A VULNERABILITY/RESILIENCE FRAMEWORK APPLIED TO CLIMATE CHANGE

WITH SPECIAL REFERENCE TO SMALL ISLAND STATES

Lino Briguglio and Stefano Moncada
Islands and Small States Institute
University of Malta

Prepared for the Workshop
"Small Island Developing States and Climate Change",
University College London, U.K.:
24-25 May 2016.

1. INTRODUCTION

Introduction…1

This presentation:

- Proposes a conceptual framework
- Distinguishes between inherent & policy induced factors
- Focuses on Small Island States (SIS).

Introduction…2

- **Vulnerability:** Communities in SIS are predisposed and inherently prone to being negatively affected by global warming:
  - SIS have a high ratio of coastal area to land mass
  - Many SIS are located in the tropics and highly affected by extreme weather events.

- **Resilience**: ‘what can be done’, policy-wise:
  - Strengthen ability of communities to cope with or withstand the effects of climate change
  - Possibly improving the condition of the affected community.

2. SMALL ISLAND STATES AND CLIMATE CHANGE

Climate change – A major challenge for SIS

- 1/5 of all politically independent countries are SIS

  South Pacific Ocean, Indian Ocean, the Caribbean Sea and the Mediterranean.

- Greatest sustainable development facing SIS relates to climate change;

- SIS emissions globally are negligible, but these states will be very highly impacted by global warming.

Multiple impacts on small island states

- Apart from sea-level rise, SIS will also be impacted by:
  - extreme weather events,
  - water shortages and
  - increased health risks from air borne diseases.

- These impacts are likely to be exacerbated in SIS that have:
  - High population density
  - Limited resources endowments
  - Indivisibilities of overhead costs

Widespread recognition of the impacts on SIS

- Three major international conferences on SD of SIDS identified climate change as a major area of concern:
  - The Barbados 1994 Global Conference
  - The 2005 Mauritius International Meeting
  - The 2014 Samoa International Conference for SIDS

- IPPC dedicates a whole Chapter to small islands in its Assessment Reports. In its 5th Assessment report this is Chapter 29 of *Climate Change 2014: Impacts, Adaptation, and Vulnerability* (Nurse et al., 2014).

High economic impacts on SIS

- The economies of SIS are likely to impacted because:
  - Many SIS depend heavily on tourism;
  - Sea-level rise is likely to harm tourism facilities and infrastructure;
  - Other industries, including fishing, agriculture and manufacturing will also be highly impacted;
  - Ports, airports and coastal reservoirs negatively impacted;
  - Coastal areas of SIS also associated with socio-cultural assets these will also impacted by sea-level rise.

- Briguglio and Cordina (2007) have shown that climate change impacts are likely to affect all sectors of the economy of Malta, including public utilities.

High impacts on low emitters

- Sea-level rise will therefore lead to heavy material and cultural losses for small islands and will affect practically all aspects of life in such states.

- This problem is of course particularly severe for low-lying islands, the very existence of which may be threatened by sea-level rise.

- This reality is particularly harsh for small islands because greenhouse gas emissions produced by these states are negligible when compared to those emitted by larger developing and developed countries.

The indivisibility problem

- A major problem faced by small island states relates to the limited resource base of small island states constrains their adaptation and coping ability, especially when large overhead costs are involved.

- As is well known, certain costs are not divisible in proportion to the population, and infrastructural development is often very costly for small territories with a small population.

Adaptation measures

- Importance of adaptation in anticipation of sea-level rise, water shortages and extreme weather events (Nurse et al., 2014; Mercer at al., 2012; Betzold, 2015):
  - Sea-walls and infrastructures to withstand strong winds
  - Clearing valleys to avoid floods
  - Preparing for eventual retreat from the beaches
  - Withholding building permits on low-lying areas
  - Early warning systems

- Various authors state that it is important to mainstream adaptation into development policies, so that benefits can be enjoyed even if climate change predictions do not materialize.

No-regrets or low-regrets adaptation

- Hay et al. (2003), in the context of the PIS, suggest that the most desirable adaptive responses are those that augment actions which would be taken even in the absence of climate change: - contributions to SD and resilience building.

- Nurse et al. (2014) argue that adaptation to climate change in SIS states generates larger benefit to small islands when delivered in conjunction with other development activities, such as disaster risk reduction and community-based approaches to development (paragraph 6.4)

Complementary strategies

- As Nurse et al (2014, para 6.4) argued, “overall, there appears to be an emerging consensus around the views expressed by Swart and Raes (2007) that climate change and development strategies should be considered as complementary, and that some elements such as land and water management and urban, peri-urban, and rural planning provide important adaptation, development, and mitigation opportunities”.

- Koshy et al., (2005) contend that a good starting point would be an assessment of the climatic variabilities and the implementation of ‘win-win’ or ‘no regret’ or ‘low regret’ adaptation options.

3. CONCEPTUAL CONSIDERATION

Definitions utilised in the presentation…1

- In brief, we are proposing that climate-change vulnerability should relate to a predisposition of a community to be harmed by climate change. By and large, this definition is in line with that adopted by the IPCC WGII (Agard et al., 2014).

- However we differ from the IPCC in our definition of resilience. In our presentation resilience is used a policy-making context, and refers to policy responses which enable (or otherwise) a community to withstand or cope with the harmful effects of climate change.

Definitions utilised in the presentation…2

- IPCC defines resilience as “The capacity of social, economic, and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity, and structure, while also maintaining the capacity for adaptation, learning, and transformation.” (Agard et al. (2014).

- This definition would seem to refer to both inherent resilience as well as to policy-induced resilience.

- In our definition the term “resilience” is confined to policy induced measures by a community to cope with the harmful effects of climate change. Inherent resilience, in our definition, is associated with a very low level of inherent vulnerability.

Definitions utilised in the presentation…3

- The distinction between inherent and policy-induced resilience is important as this makes the argumentation policy relevant.
- If resilience is inherent (automatically triggered), it would not be a subject of interest to policy, given that no intervention is needed.
- If, on the other hand, resilience is achieved as a result of deliberate effort, by subjects likely to be harmed, then we can discuss the factors that lead to its achievement.
- This is a “Nature vs nurture paradigm”, where nature refers to the degree of inherent exposure to harmful features (i.e. vulnerability) and nurture refers to the deliberate effort to counteract or recover from the effect of these harmful features (i.e. resilience).

Vulnerability to climate change

- Vulnerability (etymologically derived from *vulnerare* – to harm in Latin) is used in this presentation to refer to the propensity or predisposition or susceptibility of a community to be harmed from the negative effects of climate change. In the sense used in this presentation, such predisposition is considered to be permanent or quasi permanent.

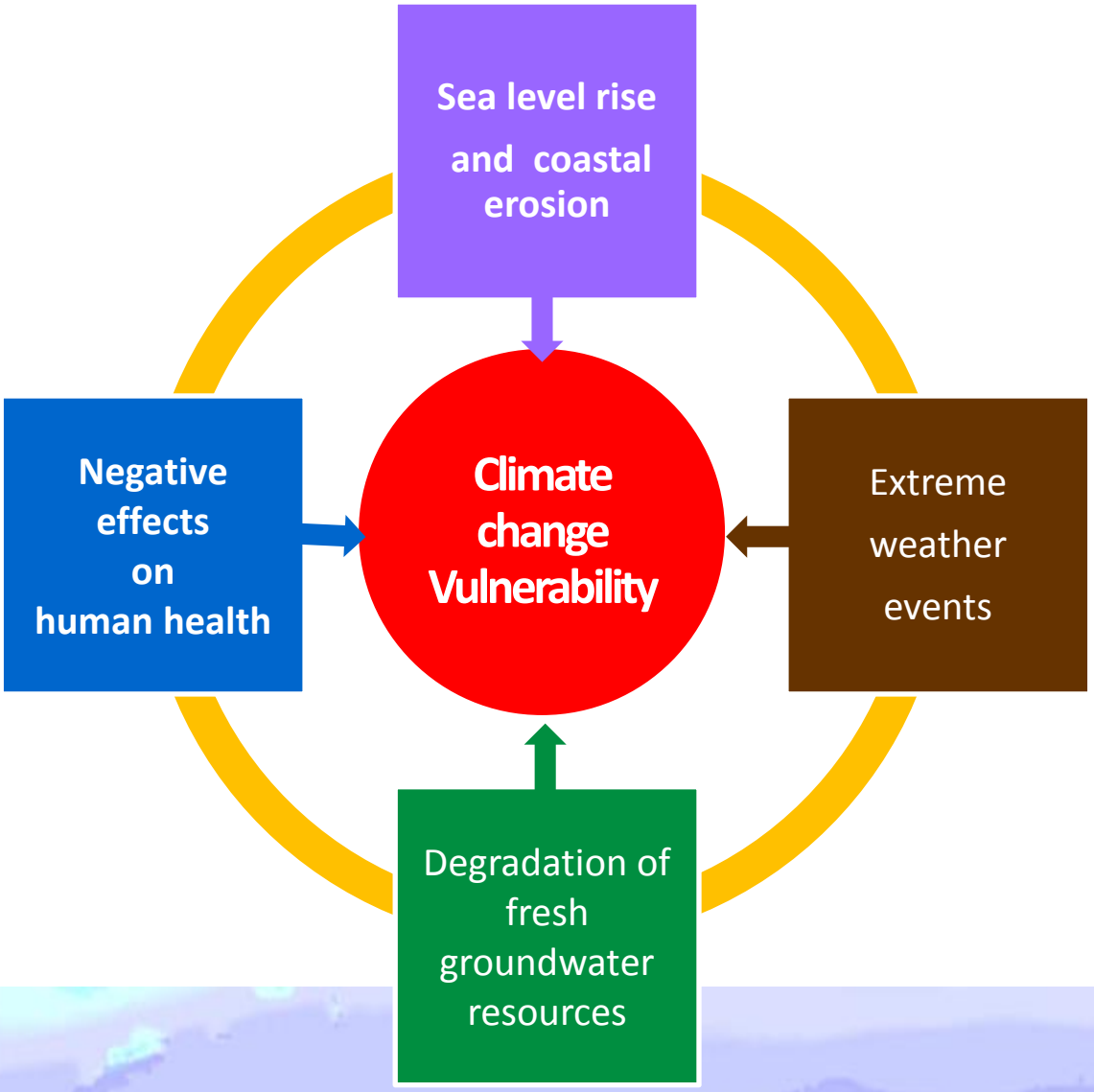
- The major harmful effect on small island states was identified in Nurse et al. (2014) as **sea-level rise,** which poses one of the most widely recognized climate change threats to low-lying coastal areas on islands.

Vulnerability to climate change

- Other identified and related harmful effect are extreme weather events (e.g., such as swell waves and storm surges) which can lead to severe sea flood and erosion risks for low-lying coastal areas and to degradation of fresh groundwater resources. There are also health effects.

- These conditions are often inherent in the affected communities in the sense that they depend on the location of the community and the natural features of that location. In other words, the affected communities are predisposed to such harm.

Vulnerability: Major impacts that harm a community



Resilience…1

- Resilience, etymologically, means to rise again (*resalire* in Latin). It is used in this presentation to refer to the ability of a community to withstand the effects of harm associated with vulnerability to climate change, through appropriate policy responses. In most publications on climate change such policy responses are labelled adaptation (see Agard et al, 2014).

- However, our definition of resilience is wider than just adaptation, and includes any human intervention that results in reducing the harmful effects of climate change.

Resilience…2

- A number of such policy responses mentioned by Nurse et al. (2014) include:
  - Facilitating adaptation and avoiding maladaptation, which includes technical and financial support for such human interventions;
  - Integration of adaptation into development plans and policies;
  - Encouragement of participatory stakeholder involvement in adaptation measures;
  - Improving risk knowledge within the community.

Risk of being harmed by climate change

- The vulnerability/resilience framework developed by Briguglio et al. (2006) can be applied to the risk of being harmed by climate change.
  - **Increased risk (vulnerability):** This is associated with inherent conditions that expose the community to negative impacts associated with climate change.
  - **Reduced risk (resilience):** This is associated with policy-induced measures leading enabling the community to withstand or cope with the negative affects of climate change.

Juxtaposing vulnerability and resilience

Risk =

Risk of being harmed by Climate Change

Vulnerability

(adds to risk)

EXPOSURE: Inherent features of a community rendering it exposed to the harm of climate change

Predispositions:

- Sea level rise and coastal erosion;
- Extreme weather level events
- Degradation of fresh groundwater resources ;
- Negative effects on human health.

- Resilience

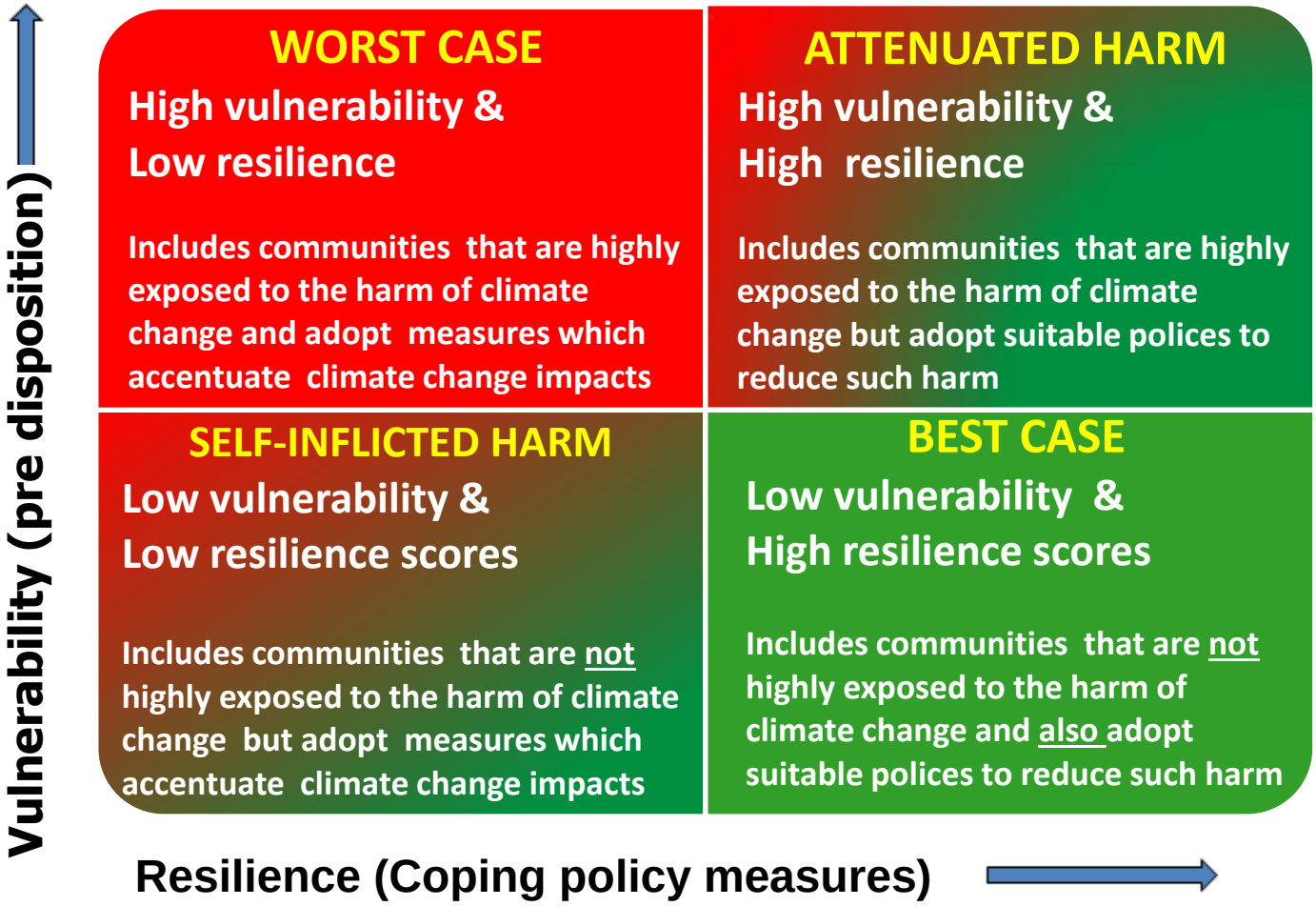
(reduces risk)

COPING ABILITY: Policy-induced measures that enable a community to withstand the harm of climate change

Policy Responses:

- Facilitating adaptation ;
- Integration of adaptation into development plans and policies;
- Encouragement of stakeholder involvement in adaptation;
- Improving risk knowledge

Four scenarios of effects on the community



4. POLICY IMPLICATIONS

Policy implications…1

- The main policy implication of the framework is that small island states, particularly low-lying ones, can, and should, adopt policies that enable them to cope with and withstand the harmful effects of climate change.

- The framework suggests that a community must first identify why they are predisposed or inherently prone to being harmed by climate change, so that the policy responses could be targeted at such risks, rendering them more efficient, effective and sustainable.

- The framework also suggests that climate change policies should not be a one-size fits all, as different communities may be harmed by climate change in a different manner.

Policy implications…2

- Climate change is associated with uncertainty, therefore a community at risk should adopt resilience building measures proactively. Resilience building for climate change can have co-benefits & should therefore be embedded in SD strategies.

- A consideration associated with this framework is that the harmful effects of climate change can be catastrophic and a given downside is not counter-balanced by an equal upside. Even if the chance of climate change are just 5% in favour and 95% against (the IPCC projections carry a much higher probability), it is still important to adopt resilience-building measures.

Policy implications…3

- By way of an analogy, if an architect tells us that there is only a 5% chance that the roofs of our house will collapse, we do not argue that there is a 95% chance that they will not. We either move out or repair the building.

- The reason for this is of course that in this case the two sides of the outcome namely that (a) nothing will happened and (b) high risk of death are not of equal weight and even a low probability of death should goad one to take action.

- This argument applies to climate change even if the odds of it happening are low – let alone if such odds are high as indicated by theoretical and empirical research on climate change.

Policy Implications…4

- As argued above, climate change poses a major threat to the small island states, who, as Betzold, 2015) argued are among the first and worst affected by climate change. Therefore resilience building is of major importance to such states.

- The framework proposed in this presentation suggest that in order to withstand the harm associated with climate change, small island states should first and foremost identify the source of climate change vulnerability, specific to their island environment. Based on such an identification, a set of deliberate and conscious policy responses should put in place, aimed at effectively and sustainably building climate-change resilience in order to address such vulnerability.

References

Agard, J., Lisa, E. and Schipper, F. (eds) (2014). Glossary. Annex II to *Climate Change 2014: Impacts, Adaptation, and Vulnerability.* Working Group II Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Available at: http://www.ipcc.ch/pdf/assessment-report/ar5/wg2/WGIIAR5-AnnexII_FINAL.pdf .

Betzold, C. (2015). "Adapting to climate change in small island developing states," *Climatic Change* , Vol;. 133:481–489

Briguglio, L., Cordina, G., Farrugia, N., & Vella, S. (2006). Conceptualising and measuring economic resilience. In L. Briguglio, G. Cordina, and E. Kisanga, E. (Eds.), *Building the Economic Resilience of Small States* (pp. 265-288). Malta: Islands and Small States Institute and Commonwealth Secretariat.

Briguglio, L. and Cordina, G. (2007). "The Economic Vulnerability and Potential for Adaptation of the Maltese Islands to Climate Change". In Proceedings of the International Symposium on Climate Change, Beijing, China, World Meteorological Organisation, pp. 62-65

Formosa, S. and Bartolo AM (2008). "Climate Change Impacts - The Gozitan Case-Study" *Gozo Observer,* No 18: 6-8. University of Malta Gozo Centre

Hay, J., N.Mimura, J. Cambell, S. Fifita, K. Koshy, R.F.McLean, T. Nakalevu, P. Nunn and N. deWet, 2003: Climate Variability and Change and Sea-level rise in the Pacific Islands Region: A Resource Book for Policy and Decision Makers, Educators and Other Stakeholders. South Pacific Regional Environment Programme (SPREP),Apia, Samoa

IPCC (2014). *Climate Change 2014: Impacts, Adaptation, and Vulnerability.* Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, Available at: http://www.ipcc.ch/report/ar5/wg2/ Briguglio, L. and Cordina, G. (2003) "The Economic Vulnerability and Potential for Adaptation of Islands to Climate Change, with Special Reference to the Maltese Islands." Paper presented at the International Policy Dialogue on Vulnerability and Adaptation to Climate Change: a Common Agenda for Developing Countries, Mexico, Zacatecas, 17-18 June

Koshy, K.C, Mataki, M and Lal, M (2005). *Sustainable Development and the Pacific Island Countries,* University of the South Pacific, Suva, Fiji.

Mercer , J., Kelman , I., Alfthan, B. and Kurvits, T. (2012). "Ecosystem-Based Adaptation to Climate Change in Caribbean Small Island Developing States: Integrating Local and External Knowledge," *Sustainability nol.4*(8):1908-1932;

Nurse, L.A., R.F. McLean, J. Agard, L.P. Briguglio, V. Duvat-Magnan, N. Pelesikoti, E. Tompkins, and A.Webb, (2014). "Small islands". In: IPCC (2014). *Climate Change 2014: Impacts, Adaptation, and Vulnerability*. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 1613-1654. Available at: http://www.ipcc.ch/pdf/assessment-report/ar5/wg2/WGIIAR5-Chap29_FINAL.pdf

End of Presentation

THANK YOU
FOR YOUR ATTENTION

.