Chapter 19
Embedding Biodiversity Modelling in the Policy Process

Nguyen Dieu Trinh
Ministry of Planning and Investment, Vietnam

Wilbert van Rooij
AIDEnvironment, The Netherlands

ABSTRACT

Biodiversity modeling for supporting policy processes is a relatively new field. Models can help policy makers to get a quick assessment of biodiversity and provide them with answers to some of their key questions on biodiversity. Models also allow them to evaluate the effects of proposed environmental policies on biodiversity and whether the policies are likely to meet their environmental targets and thus allow policies to be revised accordingly to meet the targets. In order to use modeling as a standard tool to support policy makers, it should be embedded in a policy process. The Strategic Environmental Assessment (SEA) is such a process that is well suited to include biodiversity modeling. Besides, it is forward-looking, has proper scale and timing components, and it needs an integrated approach to link social consequences on land use change and impacts on biodiversity. The modeled impacts on biodiversity can be used in SEA to guide the decision process. The results of the GLOBIO3 application at national level in Vietnam were considered useful for policymakers; however, the tools are not yet properly embedded in a policy context requiring number of conditions to be met to deliver appropriate information to the policy makers.

1. INTRODUCTION

Biodiversity is declining rapidly in many places and ecosystems. Without some promising measures to counteract the current development process, biodiversity decline will continue globally (sCBD, 2010). Land-use change is the major driver of biodiversity loss, but other drivers like pollution, fragmentation and climate change play an increasing role. Policy makers are increasingly aware

DOI: 10.4018/978-1-60960-619-0.ch019

of the risks of biodiversity loss, as biodiversity supports many ecosystem services and benefits to human well-being (MA, 2005). Therefore, policy makers need and want to be well informed on expected biodiversity loss. They need information on current and expected trends in biodiversity, and insights into the main driving forces, such as land-use change, which is duly recognized in by Convention on Biological Diversity (UNEP, 2007). The information can be used to adjust proposed policies and design alternative options in such a way, that environmental objectives can be realized. This chapter outlines the background and applicability of a national biodiversity model aimed at informing policy makers on biodiversity impacts taking a case of Vietnam.

Biodiversity modelling adds to existing methodologies of biodiversity assessment by bridging the information gaps since many countries in the world have not yet established an ecological network, that monitors all species groups by frequent inventories throughout the entire country. Biodiversity modelling thus can assess whether policies meet environmental objectives for biodiversity and helps to answer some key questions related to biodiversity, such as:

- What is changing? (indicators and monitoring)
- How is it changing? (modelling)
- What can we do about it? (assessment of drivers)
- What is the impact of policies? (assessments of policy options)

Biodiversity mainly depends on changing environmental factors therefore modelling of biodiversity focuses on the relationship between drivers and their impacts. It can be done either by relating species occurrences with environmental drivers (species modelling) or by directly relating a biodiversity indicator to these drivers (pressure based modelling).

The GLOBIO3 biodiversity model belongs to the latter approach. GLOBIO3 uses the mean species abundance (MSA) of originally occurring species relative to their abundance in undisturbed ecosystems. It describes the ´intactness´ of an area so that, e.g. primary forests have a maximum possible MSA value and asphalted parking places have otherwise. The Convention on Biological Diversity (CBD) proposes five types of indicators to assess the status of biodiversity:

1. Trends in the extent of selected biomes, ecosystems and habitats;
2. Trends in abundance and distribution of selected species
3. Change in status of threatened species: Red list index
4. Trends in genetic diversity of domesticated animals, cultivated plants, and fish species of major socioeconomic importance.
5. Coverage of protected areas

MSA belongs to the second group. The extent of ecosystems is also derived from GLOBIO3. GLOBIO3 has been developed to assess effects of environmental change on biodiversity. The model can assess past, present and future biodiversity, expressed in a limited set of indicators, at national, regional and global scales. The model is built on simple cause-effect relationships between driving forces and biodiversity impacts in terms of MSA. These relations are derived from extensive literature research. Using these general relationships allows assessments in cases where limited field data are available. This makes the assessments time and cost-effective. Drivers are land-cover change, land-use intensity, fragmentation, climate change, atmospheric nitrogen deposition, and infrastructure development. Input data from these drivers are derived from available statistical data, spatial maps, other models and expert knowledge (see details in Chapter 8). GLOBIO3 has been used successfully in several integrated