



Role of Macaronesian Forest in hydrology and rural development in the islands



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topics

- ◆ I. Macaronesia Region
- ◆ II. Forestry in the islands
- ◆ III. Role
 - Water resources
 - Erosión Control
 - Economy
- ◆ IV. Future and conclusions

Macaronesia Region

- ◆ Macaronesia consists of a group of several islands.
- ◆ Scattered in the North-East Atlantic off the coast of Africa.
- ◆ Volcanic in origin.
- ◆ The archipelagos and islands are from North to the South; Azores, Madeira, Canarias and Cape Verde.
- ◆ The total inhabitants are more than three millions.

Inhabitans (Macaronesia)

ISLANDS	INHABITANS
Azores	245.374
Madeira	247.399
Salvajes	2
Canarias	2.103.992
Cabo Verde	499.796
TOTAL MACARONESIA REGION	3.095.729

Forestry in the islands

- ◆ Subtropical cloud forests endemic to the Atlantic islands.
- ◆ **Laurisilva** , restricted to the cloud belt of the Macaronesian islands, they grow in deep soils at between 500 and 1,500 m.
- ◆ Many of the endemic biota of the islands are **seriously endangered or extinct**.

Role I ; Water resources

- ◆ Important factor to understand the water resources regulation in the islands, is the fog precipitation (cloud or *horizontal rain*).
- ◆ In the Canary Islands this effect occurs from the 600 meters, powered by vegetation adapted to this type of precipitation

Fog precipitation

- ◆ The water quantity deposited in the forest by these rains depends on the cloud density.
- ◆ Cloud density varies from 0.05 g/cm^3 in slightly dense clouds to 3 g/cm^3 in very dense clouds (Schemenauer and Cerecera, 1987).

Fog precipitation

- ◆ Water capture efficiency depends on the forest structure and tree species, as shown in the studies of Kämer (1.974).
- ◆ This water is estimated from one and a half to two times the normal rain.
- ◆ Is a great water resource, captured and regulated the forest.







Role II ; Erosion Control

- ◆ Oceanic islands are born, they grow, they are eroded and they disappear beneath the sea.
- ◆ Forests in the Macaronesian area may slow this process.
- ◆ Tree roots hold the soil.
- ◆ When a wildfire this function disappears and runoff increases.



Role II ; Erosion Control

- ◆ In these volcanic islands, the rainfall regime and its torrential nature, together with the steep slopes and the soil types present are considered to be some of the main factors affecting forest hydrology and soil conservation.



Role III ; Economy

- ◆ In the Macaronesian islands, many tourists are attracted by the nature and uniqueness of its ecosystems.
- ◆ Forest becomes an economic resource.
 - Walking
 - Rural tourism
 - Recreation and adventure
 - Camping

Tourist

ISLANDS	TOURIST
Azores	300.000
Madeira	245.000
Salvajes	500
Canarias	9.600.000
Cabo Verde	385.000
TOTAL MACARONESIA	10.530.500

Sustainable Tourism

- ◆ Promotion of sustainable tourism, people are looking for experiences related to the environment.
- ◆ This tourism could develop rural sites associated with forest.



Future and conclusions (water resources)

- ◆ In the case of oceanic islands, we can speak about Canary Islands, Cape Verde, Madeira, Hawaii and some others coastal areas with significant mountains, where the effect of horizontal rain from the trade winds **increase the availability of water in the ground.**
- ◆ Increases the **vegetation and its biodiversity.**
- ◆ The horizontal rain or fog precipitation **increases infiltration** (which is also aided by the vegetation roots).
- ◆ Infiltration is also favored by the permeability of the volcanic soils.
- ◆ All these issues are good things for the **island aquifers.**

Future and conclusions (erosion control)

- ◆ The forest is the largest resource for erosion control.
- ◆ On the islands, because of their morphology (steep slopes) the effect of erosion is most accentuated.
- ◆ **Erosion** affects all islands of Macaronesia

Future and conclusions (economy)

- ◆ The forests of Macaronesia have **no productive function.**
- ◆ The Macaronesian forests priority is **conservation** of ecosystems.
- ◆ The forest becomes **an economic resource.**

therats

- ◆ Wildfires (Canary islands)
- ◆ Clearing vegetation for grazing (Azores) and agriculture.
- ◆ Introduction of exotic plants and animals (goats) by humans has displaced much of the native vegetation.
- ◆ Mass tourism.
- ◆ Loss of Agricultural Capacity Due to Urban Sprawl.

Thank you very much
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