

Appendix 4: Conceptual research framework and decision-making products of the KZNSS Research Program

For the purpose of clarity, the research framework is divided into two components: the research themes (Figure A4.1a), and the associated decision-making products (Figure A4.1b). The four major research themes (socio-economic context, land use change, biodiversity, and ecosystem function (Figure A4.1a) are aligned with decision-making products (Figure A4.1b). The decision-making products (numbered grey blocks) inform the research within each theme, and knowledge generated within each theme contributes to improved decision-making. Each of these decision-making products links to practical implementation activities of the Municipality (see Table A4.1 below).

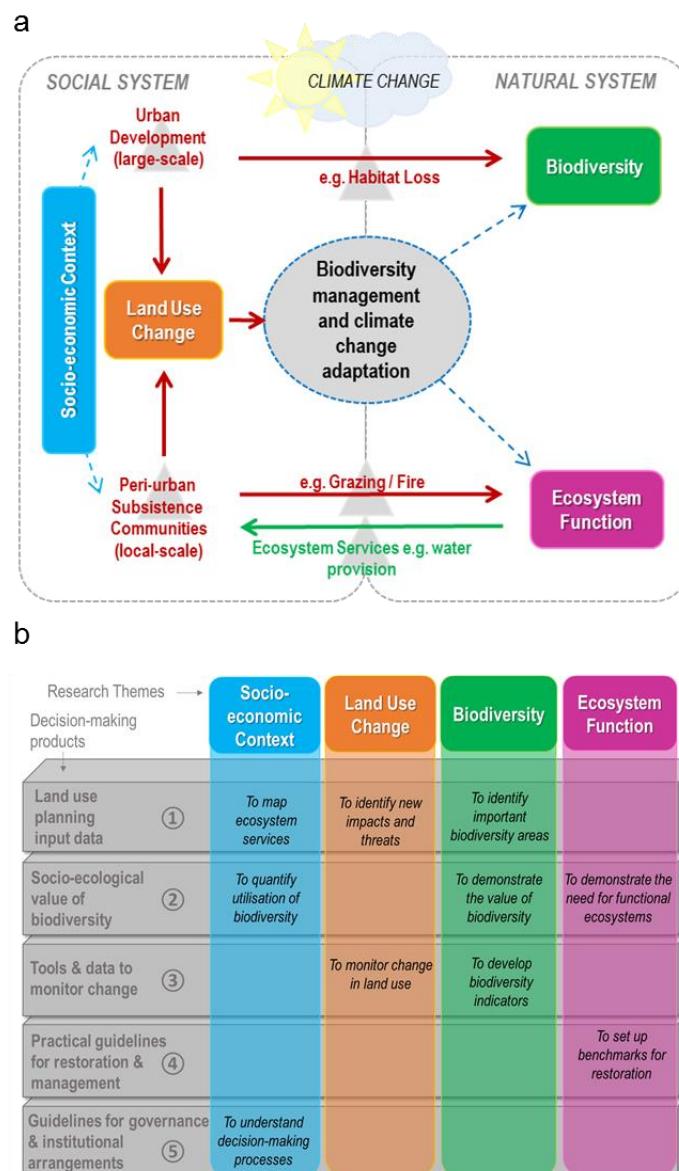


Figure A4.1: Conceptual research framework. Part a: the relationships between the four main research themes (socio-economic context, land use change, biodiversity and ecosystem function), and the various human drivers of ecosystem change (triangles and arrows) are illustrated. The central bubble represents the practice of biodiversity management and climate change adaptation at the Municipality. **Part b:** Alignment of research themes with decision-making products. The envisaged decision-making products are illustrated as grey boxes which knowledge generated by the four research themes contributes to, as illustrated by specific examples in black text.

Table A4.1: Description of key decision-making products in the KZNSS conceptual research framework (Figure A4.1) demonstrating how they relate to practice of biodiversity management and climate change adaptation through various implementation activities at eThekweni Municipality (EM).

Decision-making product	Relevance to practice and implementation activities at EM
1. Land use planning input data:	These are data required for the Systematic Conservation Plan (SCP) and D'MOSS (Durban Metropolitan Open Space System), which the Municipality has adopted as a tool for identifying priority biodiversity and ecosystem services areas (Roberts et al., 2012). The data required for the SCP include for example types and extent of spatial vegetation units and species distribution data.
2. Socio-ecological value of biodiversity	In its vision, the Environmental Planning and Climate Protection Department (EPCPD) states that its purpose is to “speak out and take action on behalf of Biodiversity and Climate Protection in Durban” (eThekweni Municipality, 2013). To this end, the Municipality requires information on the social and ecological value of the biodiversity in the city. Through its Biodiversity Impact Assessment Branch, the EPCPD screens developments proposed for ecologically sensitive areas and makes recommendations about where development should be avoided to protect biodiversity. These decisions should be defensible in a court of law, and thus scientifically-robust information on the benefits of protecting biodiversity is crucial.
3. Tools and data to monitor change:	In order to “plan for, and implement measures to address climate change and its impacts” (eThekweni Municipality, 2013) and to implement community and ecosystem-based adaptation to climate change (Roberts et al., 2012), the Municipality requires baseline data (environmental and biodiversity indicators of climate change) and a climate change monitoring protocol, developed through a scientific process.
4. Practical guidelines for restoration and management	As part of its mandate “to conserve and enhance biodiversity and the beneficial ecosystems” (eThekweni Municipality, 2013), the Municipality implements environmental management on D'MOSS sites in several ways. These management functions require technical input in order to optimise their practices, for example, best practice guidelines for management of various ecosystem types and restoration strategies.
5. Guidelines for governance and institutional arrangements	Land ownership and authority of the area under D'MOSS is diverse. EThekweni Municipality has jurisdiction over some of the land, whilst some is privately owned, and some is communally owned and administered by the Ingonyama Trust Board (ITB) on behalf of the tribal authorities. Thus there is a need for collaborative governance agreements and for the EPCPD to engage with private landowners and the ITB on issues of biodiversity conservation, planning and management

LITERATURE CITED FOR APPENDIX 4:

- eThekweni Municipality, 2013. EPCPD Strategy 2013-18: Background Report. Environmental Planning and Climate Protection Department, eThekweni Municipality, Durban.
- Roberts, D., R. Boon, N. Diederichs, E. Douwes, N. Govender, A. Mcinnes, C. Mclean, S. O'Donoghue, and M. Spires, 2012. Exploring ecosystem-based adaptation in Durban, South Africa: “learning-by-doing” at the local government coal face. *Environment and Urbanization* 24(1), 167-195.