

Climate change adaptation and nature conservation – Experience from GTZ's work in the field

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Decisions taken in nature conservation and protected area management today affect the future vulnerability of the biodiversity to climate change. GTZ has developed an approach that is designed to make it easier for conservation planners to take account of changing climatic conditions. The article presents the methodology and the experience gained when incorporating climate aspects into the conservation and sustainable use of biodiversity.

The effects of climate change will in future have a major impact on development pathways. The objectives and contents of plans – such as management plans for national parks and biosphere reserves and land-use plans – will have to be reviewed and, if necessary, adapted. Due to the long-term nature of climate change it is particularly important that climate aspects are taken into account in long-term plans. In a study in six countries the OECD (2005: 16) established that global warming could adversely affect between 12% (Tanzania) and 65% (Nepal) of all official development assistance in a partner country (OECD 2005).

Figure 1 illustrates the time horizons that are implicitly used in planning and within which the likely effects of climate change need to be considered. For instance, major infrastructure projects such as roads, railways, dams and bridges are designed to last for decades, if not centuries. Inappropriate decisions on the kind and features of the investment can have extremely expensive consequences. Conservation measures and protected areas, too, are intended to safeguard the biodiversity for tens and ideally hundreds of years. They are also faced with the need to integrate climate change into planning. Conversely, however, careful planning can increase the ability to adapt to climate change.

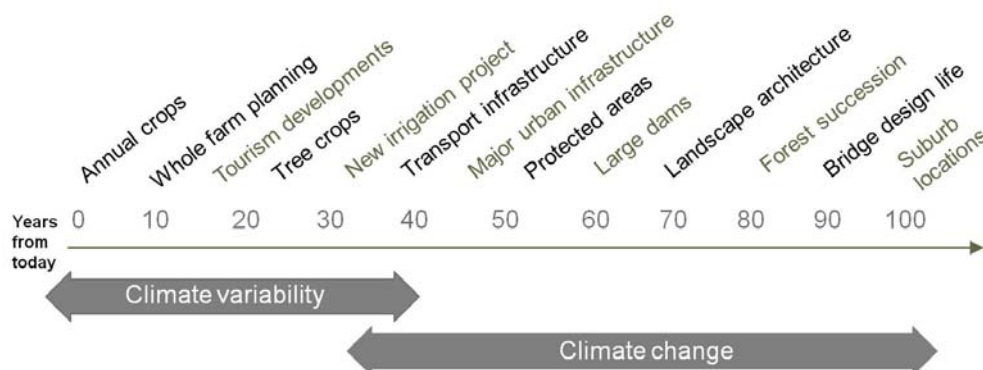


Figure 1: Planning horizons (STAFFORD SMITH et al. 2010, modified)

Climate Proofing – the context

In view of this need for action GTZ has developed a sound and pragmatic approach to Climate Proofing. The GTZ approach enables strategies, policies, programmes and projects to be analysed in terms of the risks and opportunities of climate change. It makes it easier for planners and practitioners to identify where plans need to be adapted. It can be applied in a wide range of contexts. GTZ applies its climate proofing method at different levels. It uses it as part of the climate adaptation appraisal conducted for all its own projects that are in preparation or entering a new phase. It also applies a modified form of the method known as 'Climate Proofing for Development' when advising institutions in partner countries on their own schemes for adapting to climate change (HAHN AND FRÖDE 2010).

Procedure

In the GTZ Climate Proofing approach, climate risks and adaptation opportunities are systematically analysed in a step-by-step process. Information on the most important climatic changes is first collected and systematised. Work is then undertaken with relevant stakeholders to identify 'exposure units' – those elements of the planning scheme that are particularly affected by climate change. These exposure units may be ecosystems (e.g. forests and lakes), economic sectors (e.g. agriculture and fisheries), regional units (individual villages or districts) or specific target groups (e.g. women or farmers).

In meetings and workshops experts and stakeholders then analyse the biophysical and socio-economic impacts of climate change on each exposure unit. These impacts are compiled in tables (see Figure 2). Following this, the relevance of the consequences of climate change to the plans under consideration is assessed with regard to:

- the probability of the impacts occurring
- the effects on the attainment of project or planning objectives
- the ability of institutions and the population to cope with the impacts without external support.

On the basis of this analysis, options for action are identified and prioritised that can be taken to minimise the risks and adverse consequences. Plans may require major changes or amendment (e.g. choice of areas to be protected) or simply some modification of content or technique (as in the example of bio-monitoring in Laos described below). This may also result in changed priorities in the implementation of measures already included in the management plan. The overall outcome is a plan that is better adapted to climatic changes. The steps can be modified to take account of prevailing conditions and available resources.

A	B	C	D	E	F
Climatic trend	Exposure Unit	Bio-physical effect	Socio-economic effect	Relevance for planning	Options for action
More frequented and intense heat waves	Road infrastructure	Pavement quality decreases during the heatpeak	Higher costs to maintain road infrastructure	Direct link to planning objective (improved access to markets)	Use adapted construction materials
		Shorter life time of roads	Limited access to markets	Medium probability of occurrence Low adaptive capacity	Maintain flexible construction schedule
Rising mean annual temperature	Forests	Changes in environmental factors	Possible forest uses constrained (timber, non-timber forest products for consumption and trade)	Direct link to planning objective „Sustainable forest management“	Biomonitoring
More frequent long dry phases		-> species migration, ecozone shifts More frequent and intense forest fires	Employment potential in forestry sector decreases	Medium probability of occurrence Medium adaptive capacity	Fire hazard management

Summarising table for analysis (simplified example)

Figure 2: Simplified example of the analysis in GTZ's Climate Proofing

Case study: Laos – protected area management

Early in 2010 GTZ was commissioned to appraise a new project on integrated nature conservation and sustainable resource management in the protected area of Hin Nam No (HNN) in western Laos. The project's objectives are sustainable management of the protected area, conservation of its natural resources and improvement of the living conditions of the poor in this underdeveloped region. The HNN national park consists mainly of evergreen moist forest on karst ecosystem types with endemic biodiversity. It is a UNESCO World Natural Heritage site. The protected area administration exists formally but is barely functional. A co-management plan has been drawn up in recent years and now needs to be implemented. Tourism potential in the protected area is high but has not been fully utilised: tourists have no information about the park and access is difficult. The buffer zone is one of the poorest regions in the country. Pressure on the park's natural resources through unregulated use of non-timber forest products (NTFP) and poaching is very high. Conversion of land in the surrounding areas to plantations adds to the burden of ecological degradation and loss of biodiversity in the protected area.

The principal outputs of GTZ's six-year advisory programme relate to implementation of the co-management plan, improvement of living conditions in the surrounding villages, advice on land-use planning, participatory regulation of NTFP use, support of the national park authority,

and tourism development. The Lao and German partners wanted current and future climate change to be taken into account from the outset when planning and implementing their cooperation, but were keen that this should not result in significant extra cost.

GTZ's Climate Proofing tool was used to identify the effects of climate change on the protected area and possible options for action. On the basis of the national climate strategy, the analysis was based on the following climate trends: increase in precipitation variability (with an increase in the frequency, duration and intensity of floods and droughts), increase in annual precipitation, increase in annual mean temperature (by up to 0.8°C in 2039 and 2 - 3°C in 2100) and increase in the frequency and intensity of storms (especially effects of storms that strike the Vietnamese coast).

The biophysical and socio-economic impacts of the climatic changes and their relevance to the planning of the project were compiled in tables. Box 1 summarises the principal impacts of climate change on the protected area that were identified by the appraisal.

Box 1: Key impacts of climate change in the HNN protected area

- Ecological pressure on key habitats (e.g. intermittent drying up of waterholes in central areas of the park) and key species. There are no corridors for temporary migration of populations under stress.
- Increased risk of forest fires in the transition zones during longer dry periods.
- Fluctuations in agricultural yields in the buffer zones result in increased pressure on natural resources and NTFP in the protected area. When yields are low there is an increased risk of overexploitation. Populations of some heavily used NTFP are increasingly classed as threatened.
- Heavy rain events increase the risk that key elements of the protected area's infrastructure (e.g. park administration buildings, and roads and paths) will be destroyed.
- Possible (long-term) damage to tourism potential, e.g. through drying up of waterfalls.

The capacity of the protected area administration to deal with changing environmental and climatic conditions and apply adaptive management practices is very limited. Staff of the protected area administration have little knowledge of how to utilise climate information in the management of protected areas.

It was clear from the analysis that the objectives of the GTZ project cannot be achieved unless climate aspects are taken into account in implementation. There are a number of options that can be implemented at low costs. Workshops were held in which, based on the

analysis, an action plan was drawn up detailing how the information on climate change and its key consequences could be incorporated into GTZ's support.

A distinction was made between recommendations relating to project startup and those relevant to project implementation. Account was taken of the limited funds available. Options for expanding activities if additional funds become available were noted. Project objectives and indicators were modified as appropriate. The objective of all the activities (in addition to maintaining and safeguarding the ecological capacity of the protected area) is to create an example of climate-sensitive protected area planning that can provide guidance for other protected areas in the region.

As part of the startup phase of the project it was agreed that an easy-to-read factsheet on the effects of climate change in the HNN national park would be drawn up for use by project partners in the region, national park staff and other stakeholders. The factsheet will help readers understand aspects of climate change relevant to their own work. The issue of climate change was also integrated into the project planning process. Purpose-designed training sessions were held at which staff were trained in the use and interpretation of climate information and discussed climate-related issues. Funding for a more extensive study of the impacts of climate change on individual aspects of the co-management plan is to be sought as soon as possible. Using the GTZ Climate Proofing method, the study will analyse the effects of climate change on specific ecological units (habitats, species, processes) in more detail and provide the basis for programming additional conservation measures. Data from regional models will be utilised.

In implementation of the project, climate aspects will be incorporated at various points into the preparation and implementation of the co-management plan. The plan will be expanded to include special measures for reducing climate-related risks. For example, particular attention will be paid to developing fire management capacity (training in fire monitoring, providing communities with firefighting equipment), because forest fires with the potential to cause extensive damage become a more important issue during long dry periods. The bio-monitoring system, the development of which is the core output of the project, will pay particular attention to climate-sensitive aspects such as habitats and species (e.g. individual turtle species). In addition, ecological pressures and utilisation pressures resulting from climate change (see above) will be incorporated into the participatory formulation of harvesting limits for NTFP. Experience gained by GTZ in Viet Nam will be utilised in the project's support for climate-sensitive land-use planning in the buffer zones. For example, the risk of flooding will be taken into account when designating land in the buffer zones for use. This will minimise later harvest losses (which increase the pressure on the protected area). Initial activities in this field were already under way at the end of 2010.

Further experience in the biodiversity field

The following summaries are further examples of experience of Climate Proofing gained by GTZ in the context of biodiversity conservation and sustainable use:

- In Morocco Climate Proofing was used in planning the new phase of a nature conservation and desertification control project. A number of exposure units affected by climate risks and relevant to the project were identified, including tourism, water management and agriculture. Prioritised adaptation options included soil protection measures and better management of water catchment areas. With the planned analytical steps the instrument was useful to the programme in helping to identify how it could be re-oriented to take account of the need for adaptation to climate change.
- In Mali Climate Proofing for Development was applied at various levels. The approach was used first in the sector investment programme 'Sustainable land management'. Various measures in individual projects were subsequently redesigned to take account of risk factors such as heavy rainfall and erosion. It also became apparent that even now some new crop varieties are more suitable for cultivation than others and that existing agrobiodiversity can be used for adaptation to climate change. The Malian Government intends to use the approach in future for all projects of various donors within the sector investment programme. Once Climate Proofing for Development had been found to be useful, staff in Mali was trained and a manual was produced. The government has also used the method for a strategic environmental assessment. In mid-2010 a number of local authorities began to apply the GTZ approach in local and district planning.
- In the Philippines, local and national workshops on dealing with the consequences of climate change were held as part of the project 'Adaptation to climate change and conservation of biodiversity'. The aim was to take account of the impacts of climate change in ongoing planning processes both at local community level and in medium-term national development planning.

Outlook

The experience of using Climate Proofing in connection with the conservation and sustainable use of biodiversity has been very promising. The method can be used to identify, collate and prioritise options for adaptation to climate change in the context of protected area management and other biodiversity-related measures and planning schemes. It can be applied not only in a development context but also in industrialised countries, providing a practical means of linking the conservation and sustainable use of biodiversity to adaptation to climate change.

Critical factors determining success are: the involvement of appropriate stakeholders in the administrative and scientific realms, the considered treatment of climate information (and its limits), the use of existing ecological knowledge and current research findings, and the prompt and targeted integration of climate-related considerations into the planning process.

Experience in implementing planned climate change adaptation measures will be systematically recorded, shared and utilised.

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