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**Internetic GIS:
 An Open System
 for Organic Agriculture
 Administration, Verification and Planning**



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FIG
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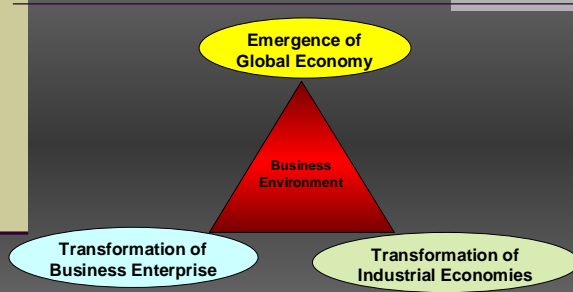
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Summary of the presentation

- Worldwide changes and issues
- Needs and approaches for an Information Network
- Principles for geospatial data dissemination through www
- Conclusions

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Changing characteristics of business environment worldwide



Emergence of Global Economy

Business Environment

Transformation of Business Enterprise

Transformation of Industrial Economies

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Emergence of Global Economy

- Global work groups and communications
- Management and control in global market place
- Global competition and Information Systems

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Transformation of Business Enterprise

- New products and services (credit cards, e-products, etc)
- Knowledge and information-based economies
- Time – based competition

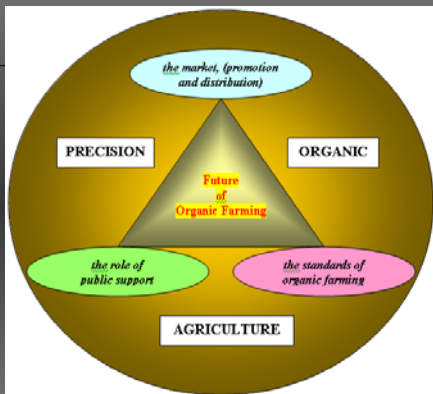
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Transformation of Industrial Economies

- Decentralization & Flexibility
- Location independence
- Accessibility on information for everyone

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Issues towards a European Action Plan on Organic food and Agriculture



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EU demands

(...according to council regulation No 1593/2000 through the establishment of LPIS)

- Immediate support to farmer's yields applications
- Immediate support to Agricultural Associations in distribution of technical advices to the farmers
- Acceleration of administrative controls
- Acceleration of spot tests

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EU demands

(...according to objectives of the latest CAP reform)

- High standards in terms of the environment, animal welfare, food safety and quality
- Adjustment of certain aspects of agricultural market policy (more competitive, market oriented, stable)
- Supply of more opportunities to farmers through reinforcement of rural development
- A simplified administration and efficient supervision of agricultural state aids without weakening Commissions' monitoring

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Environmental integration:

- A priority of the 6th Environment Action Programme Environment 2010: Our Future, our Choice

Strategic and long term approach focusing on the following key areas:

- Improving the implementation of existing environmental legislation,
- Integrating environmental concerns across all other policies,
- Working more closely with the market and industry,
- Influencing citizens behavior and action through better quality and access to environmental information,
- Supporting better land use planning and management decisions, including (in future) the environmental assessment not only of projects but also of land-use plans and programs.

A theme running through this Action Program is the need for better indicators and geographic information to monitor policy and raise awareness.

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The policy areas are grouped in the following environmental themes:

- General policy and overviews
- Sustainable Development
- Climate Change
- Air
- Land
- Waste
- Water
- Urban environment
- Nature protection and biodiversity
- Industry and Product Policy

- Chemicals
- Biotechnology
- Enlargement
- Environmental assessment
- Environmental economics
- Environmental governance
- Environmental law
- Education and training
- Radiation Protection
- Civil protection

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World Summit in Johannesburg in August 2002

...sustainable development of worldwide environmental and social constituents will decrease in contradistinction of the evolution of global economy and commerce.

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Public Health was affected! TS20

Participation of agricultural products in overall danger for cancer

| PRODUCTS | % participation in overall danger for carcinogenesis |
|--------------|--|
| TOMATO | 14,9 |
| BEEF | 11,1 |
| POTATO | 8,9 |
| ORANGES | 6,4 |
| LETTUCES | 5,8 |
| APPLES | 5,5 |
| PEACHES | 5,5 |
| PORK | 4,5 |
| WHEAT | 3,3 |
| SOYA | 2,2 |
| BEANS | 2,1 |
| CARROTS | 2,1 |
| CHICKEN | 1,9 |
| MAIZE | 1,9 |
| GRAPES | 1,9 |
| TOTAL | 78,0 |

Alternative Sectors of Agriculture :

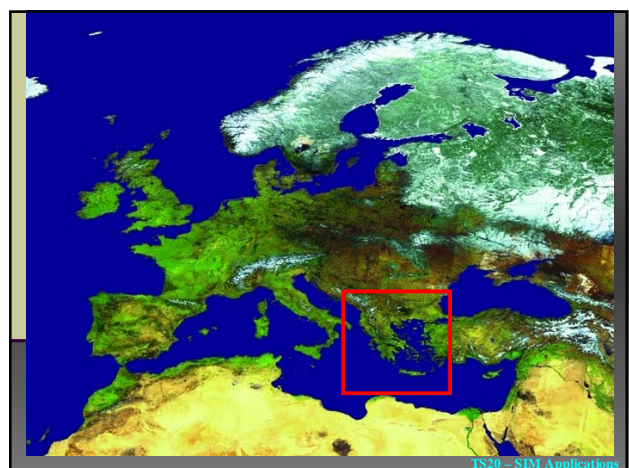
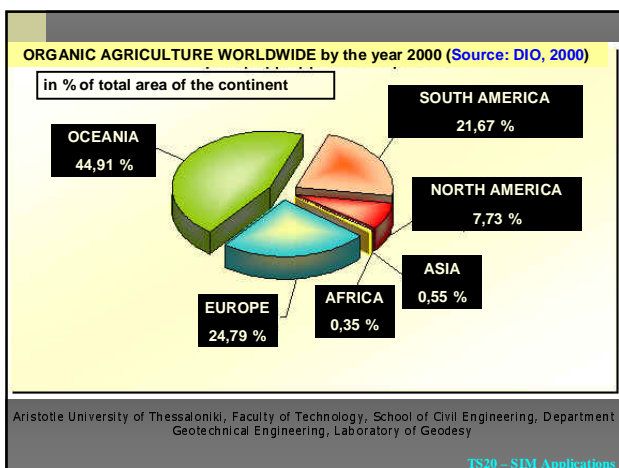
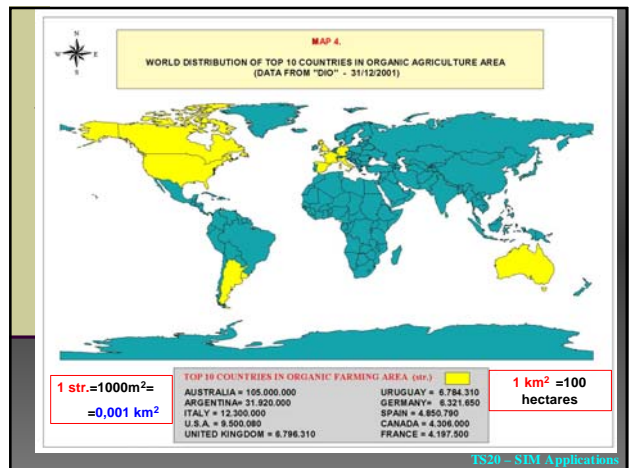
- **Natural** Agriculture (Fukuoka, 1985)
- **Conventional**, also known as **Classic**, **Scientific**, **Contemporary** or **Chemical** Agriculture
- **Sustainable** agriculture which includes **Organic** (or **Biologic**, or **Ecologic**) and **Integrated** agriculture

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Principles of Organic Agriculture by IFOAM
(International Federation of Organic Agriculture Movements):

- uses biological methods for confrontation of insects, diseases, weeds.
- aims on best soil fertility based in natural processes
- uses methods of “closed circle” production
- avoids heavy machinery because of damages of soil's connectivity and of soil's microorganisms
- avoids using chemicals
- avoids using supplemental in animal nourishing.
- Comparing with conventional agriculture, OA needs about 20% more working hands, getting yield reduction by 10-30%, achieving higher prices in organized marketing infrastructures by 15-20%
- needs 3-5 years to transit a conventional cultivated field to a biologic farming system following the restrictions of Council Regulation (EEC) No 2092/91
- implements crop rotation and co-cultivation of plants.
- underlies in inspections from authorities approved by the Greek ministry of Agriculture

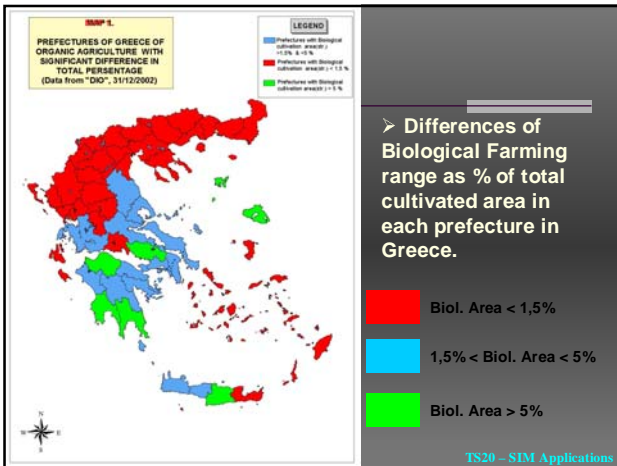
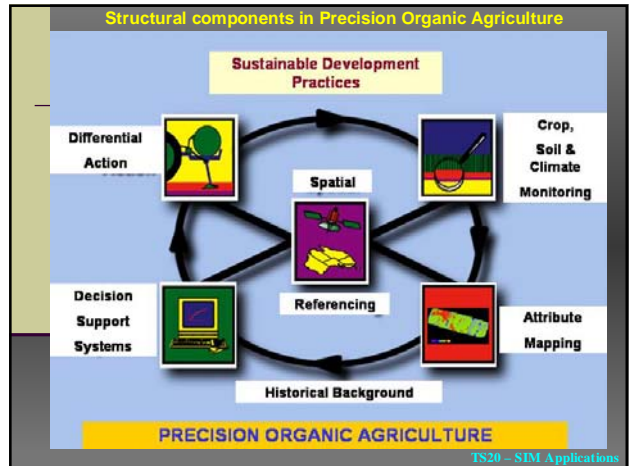
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Advantages of Greece for developing Organic Agriculture

- > It is surrounded by three sides by the sea (natural protecting shield)
- > Continuing changes in the landscape
- > Large variety of microenvironmental regions and ecotypes
- > The mean plot area in Greece is about 5 hectares (in EU-15 was 18 hectares and in USA 205 hectares)
- > Delay of using heavy machinery in a large scale and practicing of traditional cultivated methods
- > 450.000 (from an estimated 820.000 holdings) are situated in mountainous, semi-mountainous and insular areas
- > International protecting conventions are in due (RAMSAR, NATURA 2000)
- > Increase of public awareness for Biological products especially during the last decade in Greece and markets' needs of Central Europe

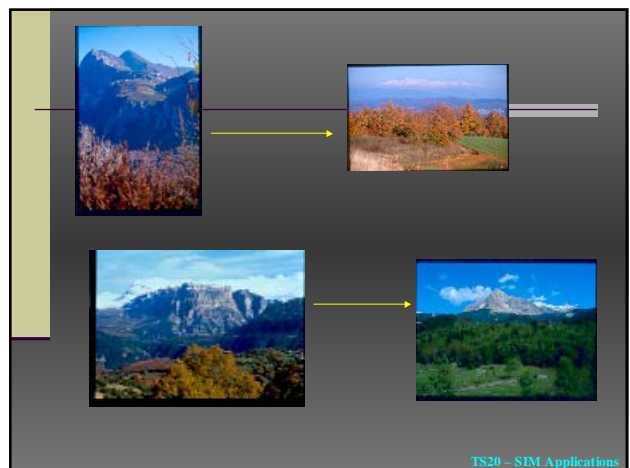
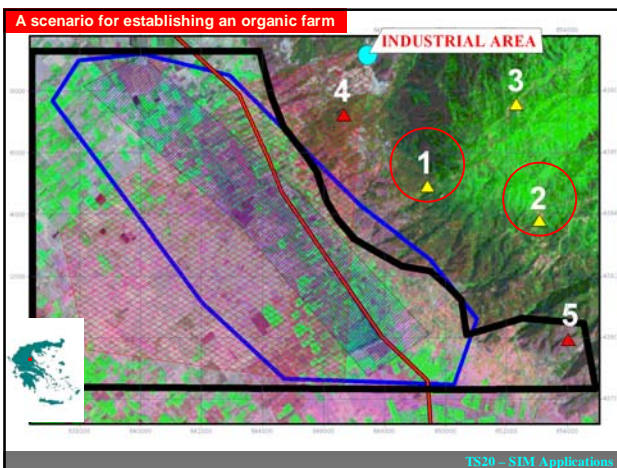
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Types of variables of collecting data for GIS in Precision Organic Agriculture

- **Yields' variables:** History, yields' distribution in the area, etc..
- **Fields' variables:** Topography (elevation, slope, aspect), topology, proximity to streams, cities, etc..
- **Soils' variables:** Soil fertility (macroelements, microelements etc.), physical and chemical properties, pH, organic matter, salinity, water-holding capacity, soil depth, etc..
- **Crops' variables:** Crop density, crops' nutrient and water stress crops' biophysical properties, photosynthetically active radiation, biomass, etc..
- **Variables of anomalous factors:** Infestation (by weeds, insects, viruses, etc.), wind damages, weather condition monitoring, etc..
- **Management variables:** Cultivation practices, crop rotation, fertilizer application, diseases and natural enemies' confrontation strategies, irrigation pattern, etc..
- **Economics' variables:** Market needs, channels distribution of products, statistical analysis, logistics' factors, etc..

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GIS Applications to Agriculture

- Land use suitability analyses
- Cropland inventories and yield monitoring
- Hydrologic / nonpoint source pollution modeling
- Watershed management
- Drought mitigation and management
- Facility management
- Agricultural product allocation and marketing
- Forest and silviculture management
- Rural planning
- Weather monitoring

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Conservation measures for black pine forests:

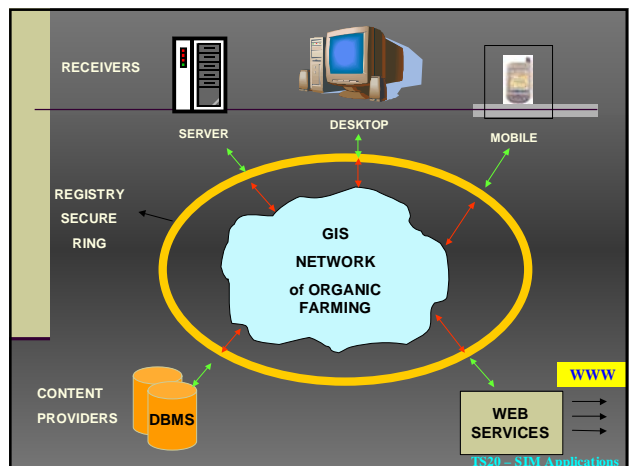
- main aim** : integrated management (harvesting) based upon forestry plans that take into account other important parameters of the forest such as :
 - Fauna species
 - Flora species
 - Biodiversity of the ecosystem.

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GIS data related files can benefit from globalization of World Wide Web:

- Already **existing data** in PC-format,
- GIS **users** are already **familiar** by using software menus,
- Easy transmission** through Internet of large files,
- The Web offers **user interaction**, so that a distant user can access, manipulate, and display geographic databases from a GIS server computer,
- Internet enables **tutorials modules** and access on educational articles and **online classes**,
- It enables **access on latest** achievements in **research** of GIS through on-line proceedings of seminars, conferences, etc.,
- Through **Open Source GIS**, it enables latest implementations of GIS programming and data sharing by minimum or no cost,
- Through online viewers and wizards, it gives the capability of someone with **minimum knowledge** on GIS **to get geospatial information** by imaging display. (Aber, 2003)

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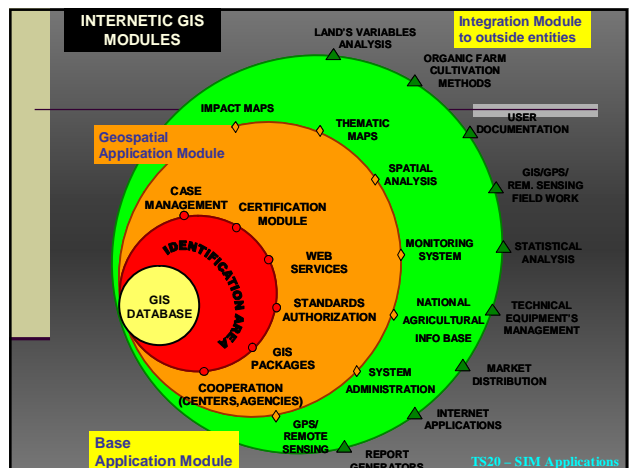
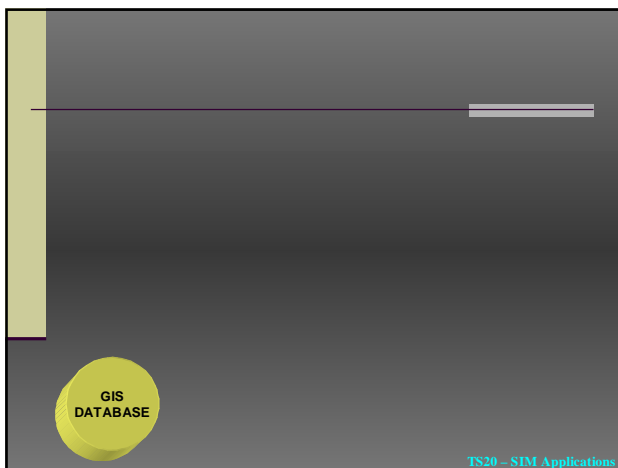
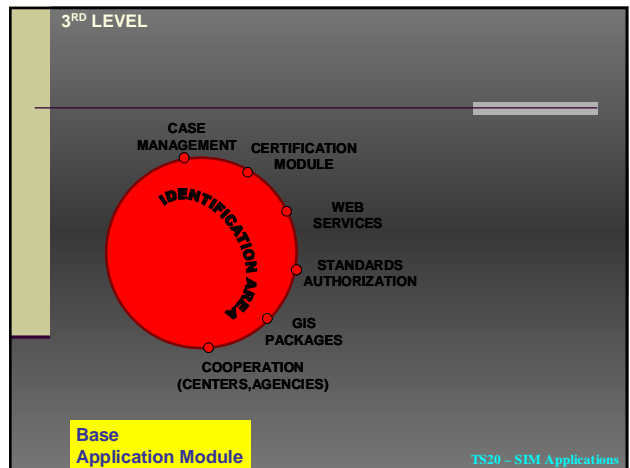
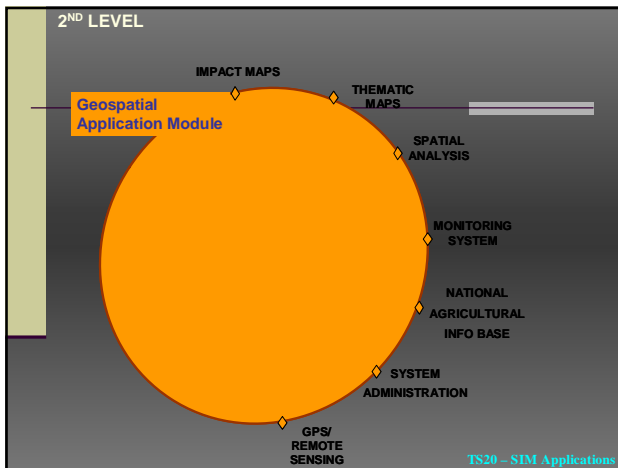
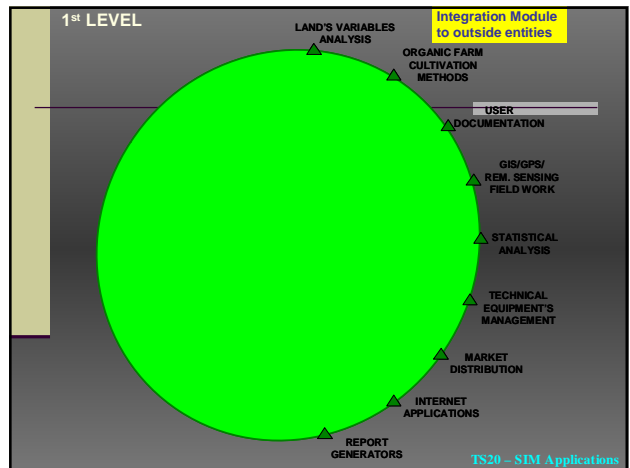


DEVELOPING MODULES FOR AN INTERNETIC (WEB-BASED) GIS SYSTEM ON BIOLOGICAL GARMING



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Promoting an Infrastructure for Integrated Spatial Information
From Data Mining to Full Interoperability
between Implemented Systems and existing
Web-based GIS Approaches

Standardisation

- Metadata
- Data Policies
- Licensing Framework
- Coordinating directives
- Data reception standards
- Authorised expert personnel
- etc...

Harmonisation

- Geodetic Framework
- Data format
- Certification
- Updating
- Data models
- Used Geo-tools
- etc...

Integration

- Data list Services
- Object Access web method
- Generalisation Services
- Query Service
- Geo-Processing tools
- Additional Extensions
- Used scripts
- etc...

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Conclusions

Integration in the Architecture workflow of an Agricultural GIS-based Intranet – Extranet needs:

- **distributed GIS applications for agricultural and environmental needs**
- **data acquisition processes**
- **wireless GIS subsystems' support**
- **standardization of geodata**

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...Conclusions

Integration in the Architecture workflow of an Agricultural GIS-based Intranet – Extranet needs:

- **establishment of supportive operational programs and frameworks (educational short course lessons on using GIS and PCs, continuing support of GIS expert analysts with mobile equipments, dissemination of supportive projects and innovation on agricultural production, etc.)**
- **integration of digital signatures**
- **integration of Open GIS principles**

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Conclusions

Organic Agriculture based on GIS provides:

- means of precise and targeted application
- recording of all plot treatments
- storage, transfer and analysis of recorded information
- tracking from operation to operation
- establishment of standardization
- digital signature certification and authentication of the evaluation for the approval, for any field subjected according to principles of Organic Agriculture
- alternatives for dissemination of scientific information in the social, economic, educational or research international community

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...Discussion

- **Need to take conservation and management measures in order to prevent disturbances of ecotypes, supporting large projects of "Umbrella status" : important nature's issues (Organic Agriculture, Endangered Species, etc.) are used to promote sustainable development activities of the environment, as well provide development or maintenance of cultural heritage entities and structures**

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Related Sites

- <http://gserver.civil.auth.gr>
- <http://www.geographynetwork.com>
- http://www.netency.com/en/netenmap/index_en.php?p=accueil_en
- <http://www.edc.uri.edu/edc/resources.asp>
- <http://spatialnews.geocomm.com>
- <http://www.geoinfo.org/websitecriteria.html>

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