Environmental Resilience and Agroforestry

Richard Leakey

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Abstract Water is at the heart of the crisis facing Africa today, and agroforestry provides some of the tools for restoring tropical aquifers that have been destroyed by years of deforestation and poor land management. When restoration does become a priority, human technologies for reforestation cannot truly mimic nature's complex restoration process. We need to control our species to do less harm rather than trying to control nature.

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Environments can be resilient but they also change very dramatically. Had they not changed dramatically over the last four million years, we would not be here. And, it is the failure of certain ecosystems to survive that forces speciation and that forces change. There are two issues that need to be emphasized here: First, temperature rise per se may not be the real issue in the context of climate change, the biggest environmental threat facing us today. The more critical issue is the effect of temperature on precipitation in the tropical and subtropical regions. Water is at the heart of the crisis facing Africa today, but that issue is missed in many discussions. In our willingness to persist with bad habits in the destruction of water catchment areas and natural

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water dispersion systems, we overlook the depletion of water reserves in the aquifers below us without any regard to where they came from and how long they have been there and how long they will take to recharge. The current practice of sinking more and more bore holes in the tropics totally disregards the needs in the future.

Second, in the discussions on environmental resilience, the resilience of the environment to a given set of conditions is given prominence. That is a very different thing from environmental resilience. For example, it may have been alright to talk about environmental resilience with confidence when the global population was at a maximum of one billion. But today the population of *Homo sapiens* is more than seven billion, and there is little doubt that it will be around ten billion soon. Environmental resilience with the impact of ten billion people is a very, very different issue from that with the impact of one billion people.

Concerns have been raised about possible temperature rises of 2 °C. The mean temperature rise in the western Antarctic along the Atlantic peninsula has exceeded 2 °C within the last decade. Ten years ago, this was expected to happen in maybe 40 years. The interesting paradox that appears from records and recent research is that in East Africa, the soil temperature probably has not risen significantly over four million years, but what has changed dramatically is the hydrology and the precipitation levels and the impact of those changes on the ecosystems. Today, we are concerned, and rightly so, about unborn generations and the livelihoods of existing populations. Yet we must recognize that it is a foregone conclusion that we will fail if we do not pay regard to hydrology and the need for a sustainable way of life that reflects less on temperature and more on water. It is in this context that the issue of agroforestry becomes critically important.

Kenya has vast tracts of forests on the western shoulder of the Great Rift Valley. Human activities have long degraded the aquifers and are therefore undermining any attempts to adapt to climate change impacts or to build a more sustainable way of life. Despite high seasonal rainfall and flash flooding, natural water capture in Kenya has been minimal. This is exacerbated by uncontrolled hydroelectric schemes and extraction of water through boreholes. Water banks, water towers, and catchments, which require healthy forests on them to function properly, are also not sufficiently valued. Agroforestry techniques could perhaps be used to specifically return degraded areas to a capacity where they will begin to trap water and store it by giving some soil cover.

It needs to be noted that when restoration does become a priority, the reforestation technologies that are conventionally used cannot truly mimic nature's complex restoration process. In Kenya's Aberdare National Park, for example, what is now a forested national park used to be farmland. After the area became protected, it eventually reverted naturally to a healthy forest ecosystem. This is an example of nature doing its job remarkably quickly and effectively.

There are vast areas of land that need urgent rehabilitation; they should be protected and fenced and left to get on by themselves, possibly with some aerial dispersion of a mix of seeds of indigenous species, and left undisturbed for 30 years for nature to do its job. Technological interventions alone are not enough to bring a forest or an ecosystem back to life. Experts become so specialized in their areas of specialization that they tend to disregard or even kill off nature's ability to heal itself. We need to control our species to do less harm. Nature has resilience, and agroforestry can help maintain that resilience. Rather than trying to control nature, we should let nature do its job.