Pimp your landscape

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A cellular automaton based tool for evaluating the impact of planning measures on sustainable landscape development

What is „Pimp your landscape“?

Pimp your landscape is a software, which helps to simulate land-use pattern changes on mesoscale level. An integrated evaluation gives immediately feed-back on the impact of land-use pattern changes on major land-use services & functions. Pimp your Landscape was developed for supporting communicative and participative processes in environmental planning.

Technological basis

Pimp your landscape is concieved as cellular automaton with some GIS functionalities.

• On EU level, Corine Landcover (CLC) 2000 is used as data basis (land-use pattern & classification) with a resolution of 100x100 m² (= 1 raster cell). If available, maps with higher resolution can be used.

• Each raster cell is communicating with each neighboring cell (Moore neighborhood, Gray 2003) based on regionally defined communication rules.

• Each raster cell can have several attributes (geo-coordinates, geology, climate, topography). These attributes contribute information on the localization and local frame conditions of a cell.

• Neighborhoodship, attributes and additional regional restrictions (regulations, directives specified by the user) are integrated into the evaluation of land-use pattern changes.

•The (georeferenced) simulation results can be exported for further use in a GIS.

Pimp your landscape is programmed in an object-oriented way; Fig. 1 shows the core elements.

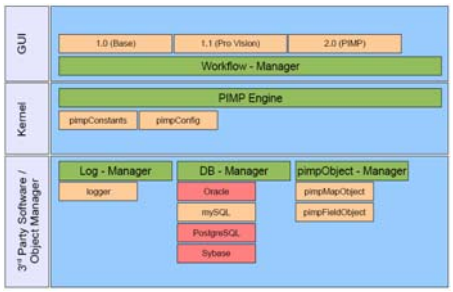

Fig. 1: Object oriented programming approach

User interface

Pimp your landscape conducts land-use pattern changes by simple mouse click. Changes can be done for each single raster cell, for larger parts of the landscape (sector) and for specific land-use types (type fill). Furthermore, other landscape elements can be introduced, such as roads and water bodies or disturbance sources with disturbance gradient, such as power plants (Fig. 2).

Each action is evaluated in real time and the results are displayed in a diagram, which helps to compare the starting situation and the simulation results.

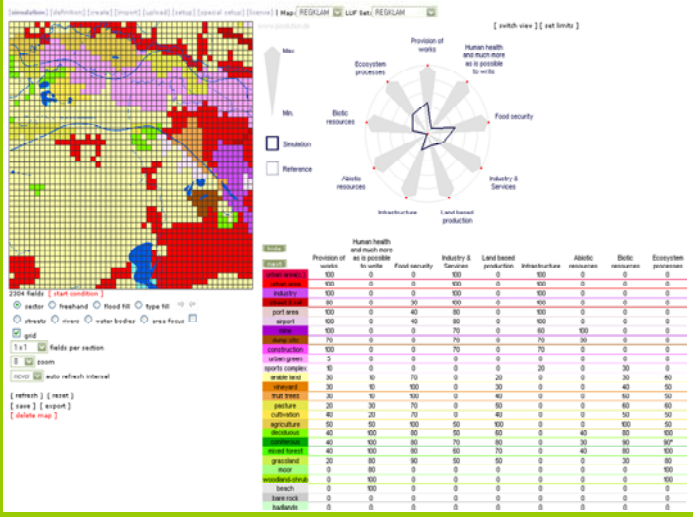

Fig. 2: User interface of Pimp your landscape (scientific mode).

The map shows the test region, the user is working on, the diagram gives information on the actual status of the region considering a set of land-use functions (LUF´s, Perez-Soba et al., 2008).

The table below displays the regional evaluation basis for the CLC 2000 land-use types.

The user can start to change the land-use pattern and insert further landscape elements with the action menu below the map.

Evaluation basis

Each land-use type is evaluated in relation to each other on a relative scale from 0 (worst case) to 100 (best case) considering its impact / contribution on selected land-use functions and services. These can be chosen with regard to their regional relevance and the application target of the software.

The evaluation is concieved in a step-wise approach (Fig. 3). First a regional basis table is developped, where each land-use type is evaluated. In a next step, environmental attributes and neighborhoodship are integrated to differentiate cells with the same land-use type according to their specific localization. Finally, landscape structure indicators and regional regulations and directives are implementd, to ajust the evaluation basis to the specific regional application.

The user is guided through this evaluation process by an action menu, which helps him also to develop regional rule sets.

Application areas

Pimp your landscape is actually available in three different versions:

(a) Game mode: This version provides only basic functionalities and is applied for environmental education at schools (UN Decade Education for Sustainable Development 2005 - 2014).

(b) Expert mode: This version allows for defining regional planning rules derived from directives and regulations and is concieved for policy support and fast sensitivity analysis.

(c) Scientic mode: This version offers full functionalities to test and teach the dynamics of the „system landscape“. It is developed for higher and further education and for scientific analysis.

Test versions of the game mode and expert mode are freely available under the portal www.letsmap.de, the scientific mode is available on enquiry.

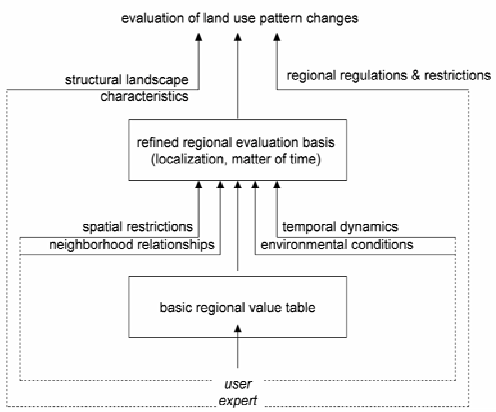

Fig. 3: Stepwise evaluation approach. Regional indicator sets and expert knowledge are bundled to derive the basic value table and the hereon up-building regional adaptations.

References

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