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Connecting the ClimateXChange, ASC and DPSIR indicator frameworks

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1. Introduction

This brief explains the alignment between the CXC adaptation indicator framework, the adaptation indicator framework used by the UK Adaptation Sub-Committee (ASC) and the Driver, Pressure, State, Impact and Response (DPSIR) model that is widely used in Europe and internationally to develop indicators for environmental decision making. Stakeholders have indicated that it is important for the CXC framework is compatible with these two approaches.

2. Comparison of approaches

The CXC indicator framework

The CXC indicator framework (Figure 1) takes a risk based approach (Martin & Moss, 2013) and explains that CXC will be using indicators of risk and opportunity, indicators of impact and indicators of adaptation action to monitor climate change adaptation in Scotland. The framework seeks to set these indicators in the wider systems in which adaptation will occur, mapping the critical factors e.g. climate change hazards, the exposed system and its vulnerability, which are known or thought to drive change in the system. It is anticipated the framework will give us a better understanding of what the influence of adaptation actions are upon changing levels of risk, opportunity and impact. A fuller explanation of the CXC indicator framework is available at www.climatexchange.org.uk

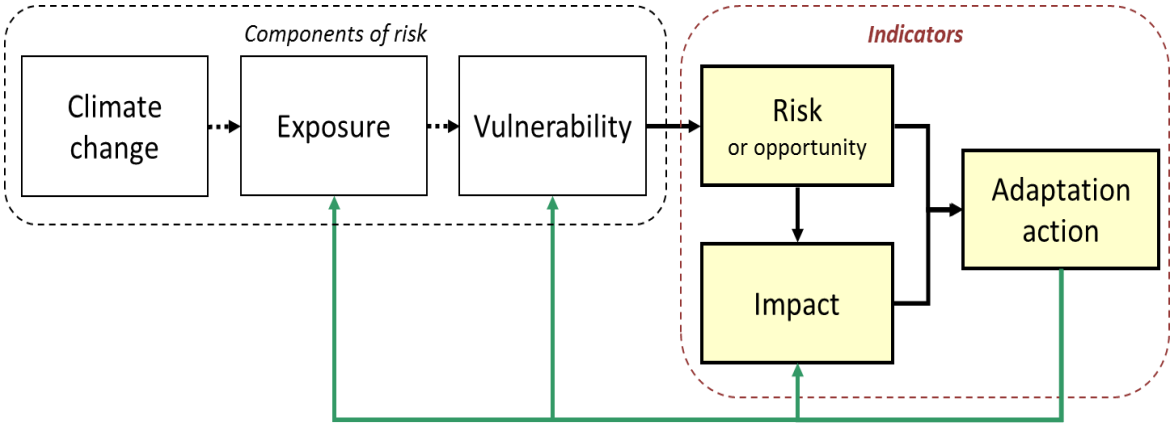

Figure 1: The CXC adaptation indicator framework

The ASC's adaptation indicator framework

The ASC's indicator framework (ASC, 2012) (Figure 2) has been developed as part of their work to produce indicators of adaptation preparedness for the UK. Like the CXC framework, it is risk-based and comprises three types of indicator: risk/opportunity, impact and action. The ASC clarify that their indicators of risk reflect changing

level of exposure and vulnerability, whilst their indicators of action 'aim to measure risk reduction rather than just the action itself' (ASC, 2012). The indicators form part of an adaptation assessment toolkit which also includes an analysis of decision making processes.

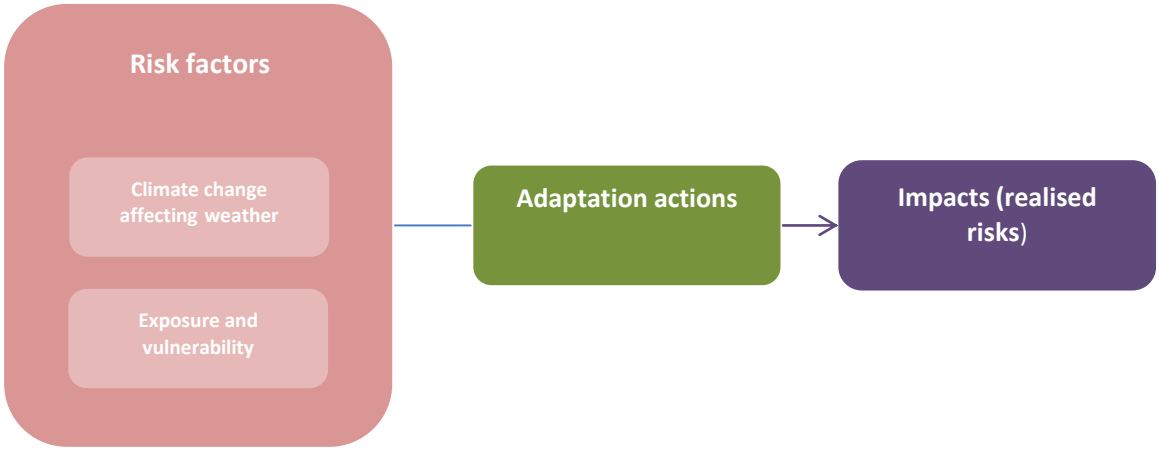

Figure 2: The ASC indicator framework (ASC, 2012)

The DPSIR indicator framework

The DPSIR framework (Figure 3) is commonly used to describe the relationships between the human and environmental systems and to generate indicators about the critical factors in these systems (Maxim & Spangenberg, 2006). It has been adopted for use by the European Environment Agency and is widely used to guide environmental decision-making in Scotland and internationally.

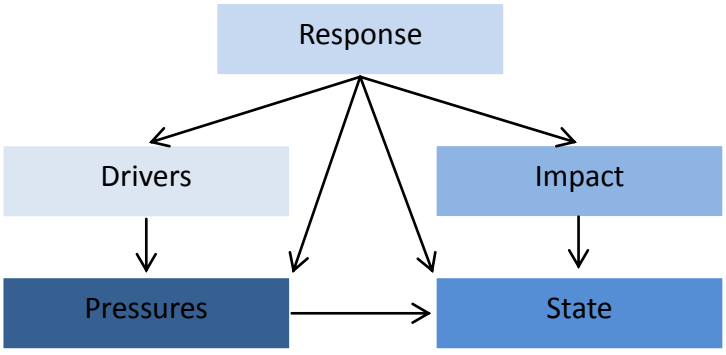

Figure 3: The DPSIR framework (Maxim & Spangenberg, 2006)

Like the CXC framework, the DPSIR framework is systems based and seeks to understand the feedback of adaptation actions upon changing levels of impact and on the factors which cause those impacts. It is based upon the idea that *drivers*, such as social and economic developments, place a *pressure* on the environment and this results in a change in its *state*. This change in state has *impacts* on the environment and on society and as a result *responses* e.g. adaptive actions, are implemented to feed back into the system and to reduce negative impacts.

Comparing the frameworks

The relative positions of the components of each framework in the table below illustrates how, broadly, the three approaches align.

Table 1 Comparison of indicator categories and terminology in the CXC framework, DPSIR approach and the ASC assessment toolkit (ASC 2012)

<table>
<tr><th colspan="2">CXC framework</th><th>CXC indicators</th><th>DPSIR</th><th>ASC indicators</th></tr>
<tr><td rowspan="3">Risk</td><td>Climate change</td><td rowspan="3">Indicators of risk or opportunity</td><td>Driver</td><td rowspan="3">Indicators of risk</td></tr>
<tr><td>Exposure</td><td>Pressure</td></tr>
<tr><td>Vulnerability</td><td>Contributors to State</td></tr>
<tr><td colspan="2">Impact</td><td>Indicators of impact</td><td>Impact</td><td>Indicators of impact</td></tr>
<tr><td colspan="2" rowspan="2">Action</td><td rowspan="2">Indicators of action</td><td>Response</td><td>Indicators of action</td></tr>
<tr><td></td><td>Decision making analysis</td></tr>
</table>

References

ASC (2012) *Climate change – is the UK preparing for flooding and water scarcity?* Adaptation Sub-Committee Progress Report 2012. Available at: www.theccc.org.uk/reports/adaptation/2012-progress-report

Martin, S and Moss, A. 2013 A *Summary of the ClimateXChange Adaptation Indicator Framework*. Available at: www.climateXchange.org.uk

Maxim, L. & Spangenberg, J.H. (2006) *Bridging the gap between two analytical frameworks*. Paper presented at the Ninth Biennial Conference of the International Society for Ecological Economics, "Ecological Sustainability and Human Well-Being", December 15-18, New Delhi, India