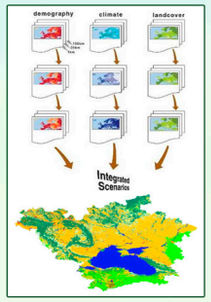
LAND USE CHANGE SCENARIOS FOR BLACK SEA CATCHMENT

4th Bi-annual Black Sea Scientific Conference

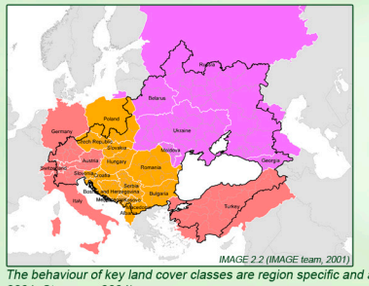
Objetives



- To create spatially explicit scenarios on:
  - *Demographic Changes*
  - *Climate Changes*
  - *Land Cover Changes*
- To integrate the three scenarios outputs

Scenarios are neither prediction nor forecast, but a plausible description on how the future may develop, based on a coherent and internally consistent set of assumption about key relationship and driving forces (IPCC-SRES, Nakicenovic et al., 2000).

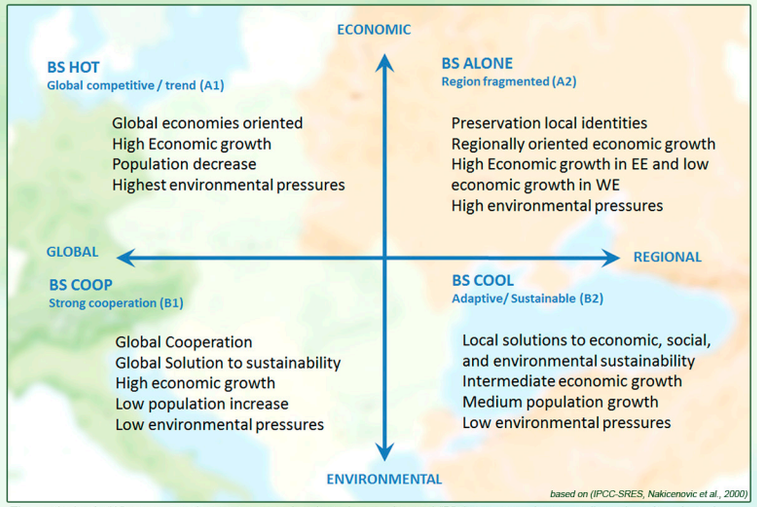
Regional Guidelines and Input Data



Thema	Data	Source
Demography	Tot pop, Urban and rural pop, past and proyections	UN, Eurostat, National Statistics, Partner contributions
Land Use	Global Scenarios Modis LU	IMAGE 2.2 NASA/EOSDIS
Climate	Precipitation and temperature, proyections	WorldClim
Conservation	WDPA N2000	UNEP EEA
Physical suitability	DEM, slope etc..	NASA/USGS
Accessibility	Infrastructure networks	ESRI, GISCO

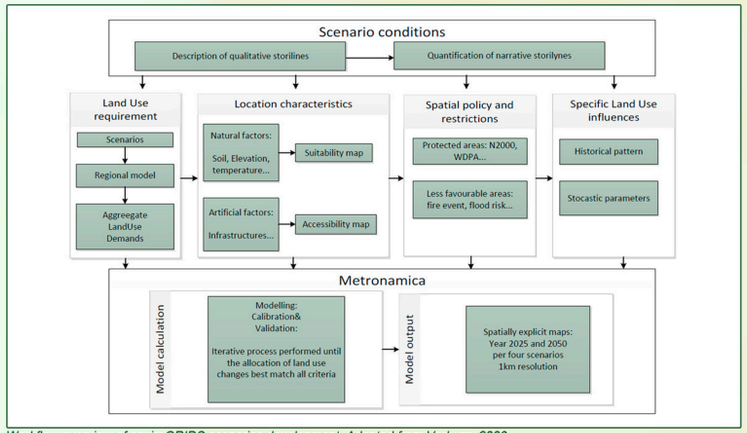
The behaviour of key land cover classes are region specific and are very much influenced by regional or global policy (IMAGE team, 2001; Strengers 2004)

enviroGRIDS storilines

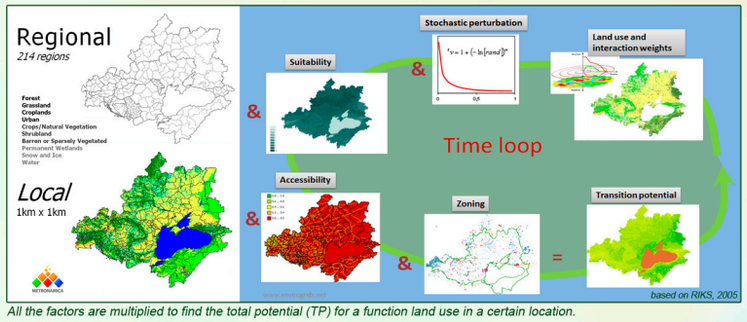


The vertical axis "A" represents the most economic oriented scenarios and "B" the most environmentally and equity oriented ones. The four resulting scenarios were discussed and approved during an EnviroGRIDS workshop in Delft, the Netherlands (April 2011).

Methodology

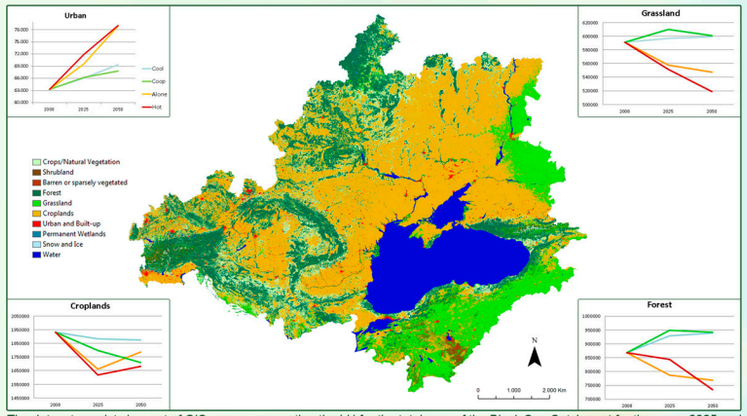


Workflow overview of enviroGRIDS scenarios development. Adapted from Verburg, 2006.



All the factors are multiplied to find the total potential (TP) for a function land use in a certain location.
TP = (1 + (-log(1 - random))$^{\alpha}$) · N · if(N >= 0; A · S · Z; 2 - A · S · Z)
Random = stochastic factor; N = Neighbourhood effect; Z = Zoning; α= Random coefficient; A = Accessibility S= Suitability

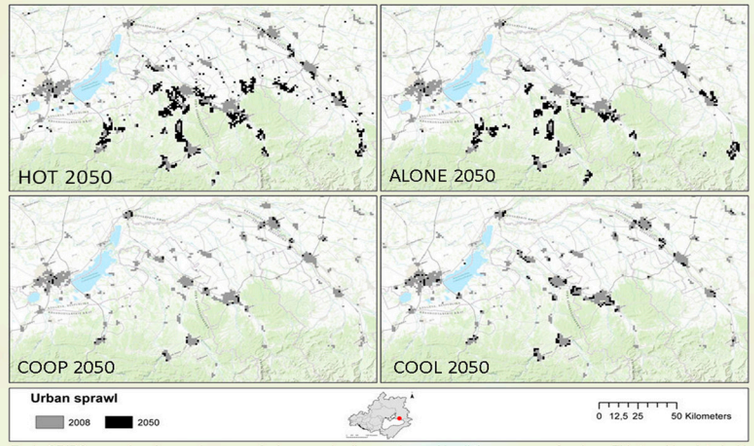
Results



The dataset consists in a set of GIS maps representing the LU for the total area of the Black Sea Catchment for the years 2025 and 2050 per each scenario (HOT, ALONE, COOP, COOL) at 1km resolution. All data, metadata, and web services (WMS, WCS, and WFS) can be freely accessed through: enviroGRIDS GeoPortal at http://www.envirogrids.cz/search

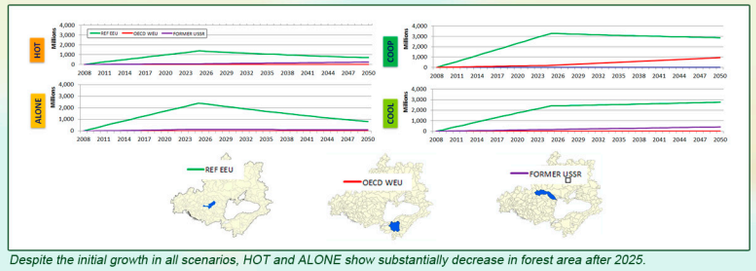
Results in detail

Urban Sprawl



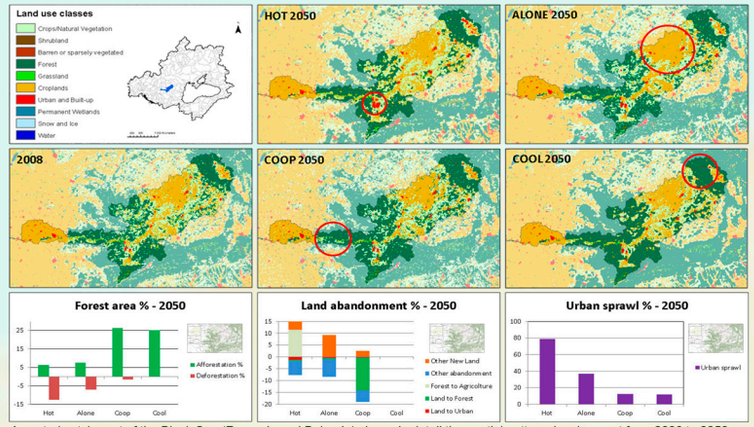
EnviroGRIDS scenarios show an increase of urban area in all scenarios and in all three groups of regions. This trend is related with the increase of prosperity and strong economic growth inducing an amplification of requirement of new urban zones (e.g. high demand of second house, extension of tourism facilities).

Afforestation trends



Despite the initial growth in all scenarios, HOT and ALONE show substantially decrease in forest area after 2025.

Comparison of scenarios



A central catchment of the Black Sea (Romania and Bulgaria) shows in detail the spatial pattern development from 2008 to 2050 per each scenario: strong expansion of urban areas (HOT and ALONE), preservation of agricultural land (ALONE and COOL), environmental protection (COOP and COOL).

Acknowledgment:

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Black Sea Catchment Observation and Assessment System supporting Sustainable Development, http://www.envirogrids.net

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