

Ecosystem dynamics under climate change

Coordinator:

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Forestry and Technology Centre of Catalonia

Objective:

To contribute to the sustainable development of rural areas

- Research
- Technology Transfer
- Training

Forestry and Technology Centre of Catalonia

EFI

Mediterranean Regional Project Centre

(**MED**iterranean **FOR**est **EX**ternalities)

Laboratory of Plant Ecology and Forest Botany

Objective

The study of biodiversity and structural and functional processes in plant communities in agro-silvo-pastoral ecosystems to establish the bases for a sustainable development.

www.ctfc.es/eco

Experience in cooperation

- Measures for improved grassland management in African savannas in Togo.
- Grassland management and fair trade of agro-silvo-pastoral products in El Salvador.



Experience in cooperation

- Biodiversity and forest management in Bosnia-Herzegovina.
- Ecological studies on rainforests and cold-temperate forests in Latin America.



Objective 1

To assess changes in biodiversity, structure, functioning and dynamics of agro-silvo-pastoral ecosystems and their services to the simultaneous action of elements of global change.

Objective 2

To evaluate links between management and biodiversity, C sequestration and the water, C and N cycles by encouraging the simultaneous assessment of the different compartments by specialists.

Objective 3

To develop methodologies to treat multi-factorial effects in complex systems by combining empirical results from field experiments, controlled-environment experiments and mathematical modeling.

Objective 4

To determine the relationships between elements of global change and socio-economic losses in rural areas and develop tools for conservation and wise land use while improving welfare through governance and fair trade.

Fact 1

- Agro-silvo-pastoral ecosystems are sustainable ecosystems providing inexpensive and renewable food for grazing animals and other products.

Global change constitutes a threat to their conservation and the services they provide.

Fact 2

- Species and habitat losses and biological invasions are considered among the most immediate environmental threats at global scales.

All species from a given ecosystem are not expected to respond similarly to the elements of global change.

Fact 3

- The rate of ecosystem processes is highly correlated to biological diversity and these processes are important for ecosystem services.

The role of diversity on ecosystem functioning has been rarely tested experimentally for C sequestration and the links among H₂O, C and N.

Fact 4

- C sequestration optimization and gas emission control can be enhanced through ecosystem management.

Much is unknown on the C pool and C sequestration potentiality in most grazing ecosystems.

COST 852:
**Quality legume-based
forage systems for
contrasting environments**

Contribution of legumes to sustainable agriculture

- Reduced requirements for inorganic N fertilizers from non-renewable sources
- Reduced losses of N to the environment
- Reduced need for imported concentrates
- Maintained and improved soil structure and fertility

Conclusions

- We should combine all the available tools to simultaneously address the major components of global change, and invent new ones.
- We are currently developing statistical models and experimental designs to treat multi-factorial effects in complex systems.
- Global change is a global issue and we should develop a methodology to integrate expertise from different fields.
- The ultimate objective is to improve the understanding of relationships between elements of global change and welfare.