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### Vilček J.: Produkcia bioenergie pôdneho pokryvu poľnohospodárskych pôd.

Poznanie energetickej efektívnosti pôd cez biomasu vyprodukovanú rastlinou môže byť jedným z rozhodujúcich parametrov hodnotenia ich produkčnej schopnosti i kategorizácie pre ich potenciálne využitie. Na základe produkcie pestovaných plodín sme pre vybraté pôdne parametre odvodili potenciál produkcie bioenergie poľnohospodárskych pôd Slovenska. Energeticky najviac produkčné sú pôdy typu černoze (88,06 GJ.ha<sup>-1</sup>) a čiernic (76,14 GJ.ha<sup>-1</sup>). Najmenej bioenergie vyprodukujú gleje, organozeme, slance a litozeme (31,63 GJ.ha<sup>-1</sup>).

Najvyšší predpoklad produkcie energie (79,11 GJ.ha<sup>-1</sup>) je na pôdach nachádzajúcich sa v klimatickom regióne veľmi teplom, veľmi suchom, nížinnom. Podľa zrnitostného zloženia najviac energie (56,98 GJ.ha<sup>-1</sup>) vyprodukujú pôdy hlinité, vodnou eróziou neohrozené (73,25 GJ.ha<sup>-1</sup>), na svahu do 3° (66,61 GJ.ha<sup>-1</sup>), bez skeletu (68,57 GJ.ha<sup>-1</sup>). Podľa zvolenej škály hodnotenia produkcie biomasy rastlín na poľnohospodárskych pôdach sú pôdy vysoko a veľmi vysoko produkčné (nad 212 GJ.ha<sup>-1</sup>), lokalizované prevažne v nížinných oblastiach.

Využitelnosť energie naakumulovanej v poľnohospodárskych pôdach pestovanými plodínami je rôzna v závislosti od pôdnych predstaviteľov a vlastností pôd. Najnižšiu využitelnosť sme zistili u pôdneho typu kambizeme (0,7–1,8 %), najvyššiu u regozemí (3,1–7,0 %).

## NEW APPROACHES TO THE INTEGRATION OF ECOLOGICAL, SOCIAL AND ECONOMIC ASPECTS IN LAND-USE PLANNING

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### Abstract

Belčáková I.: New approaches to the integration of ecological, social and economic aspects in land-use planning. *Ekológia (Bratislava)*, Vol. 22, No. 2, 183–189, 2003.

The paper is intended to deal primarily with the current trends in the assessment of ecological, social and economic impacts in land-use planning in relation to sustainable development needs. Ultimately, the need for integrating planning, particularly land-use planning, and impact assessment, is also a matter of discussion. Strategic environmental assessment (SEA) is inevitable to be part of each land-use system in land-use planning processes in order to search for common basis of the topic of the integration.

It aims to address the issue of integration of ecological, economic and social issues in land-use planning and how impact assessment, especially Strategic environmental assessment (SEA) can help that process. The most important function of SEA in land-use planning is its contribution to a stronger environmental orientation in land-use planning. On one hand SEA directly joins the process of planning and decision-making and on the other hand it can meet those impacts that interfere above the framework of the actual decision-making process in land-use planning.

*Key words:* strategic environmental assessment, land-use planning, integration of ecological, social and economic aspects

### Introduction

The ecologisation of spatial organisation of landscape is aimed at an ecologically optimum spatial organisation, utilisation and protection of landscape. It results in a proposal for the most suitable localisation of required human activities within a given territory and successively in a proposal of necessary measures ensuring the ecologically correct operations of those activities in a given locality. This can be achieved by several instruments when integrating into land-use planning but where practice evidently shows that it is still lagging behind (Hobbs, 1997; Ružička, 1996; Žigrai, 2000).

With regard to the new challenges that development faces to date (economic globalisation, devolution of decision making power to lower levels of government, urbanisation processes, deterioration of the environment) and in view of the new development paradigms (ecologisation of the spatial organisation, sustainable development, local agenda 21, public participation) land-use planning has to adopt the role of anticipating development, proposing alternatives and measures, and co-ordinating sector activities.

To successfully fulfil this challenge, land-use planning must ensure full consideration of ecological, social and economic issues, through a broad, holistic and integrative way, which should be inherent to the nature of land-use planning. Ecological, social and economic aspects should be integrated during the process of land-use planning and this can be reached by the appropriate instruments.

Strategic environmental assessment (SEA) is inevitable to be part of each land-use system in land-use planning processes in order to search for common basis of the topic of the integration. It has been seen as an appropriate instrument in order to integrate ecological, social and economic issues in land-use planning.

### SEA and land-use planning

SEA has been designed to assist strategic decision making, including land-use planning, in improving the quality of policies, plans and programmes in its capacity to contribute towards sustainable development, and, in this context, with the assessment of the ecological, social and economic impacts of strategic decisions.

SEA is seen in various forms, one being that it represents an important step towards integrated decision-making, promoting sustainable development by assessing the strengths, weaknesses and therefore the potential to environmental resources to support development (CSIR, 1996). It is also seen as providing "an entry point to the appraisal of sustainable development by ensuring that ecological considerations are addressed at the same level and at the same time as social and economic issues in policy making" (DETR, 1998).

The issue of integrated land-use planning and SEA can be viewed as a dual process: on one hand the instrumental role that is played by SEA in the integrated planning approaches towards sustainability, and on the other hand the need to ensure integrated planning for effective SEA. It appears a paradox, but in fact it shows that iterative and reciprocal processes must be put in place simultaneously (Partidario, 1999).

It seems to be necessary to improve our integration capacity by allowing assessment to take place at different levels of decision-making, integrated with other mechanisms (e.g. landscape plans), rather than just at the end. SEA can be quite instrumental here, whereas its role would be more towards the influence on the way decisions are made and the ensuring that sustainability values, principles and directions are set, and integrated, right at the outset of any policy, plan or programme, hence affecting its capacity to play the role of a potential sustainability management mechanism.

The need for an early application of SEA in land-use planning is inevitable. The late

acceptance of SEA in the planning process often means a limitation to find a possible fundamental alternative solutions to the problem (e.g. the project will not be licensed, or it will be without the substantial policy alternatives). The position of SEA in land-use planning practice is clearly expected to balance the weaknesses of EIA applied at project level (Belčáková, Finka et al., 1996).

On regional and local levels plans and settlement dimensions a lot of decisions are taken. These decisions are legally binding for plans on hierarchically lower levels. We should have in mind that, in many countries, sectoral plans have only directive effect for the location of different activities in space. Their realisation is dependent on the decision under land-use planning process.

Referring to a number of experience, in early SEA step it is necessary to review the environmental carrying capacity of an investment at all planning levels and to a maximum degree in order to exclude wrong planning and decision making steps. Land-use planning measures on regional levels, that are relevant in relation to environmental issues, should be analysed concerning the importance of environmental impact prevention having in mind the scope of relevant detail degree, i.e. planning details.

The project level EIA monitors the environmental consequences of the realisation of a project. Under this process it is not possible to address the heterogeneity of intended facilities and uses of land in the interaction with the existing structure. EIA of projects can not ensure the evaluation of cumulative and synergic effects of different activities in space. This is a dominant role of SEA, namely SEA in land-use planning.

The evaluation of spatial and cumulative effects is expected from SEA and mainly from SEA in land-use planning process, the one which represents intersectoral planning. SEA of land-use planning has top point out and address the potential environmental risks and their originators. Namely regional level seems to be the most appropriate one in order to evaluate spatial and cumulative effects since the region represents an adequate spatial unit and since the regional land-use plans are, on the basis of their co-ordination tasks the place where sectoral plans meet together in many countries.

SEA in land-use planning overcomes the implementation framework of ecology issues in up-to-date practice where the environmental aspect is often presented not transparently without difference between the "description of present state" and "environmental impacts evaluation" as well as without the analysis of feedback of secondary and cumulative effects.

It is difficult to assess the land-use planning on regional level by the EIA methods and standard EIA factors, taking into account its characteristics and different levels of details in comparison to concrete project investments and effects.

There is also a different spatial degree and scope of details of land-use planning documentation which is, by its nature, a planning instrument determining the limits of spatial development and which can be a condition of necessity for reduction of the environmental assessment to important aspects of land-use planning solutions.

On the other hand the assessment of cumulative and synergic effects requires a relatively detailed analysis of space while the analysis suggests the existence of ecological compre-

hensive model for a region (Westmann, 1985). Thus, complexity or comprehensiveness of EIA is the barrier of the methodological borders of possible implementation. Apart from that, the high complexity can heavily meet the requirements of transparency and effectiveness of the assessment. On the contrary to EIA on project level, at the level of land-use plans the stakeholders of planning developments that would be responsible for financing are usually not known.

Another important aspect not to be neglected is the time. The extent of planning process can reduce the effectiveness of land-use planning actions. The implementation of SEA into a hierarchical decision-making land-use planning system seems to be the optimal solution despite of a number of unresolved questions, i.e. weaknesses.

### What are the functions of SEA in land-use planning?

The most important function of SEA in land-use planning is its contribution to a stronger environmental orientation in land-use planning. On the other hand SEA directly joins the process of planning and decision-making and on the other hand it can meet those impacts that interfere above the framework of the actual decision making process.

To further functions of SEA in land-use planning belong mainly (Belčáková, 2001):

- SEA in land-use planning helps in the preparation of decisions and has a possibility to bring a great number of information on predicted environmental impacts resulting from planning measures during decision-making process
- SEA in land-use planning explains the ecological, social and economic context of planning process and can function as a warning in order to protect the environment against already revealed and clearly described dangerous situations and risks together with, what is important on regional level, not clearly described potential dangers
- SEA in land-use planning has to present information on such environmental impacts which own existence and consequences are not exactly defined.

SEA in land-use planning can, in this way, contribute to an improvement of decision-making process since it is a comprehensive, systematic and transparent assessment of ecological, social and economic aspects and problem implications. The coming conflicts between environmental protection and sectoral interests requirements in land-use planning can not be solved during SEA process. These requires political solutions that are transformed into decisions about a certain planning alternative. In this decision-making process, SEA can guarantee neither rational decision nor an appropriate consideration on ecological requirements. Its tasks is to contribute to such decision by its transparency and comprehensiveness. In a democratic society it is hardly possible to neglect or ignore the information on predicted ecological impacts of the developments that is systematically gathered and documented and objectively evaluated.

Thus, SEA in land-use planning has, in relation to a sectoral planning, the function of influencing and mitigation of land-use planning negatives. Its task is to contribute to such

planning which is from environmental point of view not only bearable but optimal as well, while at the same time it searches for different alternatives when considering the ecological, social and economic impacts. These are evaluated by appointed value scales, their impacts are related to the best alternative and the possible risks revealed.

### Tasks of SEA in land-use planning

Main tasks of SEA in land-use planning can be defined as follows:

- the analysis of ecological, social and economic impacts, i.e. identification, description and evaluation of effects of land-use planning measures the output of which should be the creation of information database for the process of land-use plan elaboration and for the decision-making process in land-use planning
- to address alternatives or possible solutions resulting in optimal carrying capacity of land
- to mitigate negative consequences on the environment.

While defining the subject of SEA in land-use planning, we must have in mind the realisation of land-use planning measures, e.g. decisions that have directly resulted from or have been conditioned by the proved solutions of land-use planning.

Apart from the subject of SEA, the process also comprises the level of "value" (classification, evaluation). It's aim is to come to the evaluation of a proposed land-use planning documentation in relation to expected ecological social and economic impacts. That is why it is necessary to determine criteria and evaluation scales in the form of targets and standards of environmental quality.

The degree to which the environmental evaluation of land-use planning documentation can address the carrying capacity of proposed solutions is dependent on the quality and comprehensiveness of environmental background materials. The evaluation process does not mean that we would like to determine the absolute value of carrying capacity in relation to the environment but we have in mind its relation to a certain defined basic criteria.

The carrying capacity thresholds of such comprehensive environmental system is too difficult to be set up. Apart from that, the issue of environmental quality itself is not an issue that can be determined generally. It is rather a question dependent on scientific knowledge and social targets and, thus, its content is dynamic. It means that also assessment criteria can be static neither in time nor in spatial dimension and it is not possible to establish them unambiguously, through SEA process.

No matter what methods are applied, the social system of values and targets is always the main decisive normative basis. Without this, it is not possible to transform the description and quantification of environmental potentials and factors into their evaluation.

Environmental quality evaluation criteria, being the basis of environmental potential determination, are also a basis of environmental assessment of a project, programme, plan or policy. So it is an assessment of how the realisation of a certain intention can influence

the current (actual) potential of the affected area not only in ad hoc but in a trajectory of its predicted spatial development.

The implementation of SEA into land-use planning should be the strategic interest of all societal spheres, it means the social level as well as the economic basis and SEA requires an adequate attention not only in theoretical and methodological field but in practice too.

### Forms of integration of SEA in land-use planning

Eggenberger and Partidario (2000) suggested that it should be addressed, at least, in three different forms or levels: substantive, procedural and policy integration.

Table 1. Forms of integration

<p>Substantive (technical and methodological) integration meaning:</p> <ul style="list-style-type: none"> <li>the integration of ecological (physical or biophysical) issues with social and economic issues</li> <li>the integration of emerging impact assessment issues such as health, risks, biodiversity issues with traditional biophysical, social and economic approaches</li> <li>the integration of cumulative impact assessment, technological assessment, public participation and other such broader approaches in EIA</li> <li>the integration of different applications, and experiences with the use of particular tools such as GIS, multicriteria analysis and assessment or evaluation (for example we are actually being accurate when we assess impacts on the way as determined by a formal multicriteria assessment?)</li> <li>the integration of professionals and terminologies in true interdisciplinary teams)</li> </ul>
<p>Procedural integration meaning:</p> <ul style="list-style-type: none"> <li>the integration of land-use planning, EIA and resources management</li> <li>the integration of sectoral permitting or licensing processes and EIA</li> <li>the integration of public participation in its various forums (EIA, land-use plans, governmental regulations, permitting processes)</li> </ul>
<p>Policy integration meaning:</p> <ul style="list-style-type: none"> <li>the integration of sectoral regulations</li> <li>the integration of sectoral strategies</li> <li>the timing and opportunities of political intervention</li> <li>institutional cooperation</li> </ul>

Based on Partidario (2000)

Table 1 indicates the scope of these three forms of integration.

Considering now other forms of integration, such as procedural and policy integration, and taking the example of planning, how many countries do have the same system of public participation for EIA, planning, regulatory proposals, permitting systems or how many countries have integrated permitting and EIA systems? How are we doing regarding the institu-

tional cooperation which is increasingly one of the key doors towards success concerning integration, EIA effectiveness and positive trends towards sustainability?

These are issues and concerns that interest both the impact assessment planning communities.

*Translated by the author*

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### Belčáková I.: Nové prístupy k integrácii ekologických, sociálnych a ekonomických aspektov v územnom plánovaní.

Práca je zameraná hlavne na súčasné trendy v oblasti integrácie ekologických, sociálnych a ekonomických aspektov v oblasti územného plánovania. Diskutuje o potrebe integrácie strategického environmentálneho hodnotenia (SEA) a územného plánovania. SEA je nevyhnutnou súčasťou územnoplánovacieho systému v procese územného plánovania vzhľadom na spoločné črty obidvoch procesov s cieľom udržateľného rozvoja.

Rozoberáme otázku integrácie ekologických, sociálnych a ekonomických otázok do procesu územného plánovania a spôsob, akým môže hodnotenie vplyvov, špeciálne strategické environmentálne hodnotenie tomu napomôcť.

Hlavnou úlohou SEA v územnom plánovaní je prispieť k silnejšej orientácii v otázke udržateľného rozvoja. Na jednej strane sa proces SEA pripája k procesu územného plánovania a rozhodovania a na druhej strane môže odhaliť tie vplyvy, ktoré sa vynárajú vysoko nad rámec možností súčasného rozhodovacieho procesu v územnom plánovaní.