

# **Landuse - Brownfield Redevelopment**

## **- reuse - ecological aspects - new urbanity -**

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### **Abstract**

The interaction between land use and water management is the prominent overall issue in Megacities. Land-cover and land-use leads to the subject of Brownfields which play an important role in water management. The sustainable redevelopment of brownfields may ensure and / or improve water quality and quantity essentially.

First, the decontamination of brownfields is important to prevent pollution of the water resources. Advanced new technologies of geotechnology offer many possibilities for decontamination which can be applied also in built-up areas.

Second, the choice of appropriate land use considering the functions of the brownfields for water enrichment, storage and protection may improve the drinking water supply.

Third, the reuse of brownfields is an essential contribution for the reduction of land consumption which indirectly influences the pressure on water resources quality and quantity, e.g. decreasing the pressure on greenland, which has important functions on water enrichment, storage and protection. Due to the high ecological value of greenland especially for the drinking water supply Germany has formulated the "political goal" for a nationwide reduction of greenland consumption to 30 ha/d in the year 2020 (momentarily about 110 ha/d). The achievement of this goal lies in the responsibility of the local and city governments (see REFINA 2009).

Keywords: New Urbanity, Urban Services, Regional Soil Protection, Regional Planning.

### **1 Brownfield Redevelopment**

Brownfield development means an upgrading of the "life-cycle" concept for land and real estate. Sustainability meanwhile has gained an international recognition - the revitalisation and redevelopment of Brownfields is a substantial factor - in Europe, the US and China as well as in new town developments e. g. Hangzhou with a feasibility study by SBA Consulting for 3.700 Hectare with 38,7 million square meter gross floor space. Green Building is a keyword in that context including energy efficiency, green space etc.

The decision which kind of land use of brownfields is appropriate, the redevelopment of brownfields has to be integrated in the whole spatial planning context on local up to at least regional level. The protection of environment and conservation of nature, economic growth and the improvement of life quality and conditions have to be regarded altogether to select the appropriate kind of use.

Nevertheless, the decision which kind of utilisation is in fact sustainable is often not easy due to the complexity of land use capabilities and interests. In spatial planning a lot of aspects including economic, ecologic and social options and demands have to be considered. Additionally there is often an overlap of conflicting interests. The potentials of land use on the one hand and the demands on the other hand have to be weighed against each other thoroughly.

Spatial information technology offers a lot of practical tools which may support these decision processes in line with the principles of sustainability. New developments in remote sensing, geographic information systems (GIS), modelling and visualisation allow the derivation of utilisation proposals (see WERNER 2009).

For the integrated analysis of land use options and interests multiobjective optimisation (Pareto optimality) considering areal resource allocation and conflicting or overlapping demands is a useful spatial planning instrument. The development of multicriteria decision making models has been in the focus of many spatial research projects. However, there is lack in integrated holistic systems for spatial analysis and decision making considering both capacities and options. Recent approaches to use GIS technologies are presented by HERZIG (2008) who integrates the Land Use Management Support System (LUMASS) in GIS (ESRI ArcGIS software). Fig. 1 shows the typical functionality of LUMASS solving problems with an integrated analysis of capacities, constraints and options.

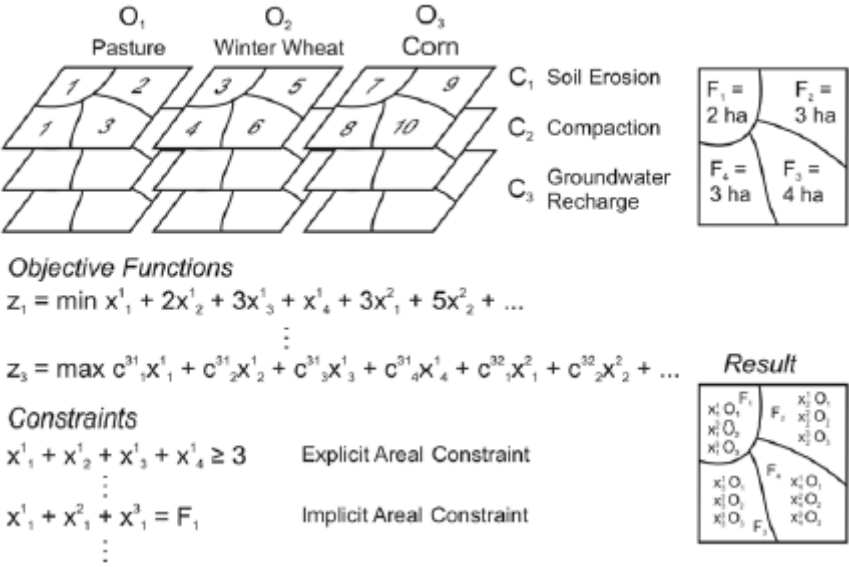


Fig. 1: Example of a typical optimisation problem to be solved by LUMASS (HERZIG, 2008)

Furthermore, brownfield development may contribute significantly to atmospheric green house gas reduction. Renewable energy resources such as solar energy and geothermal form shallow subsurface as well as "deep" potential by "Hot Dry Rock" or groundwater directly with high temperature about 100 °C will increase energy options and finally help to decrease atmospheric greenhouse gas concentrations (CO<sub>2</sub> reduction).

Brownfields in the context of "CLIMATE change" in Megacities will proof the ability and pick up of that issue by city administration, investors and legislation - economy meets politics in all kind of systems.

The U. N. Climate Summit, September this year heard by political leaders about their determination to take new steps to halt climate change.

After the cumbersome process dating back to the "Earth Summit" in Rio de Janeiro in 1992 with a kind of an unprecedented treaty "to protect the climate system for present and future generations", scientists had produced persuasive evidence that the carbon dioxide, methane and other greenhouse gases that industry, transport and farming were trapping heat and raising global temperatures, with potentially damaging effects from a changing climate. The "energy-efficiency-gap" does exist.

Five years later the Kyoto Protocol showed the first, modest reductions in emissions by industrialized countries. The lead was taken by the European Union and lately the US has got into that process.

In 2007, Bali - a two-year time table for replacing the Kyoto pact, which expires in 2012. The aim is a new overall deal at the annual U. N. climate conference this December in Copenhagen, Denmark.

Expectations are perhaps not that high beside the awareness of urgent need.

Beside a "set an aggregate goal" for emissions reductions by richer countries with 2020 and 2050 targets a "set of envision" policy-based commitments by China and important countries like India and Brazil - for example, not reducing emissions directly, but reducing "carbon intensity", or fossil-fuel use per unit of economic growth.

A possible financial support to switch to clean energy technologies and to adapt to climate change's impact on economic lives of less developed countries seems favourable.

Let's see what Copenhagen will bring - a single sweeping deal might be to much of positive expectations.

"New Urbanity" ... Urban Services - regional soil protection - regional planning

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