



IMPETUS Benin

Food security in Benin -

Development of decision support systems at different spatial scales - (2) Spatial decision support systems at the regional scale

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Introduction



The Upper Oueme basin is in large parts relatively sparsely populated with protected forest areas and some land reserves. However, this situation is changing dramatically by

- fast demographic growth including migration from other more densely populated regions
- high deforestation rates including protected areas have been observed, inducing soil erosion
- loss of soil fertility and land degradation.

The local authorities are aware of the problems, but scientifically based information and decision support is lacking.



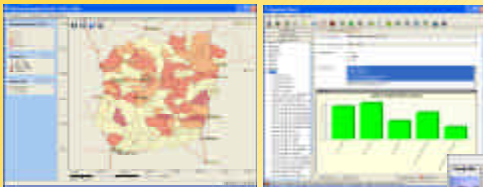
Climate and land use scenarios

Seasonal forecast model PRÉSAPLUS

PEDRO

The SDSS PEDRO (Protection du sol et durabilité des ressources agricoles dans le bassin versant de l'Ouémé) aims in estimating the effects of climate and land use changes as well as user defined management scenarios on the following ecological and economical indicators:

- Annual and monthly soil surface runoff
- Soil erosion rate
- Annual and monthly discharge in the hydrological network
- Yield of nine food and cash crops
- Total production of the nine selected crops within 121 subcatchments
- Energy value of the food production



The results of PEDRO can be presented as tables, graphs and maps

The user has the choice to define the following boundary conditions for the calculations:

- Climat
- Extension of cultivated area
- Simulation period
- Cropping system (rainfed or irrigated)
- Irrigation system and interval
- Selection of improved varieties
- Planting date
- Crop specific application of fertiliser



BENIVIS

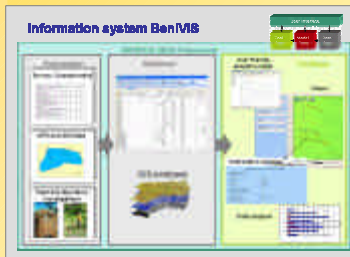
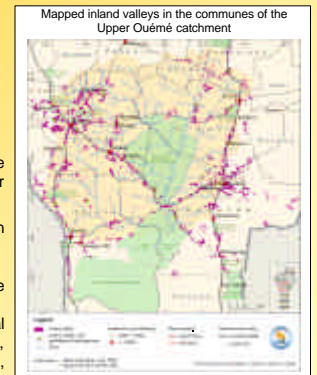
Inland valleys – a potential for agricultural production in West Africa

Inland valleys (seasonally waterlogged linear depressions of headwater zones of rivers of the precambian basement complex) offer an extensive, fairly unexploited potential for agricultural production, due to their higher water availability, lower fragility and higher fertility compared to the upland soils.

Survey of inland valleys in the Upper Ouémé catchment

Because no reliable database of inland valleys were available an extensive survey of inland valleys in the Upper Ouémé catchment was carried out:

- Locating inland valleys by questioning the local population of each village in the target region
- Mapping of the inland valley extent with a GPS
- 817 inland valleys with a total area of 5563 ha were mapped
- Questionnaires concerning socio-economic and physical aspects of the inland valley (ethnic affiliation of the farmer, access to the inland valley, distance to market, exploitation, management, geomorphology, hydrology, soils etc.)



BenIVIS – Benin Inland Valley Information system

Why SYMBA?

Before the background of increasing population and change in the precipitation patterns small scale barrages can contribute to a better food security and an increase of income.

To ensure a sustainable use and to avoid conflicts related with the small scale barrage a integrative planning and managing approach is essential

What is SYMBA?

SYMBA is a integrative decision support system which assists planners and decision makers in the realisation and management of small scale barrages.

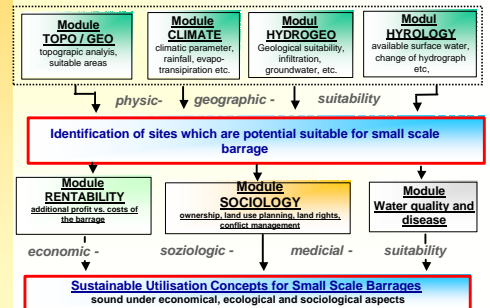


How does SYMBA work?

The different domains required for successful planning and managing are integrated.

- The **physical geographical suitability** concerning topography, climate, hydrogeology, hydrology, soil is considered (the results of the respective IMPETUS-DSS are integrated)
- The **economical aspects** are considered as well (additional yield in dependence of the design of the barrage (Pedro, Benimpact))
- The very important **sociological aspects** (land rights, access to barrage for cattle farmers, conflict management) are considered by a structured planning scheme

System for the Management of Small Scale Barrages



Conclusions

The systems are technically operational. By the provision of capacity building opportunities including academic and technical training, user and administrator manuals, planning capacities in the area of sustainable land and water management in Benin have been strengthened and improved



Universität zu Köln



GLOWA

Ministry of Innovation, Science, Research and Technology of the German State of North Rhine-Westphalia

