

# **Environment of, Forest Ecosystems and Forest Research in Taiwan**

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## **Abstract**

Taiwan Island is located about 130km off southeastern Eurasian Continent in the South China Sea where the Philippine Sea Plate slides under the eastern margin of Taiwan basement by tectonic movement. This tectonic force uplifts the island by roughly 2-3 cm a year and pushes it northeasterly by approximately 8cm a year. The island has been shaped by many other natural forces as well, such as frequent and powerful earthquakes and seasonal typhoons with torrential rainfall. All these forces lead to high mountain-building, eroded surface, massive land slides, and rugged terrains with short and torrential rivers. The island, however, is blessed with abundant precipitation averaging 250cm per year and warm temperature averaging 24°C annually.

Currently, forests cover about 58% of the total land area. They are lush and their ecosystems diverse, ranging from tropical seasonal rainforest in the lowland area to subalpine fir and junipers forests in mountains up to 3,700m a.s.l. About 1/5 of natural forests was cut and converted into tree plantation. Research of these natural and plantation forest ecosystems has been focused on understanding the dynamics of ecological processes, protection of biodiversity, adaptive management of man-made forests for timber production and biodiversity restoration and also reforestation of abandoned or marginal farmlands.

Over 10 forested watersheds were gauged to study hydrology, biogeochemistry, stream sedimentation processes, and clearcutting impacts. Five large forest dynamics plots varying 6-25 ha in size were established following the standard protocol established by the Center Tropical Forest Science, Smithsonian Institution. These forest plots represent diverse natural vegetation types of hardwood forests in Taiwan. All information produced from studied plots can be accessed and shared among ecologists locally and internationally. Seven long term ecological research sites have been established since 1992 to study ecological phenomena and processes and also serve as educational field stations. A multi-disciplinary and integrated tree (*Cryptomeria japonica*) plantation research project at ecosystem level was launched in 2004 to study impacts of the monoculture tree species management on biodiversity, timber production and restoration to natural forest.

Long term potential threats to forest ecosystems worldwide are impacts from global changes in temperature, air pollution and other impacts associated with anthropogenic disturbances. International collaborations need to be put into action. Data-sharing is one of the most urgent and effective actions that can enhance collaboration among ecologists and save time and labor. Protocols of information

management have been standardized in order to understand ecosystem dynamics across ecological as well as political boundaries at broad spatial scale.