Drivers and pressures of city water resources – a risk-based decision support system for implementation of the Ecosystem approach

The paper presents results of application of the DAPSET (Drivers and Pressures Strength Evaluation Tool) to the assessment of risk associated to different drivers and pressures of environmental quality in the City of Lodz. The tool was developed as a deliverable of FP7 No ALTER Net (A Long-Term Biodiversity, Ecosystem and Awareness Research Network). www.altner.info

**MOTIVATION**

- to identify main drivers and pressures to environment and water resources in Lodz
- to understand the perceptions and approaches of decision makers towards main drivers, which influence the management decisions
- to define main areas of action towards reaching the Lodz Vision 2038
- to test usefulness and operability of the tool, and improve it

**WHAT IS DAPSET?**

DAPSET is a software-based instrument that provides snapshot assessments of important features of different drivers of biodiversity change and pressures adversely affecting biodiversity. The basis for the snapshot assessments is a set of eleven criteria with respective measurement scales giving advice on the design of bio-economic monitoring activities and establishing a common denominator for importance appraisal. DAPSET is an aid to support communication with stakeholders and policy makers in order to identify management priorities and suitable response actions within the DPER (Drivers – Pressures – State – Impacts – Responses) framework.

The methodology provided by DAPSET frames the multi-dimensional character of factors inducing environmental change by strictly defined parameters in order to enable comparability of the impact of pressures and drivers at a number of scales. The tool allows basic long-term studies on aspects of management and decision making to also be the basing on down or up simulations and best practices.

**METHODS**

**STEP 1**

- Literature-based identification of main drivers and pressures for environment quality and water resources in the city, and selecting key 4 on the basis of questionnaire distributed among LA members

**RESULTS**

**STEP 1**

- Ecological awareness of citizens
- Law execution
- Economic potential of the city
- Adequacy and integrity of national and international regulations
- Land development
- Access to new technologies
- Welfare and life style
- Clear structure and competences of administration & governance
- International regulations
- Transport development & people mobility
- Community participation in decision making
- Political situation/environment
- Demography

**INTERPRETATION**

The 11 tool's criteria grouped into 2 classes:
- Primary criteria: Connectedness, Spatial scale, Connectedness, Mobilization / Attraction
- Second order criteria: Acceleration, Persistence, Time delay, Invisibility, Irreversibility

The risk profile for change in land uses

**CONCLUSIONS**

Among the analysed drivers citizen’s awareness and economic potential have been assessed along two scenarios. Low economic potential imposes a danger of proceeding degradation of natural resources, cultural heritage and city infrastructures. The city may not be able to apply new technologies, invest in services, education, effective management. Ad hoc solutions to emerging problems are more likely to be applied than long-term planning. High potential may indicate a switch in priorities towards economic gains at costs of loss of resources and green spaces, and intensification of urban sprawl, etc. Low citizen’s awareness leads to limited law execution; lack of responsibility for the environment; low willingness to search and pay for new, environmentally friendly solutions; and lack of public interest in protection and conservation. Interestingly high awareness has been perceived by decision makers as a factor imposing higher risk to resources as that handicaps an implementation of city plans, and forces city government to implement long-lasting process of social consultation. As such high awareness “disorganizes” the decision making process.

According to the scores the low economic potential of the city requires intensification of management effort and hence extra investments in order to lower the risk. In this case the danger is related to the fact that the driver affects all economic sectors and may have a broad and persistent impact. It also mobilizes community attention, however it may not necessary mean willingness to change a lifestyle or get involved in activities building up city potential. The profile of the low environmental awareness of similar shape. High management values for both factors indicate that they require an urgent action based on integrated, trans-sectoral plan for the whole city.

The risk profile for land use change indicates that very little attention is given to land development and this factor is not perceived as urgent issue for the city. However decision makers are aware that the consequences of current land transformations may not be visible yet (time delay factor) and may affect many regions of the city in invisible way. Finally low enforcement although often mentioned in discussions has been considered as leading to high environmental risk due to persistent consequences of big spatial scale, invasibility, delayed effects and unawareness of people that the problem does exist (limited access to information and low mobilization potential). Lower values for acceleration and irreversibility prove that there is possibility to solve the problem however it is complex due to involvement of many sectors (intersectorality).


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