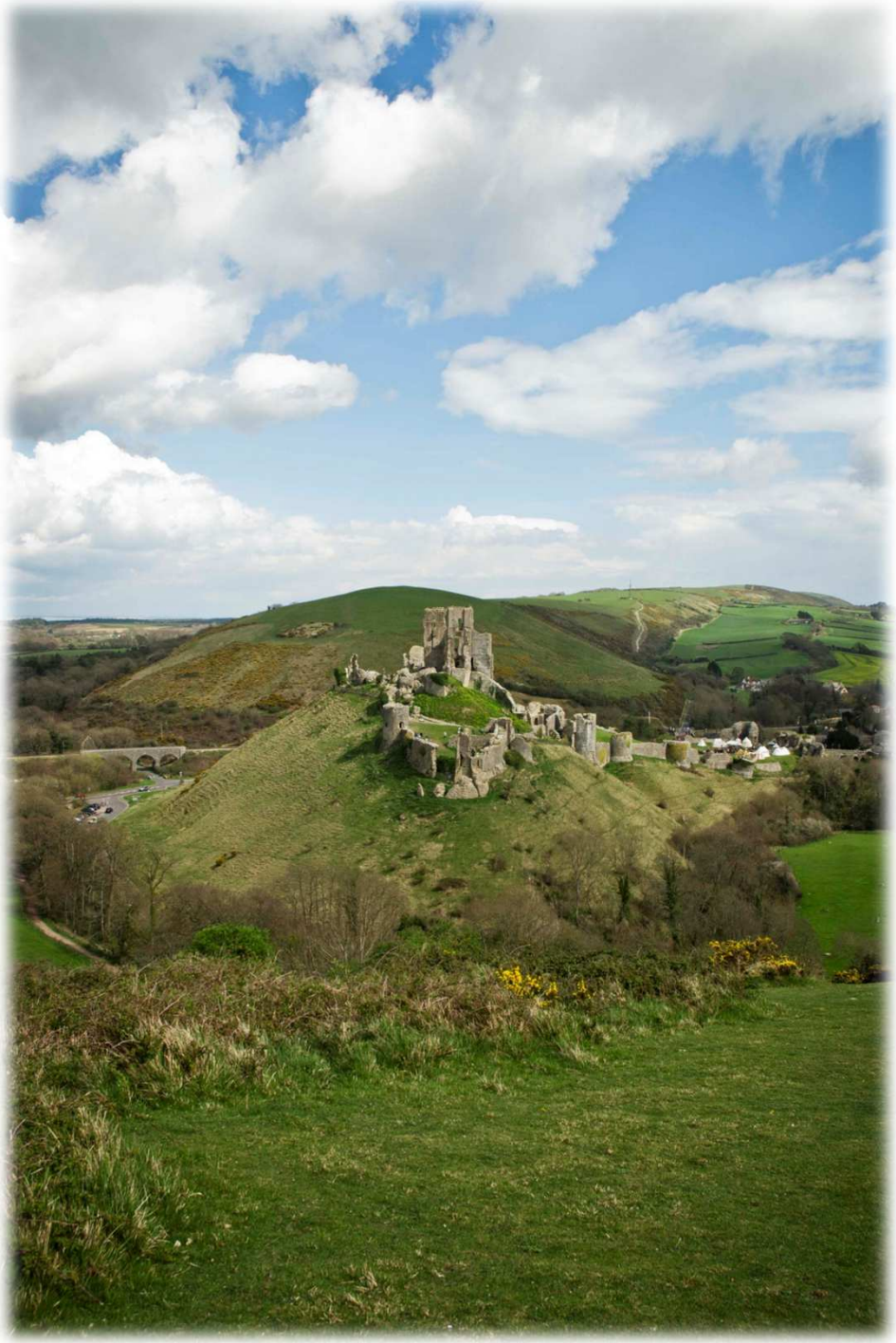

Process and outcome-based indicators

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Purpose of adaptation indicators

Primary purpose:

- **To monitor implementation & effectiveness of adaptation policies, measures & actions**

Can also be used to:

- Justify, target & monitor funding for adaptation
- Mainstream adaptation within & between sectors
- Communicate adaptation to policy & decision-makers & other stakeholders
- Compare adaptation achievements across sectors, regions & countries
- Inform international climate change negotiations

Conceptual framework for adaptation indicators

			Process-based indicators		Outcome-based indicators
Planned adaptation to climate change impacts	→	Building adaptive capacity	Development of adaptation policies (e.g. preparation of catchment-specific flood management policies/plans)		
			↓		
		Delivering adaptation actions	Implementation of adaptation measures (e.g. construction of flood protection schemes)	→	Effectiveness of adaptation actions (e.g. reduction in economic losses due to floods)

Process and outcome-based indicators

Process-based indicators:

- **Seek to monitor key stages that lead to choices about end points or outcomes & should inform & justify decisions**

Outcome-based indicators:

- **Seek to monitor explicit end points or outcomes & should focus on long term effectiveness of decisions**

Regional strategies: case studies

Common aims:

- **Improve knowledge of climate change impacts**
- **Identify possible sector & area-specific adaptation options**
- **Increase adaptive capacity of sectors & areas**
- **Facilitate, coordinate & encourage participation in delivery of adaptation actions**

Building adaptive capacity: examples of process-based indicators

Sector	Indicator
General	Production of local adaptation guidance
	Production of disaster management plans
Agriculture	Research into farming techniques that accommodate climate change
Biodiversity	Integration of adaptation into conservation management plans
Health	Establishment of coordinating authorities & networks
Tourism	Research into effects of climate change on recreational areas
Water	Development of flood management policies/plans

Delivering adaptation actions: process-based indicators

Sector	Indicator
Agriculture	Implementation of measures to reduce soil erosion & desertification
	Introduction of drought & heat resistant crops
Biodiversity	Removal of spatial barriers to increase natural adaptive capacity
	Extension, connection & establishment of buffer zones around protected areas
Health	Mapping & control of disease vector species (e.g. mosquitoes)
	Provision of climate control equipment for vulnerable people
Tourism	Modification of recreational facilities to accommodate higher temperatures
Water	Construction of flood protection schemes

Delivering adaptation actions: outcome-based indicators

Sector	Indicator
Biodiversity	Reduction in degraded ecosystems
Health	Reduction in deaths during heat waves
Water	Reduction in losses due to floods

Biodiversity policy area: case study

Bern Convention's seven overarching adaptation principles:

- **Take action now**
- **Maintain & increase ecosystem resilience**
- **Accommodate impacts of climate change**
- **Facilitate knowledge transfer & action between partners, sectors & countries**
- **Develop knowledge/evidence base & plan strategically**
- **Use adaptive conservation management**
- **Undertake monitoring & identify indicators**

Examples of process and outcome-based indicators

Building adaptive capacity: process-based indicators
Amendment of biodiversity policy, legislation and agreements to reflect climate change
Integration of adaptation into sector/cross-sector plans at national to local levels
Exchange of information and communication of best practice on successful adaptation
Delivering adaptation actions: process-based indicators
Assessment of species and habitat vulnerability
Implementation of measures to protect vulnerable species and habitats
Evaluation of progress through the adaptive management cycle
Delivering adaptation actions: outcome-based indicators
Reduction in other sources of stress and harm
Establishment of buffer zones around conservation areas
Establishment of networks of interconnected protected areas and intervening habitat

References and contact details

Harley, M. & Hodgson, N. (2008). *Review of existing international and national guidance on adaptation to climate change: with a focus on biodiversity issues*. AEA report to Bern Convention Group of Experts on Biodiversity and Climate Change, Council of Europe.

Harley, M., Horrocks, L., Hodgson, N. & van Minnen, J. (2008). *Climate change vulnerability and adaptation indicators.* European Topic Centre on Air and Climate Change Technical Paper 2008/9, European Environment Agency.

Harley, M. & van Minnen, J. (2009). *Development of adaptation indicators.* European Topic Centre on Air and Climate Change Technical Paper 2009/6, European Environment Agency.

Harley, M. & van Minnen, J. (2010). *Adaptation indicators for biodiversity.* European Topic Centre on Air and Climate Change Technical Paper 2010/15, European Environment Agency.

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