, 2014; and Prakash, 2011).

A brief overview of some potential options that may be valuable to consider in the UAE is provided in the bullets below.

- Assess and address any procurement barriers to food imports: Large international food trades may represent high risks in a future climate-changed world where supplies may become more limited and procurement may become more competitive. Any barriers in the UAE to efficient and market-based international procurement systems - whether in existing legislation or in food control regulatory procedures - should be reviewed and removed as appropriate to take advantage of cost-effective procurement strategies such as electronic tendering and transaction-risk mitigation (i.e. risk hedging).
- Exploit any regional economies of scale for food imports: Alone, the UAE is not a large importer of any food commodity by quantity. On the other hand, the GCC countries as a bloc of countries represent a major importer of certain food commodities that will likely be constrained under climate change, as the study has shown. For example, in 2013 about 1 billion tonnes of refined sugar was imported by GCC countries, about 40 times the level of China and 6 times the level of US (the two highest importing countries in the world), respectively. Similar - though not as large - food import patterns are evident for other potentially constrained food imports like cooking oil, fruit, wheat,







and rice, when compared to China and the USA. With such evident economies of scale at the GCC bloc level, there could be substantial market leverage that would allow the UAE/GCC to take advantage of formal risk markets and push for better prices – provided the UAE and GCC countries establish and/or build upon food procurement collaboration mechanisms.

- Develop an early warning system to monitor international food trade developments: Putting in place an agency/department in the UAE with the sole responsibility of monitoring world and regional supply and demand for major food items that are projected to be export-constrained to the UAE under climate change (e.g. wheat, rice, vegetables, fruit, cooking oil, groundnuts) could provide a valuable information system to help identify potential supply/demand warning signs and potentially foresee looming price shocks. Such an early warning system could enable advance action to adjust import levels and/or apply risk hedging strategies that would lessen the UAE's vulnerability to circumstances in food exporting countries beyond its control.
- Complement physical food stockpiling with virtual stockpiling strategies: Physical stockpiling strategies would involve buying and stockpiling potentially constrained food items during good years (i.e. agricultural productivity is high in major exporters and international food trade prices are low). The location could be within the UAE or even elsewhere within the GCC as part of a GCC-wide stockpiling strategy. Virtual stockpiling strategies would involve the use of financial instruments such as futures contracts and options. These would help to ensure procurement of a constrained food item at a certain price without the costs of the physical infrastructure for perishable items.



- Invest in agricultural research and development in traditional priority trading partners: Many countries upon which the UAE relies for substantial quantities of food imports (e.g. India) are also countries where the resources and systems needed to effectively adapt its agricultural systems to climate change are lacking. As a complement to its overseas development assistance strategies, the UAE could consider investing in rehabilitating irrigation infrastructure, distribution networks, or other stages of the food supply chain in these countries. Such investments could increase the agricultural productivity of the land and could be combined with price-competitive bilateral agreements on future imports.
- Reassess agricultural land acquisition strategies: In recent years, the UAE has embarked on a coordinated regional policy to buy or lease agricultural land abroad as a way to pursue long-term food security. The objective has been to secure deals, particularly in other Islamic countries, by which capital and oil contracts are exchanged for guarantees that private corporations from the Gulf will have access to farmland and can export the produce back to the region. However, there are potential risks to this strategy, the foremost being that many of the same countries in which land-lease arrangements have been established are also likely to experience adverse impacts of climate change on agricultural productivity. Rather than being shielded from food market volatility, the cost of agricultural production from such lands would likely be volatile as well. Moreover, there is the possibility that during a future national food production crisis in such countries, the government could simply ban food exports temporarily, as was the case during the 2008 global food crisis.



## References



Abbot, P., 2010. Stabilisation Policies in developing countries after the 2007-08 food crisis, Global forum on Agriculture, 29-30 November 2010, Paris

Dawe, D. (ed.), 2010. The Rice Crisis: Markets, Policies and Food Security, Food and Agriculture Organization of the United Nations and Earthscan, Rome, London and Washington, DC. 3-11. <http://www.fao.org/3/a-an794e.pdf>.

FAO, 2011a. Price Volatility in Food and Agricultural Markets: Policy Responses. [http://www.fao.org/fileadmin/templates/est/Volatility/Interagency\\_Report\\_to\\_the\\_G20\\_on\\_Food\\_Price\\_Volatility.pdf](http://www.fao.org/fileadmin/templates/est/Volatility/Interagency_Report_to_the_G20_on_Food_Price_Volatility.pdf)

FAO 2011b. Policy options to address price volatility and high prices, in The State of Food Insecurity in the World 2011: How does international price volatility affect domestic economies and food security? <http://www.fao.org/docrep/014/i2330e/i2330e00.htm>

FAO, 2014. The State of Food Insecurity in the World 2014: Strengthening the Enabling Environment for Food Security and Nutrition. Food and Agriculture Organization of the United Nations, Rome. <http://www.fao.org/publications/sofi/2014/en/>.



Porter, J.R., Xie, L., Challinor, A.J., Cochrane, K., Howden, S.M., et al. (2014). Chapter 7: Food Security and Food Production Systems. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, C.B. Field, V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastandrea, et al. (eds.). Cambridge University Press, Cambridge, UK, and New York. [http://ipcc-wg2.gov/AR5/images/uploads/WGIIAR5-Chap7\\_FINAL.pdf](http://ipcc-wg2.gov/AR5/images/uploads/WGIIAR5-Chap7_FINAL.pdf).

Prakash, A. (ed) (2011). Safeguarding Food Security in Volatile Global Markets, Food and Agriculture Organization of the United Nations, Rome. 175-201. <http://www.fao.org/docrep/013/i2107e/i2107e10.pdf>.

World Bank. (2012). Improving Food Security in Arab Countries. The World Bank. Washington, DC



## About



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### AGEDI

Under the guidance and patronage of His Highness Sheikh Khalifa bin Zayed Al Nahyan, President of the United Arab Emirates, the Abu Dhabi Global Environmental Data Initiative (AGEDI) was formed in 2002 to address responses to the critical need for readily accessible, accurate environmental data and information for all those who need it.

With the Arab region as a priority area of focus, AGEDI facilitates access to quality environmental data that equips policy-makers with actionable, timely information to inform and guide critical decisions. AGEDI is supported by Environment Agency – Abu Dhabi (EAD) on a local level, and by the United Nations Environment Programme (UNEP), regionally and internationally.

For more information, visit [www.agedi.org](http://www.agedi.org).

All reports and resources are available for download at [www.agedi.org](http://www.agedi.org) and on our Climate Change Inspectors Online Portal, <http://www.ccr-group.org/cc-inspectors>.



### CCR Group

Climate Change Research Group (CCR Group) is a sustainable development research and consultancy firm focused on the intersection of energy, climate and development. Our network of specialists works with international development organizations, national and local governments, as well as non-governmental institutions to formulate policy frameworks, technical assessments and capacity building programmes.

Since CCR Group's founding in 2009, we have lead projects across Africa, the Middle East, Eastern Europe, Asia and the Americas. Because each client faces a unique set of challenges based on local context, we have experience developing strategies for multiple issue areas within sustainable development. Thematic issue areas and services for CCR Group include: Climate Change Adaptation Strategies; Greenhouse Mitigation Analysis; Climate Change & Disaster Risk Management; Climate Change, Agriculture & Food Security; Climate Change & Water Security; Climate Change & Public Health; Power Supply & Renewable Integration Modelling; Air Pollutant & Greenhouse Gas Emission Scenarios Modelling; and Capacity Strengthening Programmes.

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