

Global Warming, Community Forestry, and Conservation Areas

Occasionally an opinion is expressed in a magazine or newspaper that global warming has not been proven to be due to human causes, and that the relation between the increase in greenhouse gases (mainly CO₂, CH₄ and N₂O) and the Earth's temperature increase may be just a coincidence. Such opinions were defensible more than 10 years ago, but the scientific evidence that recent global warming has been caused by greenhouse gases and other human activities is now so strong that virtually no scientist questions it any more. The close relationship between CO₂ concentration in the atmosphere (or a[CO₂]) and temperature fluctuations has been documented over the past millennia from ice core and lake sediment data. The sudden increase in temperature since about 1975, however, cannot be accounted for by any models based on entirely natural causes.

That rapid global warming is occurring is a fact that is evident even without measuring temperature. The rise in sea level, the melting of glaciers on all continents, melting of the permafrost, and the thinning and retreat of the Arctic and Antarctic ice caps are indisputable evidence. Mainstream scientific opinion solidly supports the findings and now shows deep concern about their possible consequences. Of course, research also shows that climate has changed throughout the Earth's history, and we do not yet fully understand all these changes. But the suddenness of the present changes, and the likely effects they will have on humans, are reasons for great alarm.

Global warming is already affecting ecosystems all over the Earth. Each month, scientific journals report new findings on changes in the northern limits of animals and plants, changes in the date of flowering in spring, changes in time of leaf fall, and earlier arrival of migrating birds from the south. Shifts of 10 to 20 days are now common. Populations of species dependent on Arctic and Antarctic ice are in decline.

Animals and plants have responded to changes in global temperature in the past by altering their ranges. As habitat for animals and plants has become reduced and highly fragmented, many species will have nowhere to go and will become extinct. Every phase of human activity will be impacted by the anticipated changes in rainfall, crops, health, pests, phytoplankton, fish populations, diseases, etc.

Few, if any, changes in animal and plant cycles have so far been reported in Thailand, because there is relatively little quantitative ecological research and little systematic long-term monitoring activity here, as compared to the U.S. and Europe. Some changes are beginning to be documented on the few long-term forest dynamics plots established in a few Thai forests. Some species of trees and birds are showing signs of shifting their ranges in response to warming.

Although anthropogenic global climate change is now beyond reasonable doubt, what to do about it is the subject of much debate. What should Thailand do about global change? Thailand is party to the UN Framework Convention on Climate Change and the Kyoto Protocol, and has responsibilities under these treaties for limiting CO₂ emissions or promoting uptake of a[CO₂]. Developing countries are not required to limit fossil fuel use under the treaties, but may be responsible for improving land use so as to limit or reverse CO₂ release from vegetation and soils. Thailand should adopt technologies for reducing greenhouse gas emissions when they become available and economic.

Some actions designed to reduce a[CO₂] could be counter-productive to Thailand and actually damage our biodiversity further. One of these is to promote use of hydroelectric

power. Large dams generate electricity without releasing CO_2 , but the social and environmental costs of large dams are high. Large hydroelectric power projects, in addition to destroying the vegetation in the impoundment areas and the biota of the rivers, impose severe living costs that fall disproportionately on the poor, who may be forced to encroach on upland forests to make a living (further increasing $a[\text{CO}_2]$), or be resettled in sterile developments with a reduced quality of life. Thus, large-scale hydroelectric power is an unwise alternative to fossil fuels.

Another alternative with suspect motives and effects is increasing plant biomass through plantation forestry for producing wood or pulp. This option is being tried in Thailand, and benefits primarily the industrial sector, not rural residents. Whether it actually reduces $a[\text{CO}_2]$ or not depends on the vegetation it replaces. Eucalyptus plantations also have negative effects on ground water level, soil quality, and biodiversity.

Providing incentives for villagers to regrow forests may be a better alternative than plantation forestry. This is the basis of community forestry. Since this places important decisions about management and goals in the hands of local communities, however, this might not be regarded as a strategy for reducing $a[\text{CO}_2]$. Nevertheless, community forests would in all likelihood sequester more CO_2 than wood and pulp plantations, as a wide variety of species would be planted and harvesting would involve non-timber crops as well as wood. In addition, this alternative would benefit both local residents and the biodiversity surrounding them. Such forest restoration may best be initiated on degraded lands by supervised planting of selected native species as promoted by the Forest Restoration Research Unit in Chiang Mai University.

The question is, how can community forests be promoted on a large enough scale to produce a significant increase in vegetation cover? Large amounts of degraded land must be dedicated to community use and legally safe-guarded against sale or use for development projects. It must be in the hands of responsible village leaders. The only land that appears to satisfy such requirements at present is temple sanctuary land. Temple sanctuaries often stand out as green patches from the surrounding deforested landscape.

Thailand's draft community forestry bill remains stuck in parliament. Argument continues over the right of communities to maintain settlements inside conservation areas such as Thung Nai Naresuan Wildlife Sanctuary, where Karen settlements have long existed. This problem should be divorced from the granting of rights to communities *outside* protected areas, where people should be allowed to take control of their local environment and livelihoods with minimal government interference. The best way to cut this knot is to deal with these problems in two separate legislative acts. The very definition of "community forest" is also a divisive issue.

Protected conservation areas in Thailand may now be a sink, rather than a source, for $a[\text{CO}_2]$. Much degraded forest exists within protected area boundaries, and in many places such forests are rapidly regenerating, absorbing carbon in their wood, leaves, roots, and in the soil. Better protection of parks and wildlife sanctuaries alone will allow increase in their storage capacity for the pool of atmospheric carbon. Reduction of fires within and on the borders of protected areas will also increase this capacity.

—Warren Y. Brockelman