

# Vulnerability in small islands and the Arctic

1. Key messages
2. We are already vulnerable to the weather
3. We need to adapt to climate change because...
4. Adaptation has started
5. Regional work is being undertaken

Emma L. Tompkins

Finding solutions to the biggest problems facing humanity and identifying the key opportunities  
of the 21st century  
<http://www.21school.ox.ac.uk/>



## Key messages

1. Most islands are already vulnerable to hazards...
2. Hazards don't have to become disasters
3. Sudden-onset climate changes...require disaster risk management
4. Creeping changes...require planning, planning and more planning
5. Successful adaptation...requires balancing risk, cost, and local participation
6. Principles of good climate adaptation...work together; find 'no regrets' options; learn and update; don't ignore uncertainty

Finding solutions to the biggest problems facing humanity and identifying the key opportunities of the 21st century  
<http://www.21school.ox.ac.uk/>



## Good practice guidelines exist

Island nations are already vulnerable to existing weather hazards...climate change could make these hazards more severe or more frequent...but we can cope...

We need to prepare for climate change because...hazards don't have to become disasters

Managing sudden-onset climate changes...requires disaster risk management

Managing slow-onset or creeping changes...requires planning, planning, planning and more planning

Successful adaptation is not as easy as it sounds...risk, cost, local voices have to be traded off

Principles of good climate adaptation...be flexible, work together; don't over-focus on climate change, find 'no regrets' options; learn and update; don't ignore uncertainty

## Small islands are vulnerable to weather and climate



### Climate change is happening and already dangerous

Scientists tell us that if the concentration of carbon dioxide in the atmosphere reaches 450 parts per million of CO<sub>2</sub> we could cross a dangerous threshold when certain impacts will become inevitable (in January 2007 we are at 385ppm). However some would argue that we already experience a dangerous climate. The climate could be considered dangerous if one person dies as a result of a weather hazard.

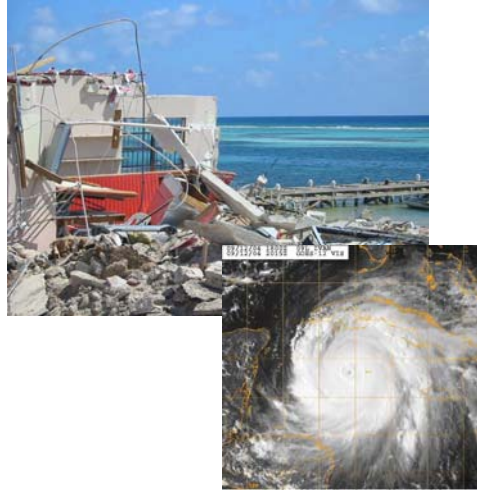
We are already exposed to hazards: droughts caused by changes in precipitation;

#### **Use pictures starting at top left in clockwise order**

rough seas which prevent docks from functioning (picture of Cayman Islands dock in stormy weather); extreme flood events related to heavy precipitation events and storm surges (picture of flooding following Hurricane Ivan); houses and roads demolished by storms (bottom two pictures). It is very difficult to attribute any one event to climate change, however we do know that people suffer as a result of these climatic events.

We also know that we don't all suffer the same when we are affected by weather hazards. The poor, the weak, the elderly, those with low mobility all seem to suffer more than most. While there are vulnerable people in society, this makes us all vulnerable to climate change. We will never eradicate vulnerability, but we can work to reduce the vulnerability of specific groups to help them prepare with many types of challenges. Anyone working on climate change adaptation must recognise the importance of working with the vulnerable – even if it is not their direct remit.

# We need to prepare for climate change because...



Finding solutions to the biggest problems facing humanity and identifying the key opportunities of the 21st century  
<http://www.21school.ox.ac.uk/>

 THE JAMES MARTIN  
21ST CENTURY SCHOOL  
UNIVERSITY OF OXFORD

**Key message: Lack of preparedness for hazards costs lives. If we are prepared we can make the most out of change**

Disasters do not happen because you are unlucky or in the wrong place at the wrong time. Disasters happen when a hazard hits a vulnerable community or ecosystem. Until recently it was believed that disasters were 'acts of God', they were beyond human control. This thinking meant that individuals, communities and entire countries perceived themselves to be at the mercy of disasters such as floods, hurricanes, tsunamis. Yet, we now know that science can tell us which parts of the world are susceptible to hazards, we know which parts of our country for example are susceptible to flooding and we can prepare for those risks. People in the disaster risk management community tell us that the damages from natural (and manmade) hazards can be significantly reduced by investing time and effort into preparing for it. We will talk about this later.

There are many examples that we could cite that show how lack of preparedness creates disasters and how good preparedness averts it. A good example can be found in the Caribbean. In 2004, September 11th – 12th, Hurricane Ivan, a Category 5 hurricane with gusts of up to 171 mph; maximum sustained winds of 150mph, and sea surge of 10 feet pounded the very low lying Cayman Islands (average height above sea level is 4 ft). While 95% of homes and other buildings were damaged, there were only two deaths. It was believed that this was a result of having excellent hurricane preparedness plans which were implemented as soon as the storm was 36 hours from the islands. In addition, the islands impose a strict building code (which generally follow South Florida's building codes) which mean that properties are built to withstand the impacts of hurricanes. (for more info see [http://chps.sam.usace.army.mil/USHESdata/Assessments/2004Storms/NHC/ivan/tropical\\_cyclone\\_report\\_Ivan.htm](http://chps.sam.usace.army.mil/USHESdata/Assessments/2004Storms/NHC/ivan/tropical_cyclone_report_Ivan.htm))

In contrast, in 2005, August 29th, a similar sized hurricane hit New Orleans, this was Hurricane Katrina, it had maximum sustained winds of 140mph with slightly lower gusts, storm surge and rainfall than Ivan. In New Orleans 1,100 people lost their lives and many thousands of homes were permanently beyond repair. The lack of a well rehearsed hurricane preparedness plan in the case of New Orleans meant that few knew of the risks associated with hurricanes, few knew of the areas of physical and social vulnerability and few knew how to act before, during and after the storm.

We know that climate change will exacerbate the risks that we already face, whether they are related to floods from high levels of rainfall, droughts from too little, or changes in storm patterns. But we also need to know that climate change will bring new risks for which we need to be prepared.

What is very clear is that climate change will affect the most vulnerable in society. It was not the rich who died in New Orleans, nor those with access to resources to enable them to leave. Those who suffered most were the poor, the weak, the elderly and the sick. We know in all other cases of weather hazards, such as the heat wave in France in 2003 that it is the vulnerable who suffer most when natural hazards occur. Therefore we need not only understand what the current and future hazards associated with climate change might be, but we also need to identify those who are most vulnerable to those risks.

NO population = 500,000; deaths = 1577

GCM population = 60,000; deaths = 0 (should have been 190 proportionately)

## Adaptation: from why to how

- what is it – theory and concepts (1980s/ early 90s)
- is it happening – evidence (late 1990s/ early 2000s)
- can we map it – tools and scenarios (early 2000s)
- how should we manage it? (recent)
- What is success? (demanded – not yet produced)

Finding solutions to the biggest problems facing humanity and identifying the key opportunities  
of the 21st century  
<http://www.21school.ox.ac.uk/>



Adaptation has transformed over the years from basic questions that relate to: what is adaptation and is it happening, to the more recent questions of how should we implement it and how can we ensure we are successful?

Clearly adaptation has already begun and now the need is to ensure it is undertaken in a way that generates long term sustainable benefits and does not hinder future adaptations.

In terms of implementation it is clear there has to be an emphasis on reducing the vulnerability of those who are susceptible to any kind of change, however there also needs to be awareness that the population at risk under climate change will expand, to include those in low lying coastal areas, those who will begin to experience hazardous climate variability and those who will be unable to cope with the increasing variability of their climate.

Success can only be measured in terms of how effective the measure is in bringing about long term development. If the adaptation prevents the adaptor or others from coping with and responding to the changes that climate change brings then it cannot be considered a success.

# Adaptation has started



In response to climate change. And without waiting for additional resources, Governments and communities are already investing in adaptation.

For example in the UK the UK Climate Impacts Programme ([www.ukcip.org.uk](http://www.ukcip.org.uk)) has been established whose remit is to work with businesses and government in the UK to help individuals, groups and businesses find ways to adapt to climate change. For example, as a result the UK now has a heat wave plan (**middle picture**).

In the Caribbean a 10 year programme has been running that is exploring how adaptation can best take place, this was initially through the GEF funded Caribbean Planning for Adaptation to Climate change (CPACC), this transformed into ACCC; MACC and now through the CCCCC. This institutions is building capacity, training people and evaluating baseline conditions and areas of vulnerability (**bottom picture/logo of the CCCCC centre**)

The Pacific equivalent is known as PICCAP (**left hand picture of a PICCAP brochure**).

In the Arctic, individuals are responding to changes that they are experiencing, these responses can be seen in the IPCC reports, and much work has been undertaken in Alaskan and Canadian universities (**left hand picture of Inavualit community member drying skins**)



There is a lot of work going on in the different regions which reflects the levels of interest and concern that exists

For example in the Caribbean, there have been many outputs from the CPACC/ACCC/MACC project

The South Pacific Regional Environment Programme (SPREP) that hosts PICCAP has also invested in adaptation to climate change

The US and the Canadian government have also invested in research in the Arctic  
 Pictures in clockwise direction are:

- 1: US Govt report on climate change permafrost and infrastructure (2003)
- 2: Vulnerability and Adaptation Resource group logo (the group comprises all the major donors including World Bank, GEF, UK DFID, GTZ, US Aid, CIDA, SIDA etc..)
- 3: UN Adaptation Policy Framework to assist countries to think about adaptation
- 4: ACIA report on Impacts of a warming world on the arctic
- 5: IPCC 2001 (1990, 1995 and 2007) reports on the regional impacts of climate change

# Vulnerability

Figure 2.3 The Disaster Crunch Model



(Adapted from Blaikie et al., 1994)

Finding solutions to the biggest problems facing humanity and identifying the key opportunities of the 21st century  
<http://www.21school.ox.ac.uk/>



The best place to start thinking about adaptation is in terms of the those who are already vulnerable, this might be to existing weather stresses, war, economic change or any form of internal or external stress. This is because climate change will effect those who are least able to cope the hardest. Making sure that these people are moved out of poverty must be a central goal of climate change adaptation, as without this, any palliative measure to help those unable to cope with any change to adapt to climate change will not have any long term benefits.

The picture shows the disaster crunch model is an excellent model that helps show the progressions of vulnerability leading to disasters.

# Help the poor adapt first

## FOCUS ON:

- POVERTY REDUCTION
- GETTING PEOPLE OUT OF VULNERABLE CONDITIONS
- ENHANCE ACCESS TO RESOURCES

- Adaptation funds will not enhance ability to adapt alone
- Much is known about how to reduce poverty:
  - Exploit natural resources (sustainably)
  - Build the private sector
  - Build regionally connected infrastructure
  - Reduce social exclusion: ensure basic human needs are met
  - Reduce regional inequalities
  - Improve governance and effectiveness of the state

Finding solutions to the biggest problems facing humanity and identifying the key opportunities  
of the 21st century  
<http://www.21school.ox.ac.uk/>



THE JAMES MARTIN  
21ST CENTURY SCHOOL  
UNIVERSITY OF OXFORD

In most cases it will be the poor who suffer most and who need the assistance to adapt. Therefore the focus has to be on addressing peoples lack of entitlements and:

- POVERTY REDUCTION
- GETTING PEOPLE OUT OF VULNERABLE CONDITIONS
- ENHANCING ACCESS TO RESOURCES

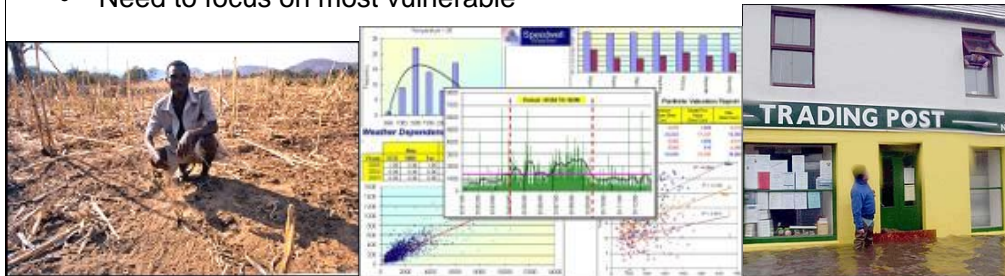
Adaptation funds will not enhance ability to adapt alone (e.g. New Orleans), there has to be investment in getting those who will be most susceptible to harm, out of harms way.

Much is known about how to reduce poverty (e.g. there has been significant investment in the UN Poverty Reduction Strategy Plans, Millennium Development Goals). Basic principles include:

- Exploit natural resources (sustainably)
- Build the private sector
- Build regionally connected infrastructure
- Reduce social exclusion: ensure basic human needs are met
- Reduce regional inequalities
- Improve governance and effectiveness of the state

# Basic principles of adaptation

- Early adaptors will benefit
- The private sector will adapt
- Resources already exist to fund adaptation privately
- Need to focus on most vulnerable



There are some basic principles that we already know from research on adaptation:

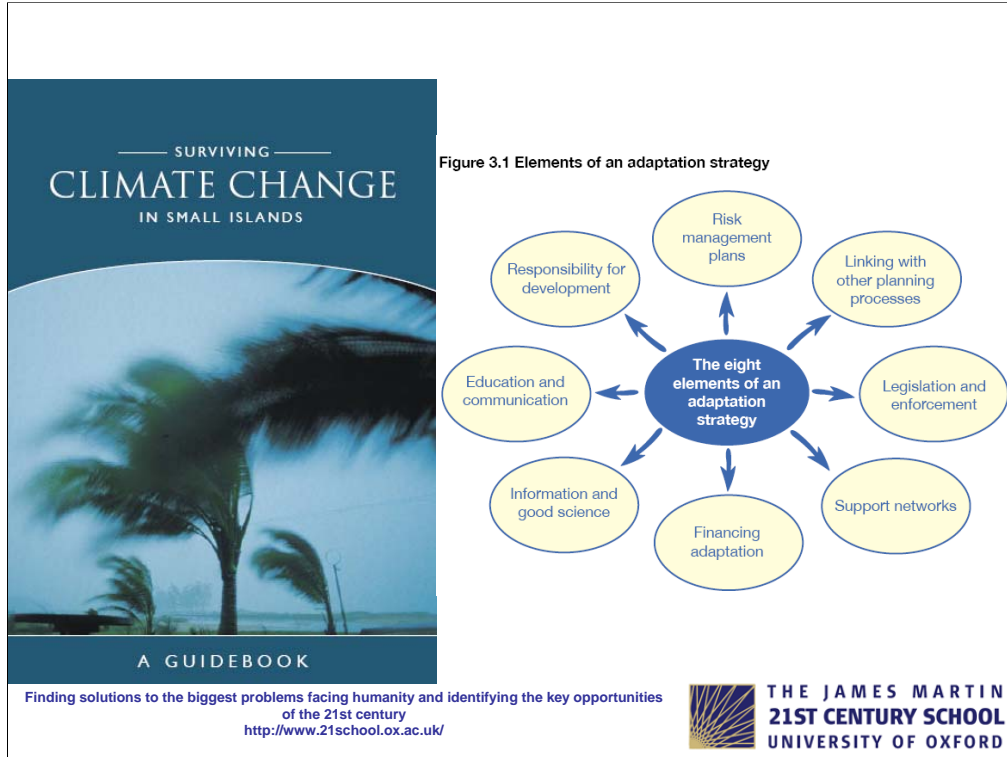
Picture 1 - disaster risk management cycle. Early adaptors will benefit. This is clear from all the research on disaster risk management, which shows that those who prepare for hazards suffer significantly less than those who do not (see the earlier example of the Cayman Islands and New Orleans and their levels of preparedness for similar sized hurricanes).

Picture 2 – sand bags used to block flood water from entering shop. There are benefit to be had from adapting, therefore the private sector will adapt. Incentives and penalties may be needed to ensure that the private sector adapts in ways that generate wider benefits. For example, incentives could be introduced to encourage construction companies to build in ways that reduce the effects of hotter summer temperatures and enable better coping with floods.

Picture 3 – weather derivatives computation sheet. Resources already exist to fund adaptation privately – the government needs to find ways to ensure that these resources are explored before the government is expected to step in. One way to do this is to raise the profile of climate change and encourage early adaptation by the wider population (this is the model developed by the UK Government through the UK Climate Impacts Programme)

- Private savings
- Private loan providers
- Private insurance
- Government grants
- Government service and info providers (e.g. UKCIP)
- Micro-credit scheme

Picture 4 – african farmer suffering drought. As I mentioned earlier, the most important element in adaptation is to focus on non-adaptors and most vulnerable



This image may be useful – it is the handbook we developed, along with one of the key figures which describes how to think about developing an adaptation strategy