030

Impacts of climate change on forests in different climatic zones and their implications on sustainable development

W A J M De Costa
Department of Crop Science, University of Peradeniya, Sri Lanka.

Atmospheric and meteorological data collected during the last few decades show clear evidence that global climate is undergoing a long-term change. Increasing atmospheric concentrations of greenhouse gases (i.e. CO_2, CH_4, NO_x and CFCs) and the consequent warming of the atmosphere are clear features of long-term climate change. Because of their long life span, these changes in climate are likely to influence the functioning and productivity of forest ecosystems. The objective of this review is to predict the impacts of climate change on forests on the basis of experimental results on key plant physiological and ecological processes.

There is clear experimental evidence that increasing atmospheric CO_2 (C_a) increases photosynthesis and biomass production of forests. However, the magnitude of growth stimulation is likely to vary with temperature. The highest increases in productivity are expected to occur in the cooler and moist climatic zones while the productivity increases would be lowest or absent in the warmer and drier zones. It is highly probable that the species composition of forests in all climatic zones would change because of the differential response of different plants species to increases in C_a and temperature. There is clear evidence that the underlying physiology of all plant species become relatively drought tolerant with increasing C_a. Hence, there is a possibility that in areas which are not deforested due to human population pressure, the existing forests would spread beyond their present boundaries with lowland evergreen forests extending to relatively drier, sub-humid climates and dryland deciduous forests extending to relatively semi-arid climates.

Climate change induced changes in forests will definitely trigger changes in soil and in the complex network of organisms that inhabit forests. While the inputs of carbon and nutrients to the soil through litter fall and root exudates are likely to increase with increasing C_a, soil organic matter decomposition would also increase with increasing soil temperatures. Photosynthesis in a future high CO_2 environment will produce plant tissues with higher carbohydrates, but lower nitrogen. This will affect the populations of organisms which feed on plants. Therefore, the climate change induced changes in forests could cause wide ranging and complex secondary and tertiary effects on the whole forest ecosystem.

It is well-established that management of forest resources is a vital component of sustainable development. Therefore, understanding and identifying the impacts of climate change on forest ecosystems would be essential in formulating rational forest management strategies to achieve long-term sustainable development.

031

Measures for a sustainable lobster fishery

D N Koralagama, O Amarasinghe and D S Jayakody
University of Ruhuna, Sri Lanka

Lobsters; the crustaceans have four varieties as spiny, slipper, clawed and coral reef lobsters. Although all the species have a biological and environmental importance only two varieties; spiny and slipper lobsters have acquired the market and attribute for the fishery. Lobster fishery is a paramount component which contributes more than five percent foreign exchange from total fish earnings in Sri Lanka. This has an export oriented market with attractive high prices, around 2000 $LKRkg^{-1}$. The fishery has explained as a capture fishery. Therefore, the resource is subjected to over exploitation due to unattainable demand. That means, the fishery is currently in a period of transition era of open access to a period of limited access. In fact, it needs a well managed, monitoring plan and functioning rules and regulations towards a sustainable lobster fishery that would be discussed through this study.

The data were collected from five lobster processing companies and three purchasing centers in *Gampaha* district. Informal discussions were held with officers at NARA and ministry of fisheries. The sustainability was calculated using surplus yield model (Schaefer, 1954 – 1957).