5th International Conference on Fog, Fog Collection and Dew
Münster, Germany, 25–30 July 2010
FOGDEW2010-137

Dynamics and evolution of tree populations and soil-vegetation relationships in Fogscapes: Observations over a period of 14 years at the experimental sites of Meija (Peru).

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The Fogscapes, i.e. fog-dependent landscapes, and the sub mountain drylands of the Pacific Coast from Ecuador to Northern Chile are amongst the most fragile regions of the planet. The so-called “Lomas” (i.e. Hills) ecosystems are characterised by pre-desertic flora and vegetation where the plant phenological pattern coincides with the fog season from June to December every year. The occurance of ENSO (El Niño Southern Oscillation) affects these ecosystems inducing, occasionally, a sudden change in the characteristics of the vegetation. Relics of low-density woodlands dominated by Caesalpinea spinosa and scattered trees of the same species (which during the fog season appear as savannah-like ecosystems) are still present but becoming increasingly rare due to past and present over-grazing

In the experimental site of Las Cuchillas, located on the coastal hills close to Meija (Dept. Arequipa, South Peru) trees of native species (Caesalpinaea spinosa and Prosopis pallida) and exotic species (Acacia saligna, Casuarina equisetifolia, Parkinsonia aculeata) were planted in 1996, in order to look at the rehabilitation potential of the de-graded “lomas” ecosystems. This paper deals with the results observed over a period of 14 years’ of tree growth patterns and the related results concerning the soil and habitat dynamics. Among indigenous species Caesalpinea spinosa shows the heighest rate of survival even if the height increment is low and the tree crowns tend to dry out at a height of approximately two metres, followed by the appearance of new shoots produced during the course of the seasons. The exotic Acacia saligna shows the maximum height, diameter and crown volume increments. The habitat conditions, both in term of diversity / frequency of plant and animal populations, and plant cover (LAI estimated by processing fish-eye lens images) have changed substantially over the years. A number of samples from the top mineral soil and random samples from the forest floor were collected both from the reforested test site and from the adjacent control areas were no trees had been planted. The samples were analysed for organic carbon and total nitrogen. Overall, the tree-covered soil retained much more of both elements than the non-forested areas, thus demonstrating the efficiency of the intervention carried out in terms of combatting the greenhouse effect. The various tree species planted, however, showed greatly variable capacity to promote carbon sequestration at soil level.

The results referred to above are critical in understanding the plant population dynamics of pre-desertic ecosystems in response to climate change and in assessing the potential of reforestation programmes and landscape conserva-tion strategies for the purposes of carbon sequestration.