APAT

Agenzia per la protezione dell'ambiente e per i servizi tecnici

INTERREG IIIB - ARCHIMED

PRIORITY AXIS 3: ***INTEGRATED AND SUSTAINABLE MANAGEMENT OF CULTURAL AND NATURAL RESOURCES AND OF LANDSCAPES AND RISK MANAGEMENT"***

MEASURE: 3.3 ***Management, prevention and reduction of natural risks: drought, desertification, fires, earthquakes etc.***

FIELD OF INTERVENTION: ***353. Protection, improvement and reformation of the natural environment***

IMPLEMENTATION OF PUBLIC ACTIVITIES ON MONITORING, PREVENTION AND CONTROL OF ENVIRONMENTAL HAZARDS.

The project deals with the operative implementation of a set of actions finalised to monitor spatial and temporal dynamics of land use/land covers in the six Italian Mediterranean regions. The project is based on the improvement and updating of results achieved in the I&CLC2000 project (Image and Corine Land Cover 2000).

Expected results: Earth Observation techniques to prevent and to manage fires.

On one side the project will implement a multitemporal study at 1:100.000 scale level (adopted in I&CLC2000), on the other side it will be developed a new set of CLC database at 1:25.000 scale to better understand differences in land use changes induced by scale effect and to enhance the contribution of the different driving forces. This historical/dynamic approach will permit to identify the permanents land use changes in the landscape, mainly due to new artificial surfaces, and to deal separately with the "seminatural" pressure factors among the different driving forces, like natural revegetation on abandoned agricultural areas, loggings operations for land cover and wildland fires in the Mediterranean regions: special focus will be made on this last phenomenon.

The project is mainly based on the integrated use of GIS (Geographic Information System) and Earth Observation techniques.
The project is structured in several Working Package.

The project is implemented operatively over six Italian Regions: Campania, Basilicata, Puglia, Calabria, Sicilia and Sardegna. Regions Calabria and Basilicata, for some specific WP, are test areas used to develop specific procedures.

WP1 – Development of detailed land use/land cover map

Some specific phenomena such as forest fires and illegal logging or other man-induced changes in land use/land cover (derived by changes in agricultural or environmental policies, social conditions, etc.) in Mediterranean environments have to be monitored over the time with higher resolution than that one used in the original CLC DB .
Mediterranean landscape is in fact characterised by a very high level of fragmentation, heterogeneity and biodiversity. The surfaces of forest fires and loggings are very limited (frequently

a few hectares). Monitoring of such phenomena in such a context cannot be carried out at those scale levels adopted in the original project (1:100.000 in I&CLC2000).

WP1 deals therefore on the implementation of a 5th thematic level of Corine Land Cover database at a nominal scale level of 1:25.000 over two Italian Regions (Calabria and Basilicata).
The project is based on the use of High Resolution remotely sensed images acquired by SPOT 5 satellite. In specific area a more detailed study will also be carried out with VHR (Very High Resolution) imagery from IKONOS or Quick Bird to better investigate the role of resolution and scale level in analysing multitemporal phenomena.
The system of nomenclature will be developed and harmonised with other relevant processes, suchas EUNIS nad Natura 2000, in order to be directly compared with the CLC standard available at the 3rd thematic level.

Expected results: land use land cover maps for Calabria and Basilicata developed at 1:25.000 scale level based on 5th thematic level of CORINE system of nomenclature.

WP2 – Multitemporal analysis

This WP is vocate to the development of new historical land use/land cover dataset and to their analysis.

WP 2.1 Historical mapping
In such task historical land use/land cover maps will be acquired in order to better analyse dynamics in past times. Three main datasets will be implemented for all the six Italian Regions:

- forest map of Italy developed by Forest Corps in the 1936-1939. Maps, now available in paper format at 1:50.000 scale, will be acquired by scanners, geocoded and then digitised.
- Land use maps developed by Touring Club Italia in 1970 at 1:200.000 scale level. The database will be acquired with same methodology previously described.
- Corine Land Cover 1980. The database will be implemented at 1:100.000 nominal scale level by manual modification of CLC90. The activity will be based on a new acquisition of a historical coverage of Landsat MSS satellite imagery. The CLC80 will be implemented on the basis of the same thematic and geometric standards of CORINE project.

WP 2.2 Multitemporal analysis
In this WP a time series analysis of available dataset will be carried out. Different methodologies based on GIS techniques will be used to describe and analyse changes in land use/land cover. A specific analysis will be carried out to identify and track changes at least just potentially linked to desertification or other losses in natural or landscape values. Changes will also analysed to identify local variation and relationships with other environmental, social or economic factors (soil properties, orography, changes in local economics or in social conditions, etc.).
To implement such analysis all available datasets will be standardise both under a geometric and a thematic point of view.

WP 2.3 Future dynamics modelling
The final goal of this WP is to provide some future scenarios of future land use/land cover dynamics. For such task different available GIS methodologies will be used (Markov chains, cellular automata, neural networks, expert systems, etc.). The impact of changes in local socio-economics network or in national or international agricultural or environmental policy will be evaluated producing different future scenarioand should be of great interest for the development of the following WPs.

WP3 – Real time updating service

On the basis of past experiences updating methods for land/land cover database are essential to support land management policy. For such a purpose a real time service will be implemented to modify and update CLC database trough the use of Internet based on-line GIS systems.

Both 1:100.000 official CLC2000 database at 3rd thematic level and 1:25.000 CLC database at 5th level developed in WP1 will be available on-line.

Registered and authorised users will be able to login in the system and to change database registering specific local changes in Use and Cover (forest fires, forest loggings, revegetation, permanent modifications etc.). Changes will have to be checked by authorised personnel who will certify changes.

The system will provide a solution in limiting costs for land use/land cover maps updating.

WP3.1 – Forest fires assessment in the Land Use-Land Cover context

This will be the first application, proposed in this project, of the updated CLC database at a suitable scale for regional planning purposes.

The development of tools for a better knowledge of territory are crucial, with the aim to identify trends, concentration, dynamics of the phenomenon and to put down proper and efficacious fire danger and risk prediction/prevision methods (Chuvieco, 2003).

Crucial, in this context, are the Land Cover assessment and the tools of geographic information, which allow a spatialization of the dependent variable (fire occurrence and fire risk ranking in the space), therefore the interpretation of an anthropogenic phenomenon with an exclusive, direct dependence on social behaviour, whether voluntary or involuntary (Leone & Lovreglio, 2003), often related itself to the Land Use patterns. In Mediterranean Region population density and dwelling diffusion within fire prone areas make this subject particularly interesting, as evidenced by wildfires that occurred during the summer of 2003 e 2004. These kind of fires and their related issues are nowadays the real challenge for wildfire researchers and managers, since very complex spatial context with many interrelated social, natural resource and wildfire issues are dominant, like the wildland-urban interface (WUI) areas, at suitable scales.

Wildfire risk characterization is also an extremely important component of prevention activities. In particular wildfire risk analysis in complex areas permits to define proper management strategies. Crucial, in this context, are the CLC information and the tools of geographic information, which allow spatial analysis of the dependent variables (fire occurrence in the space, i.e.) and the interpretation of an anthropogenic dominated pressure factor with an exclusive, direct dependence on social behaviour, whether voluntary or involuntary (Leone & Lovreglio, 2003).

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