
Kenya: The Forest Service to the rescue of eucalyptus

Concerns have been raised in Kenya about the high water consumption of eucalyptus trees, which in 2009 led the country's Environment Minister, John Michuki, to order the uprooting of eucalyptus trees from wetlands and banned their planting along rivers and watersheds. WRM welcomed this move and provided an overview on this issue in WRM bulletin 147 (October 2009).

Within this context, we were taken by surprise by a recent document produced by the Kenya Forest Service, basically aimed at further promoting eucalyptus plantations in the country ("A Guide to On-Farm Eucalyptus Growing in Kenya", December 2009. Available at http://www.wrm.org.uy/countries/Kenya/Eucalyptus_guidelines.pdf).

In words of Prof. Eric Koech Chairman of the Kenya Forest Service Board (foreword to the document), this Guide "has been developed as a result of the increasing concern on the effect of the species on the hydrological cycle." He says that "there are claims that the species consumes a lot of water resulting in decrease and in some cases the drying of rivers, springs and lakes."

He seems to subscribe to those "claims" by stating that "generally, planting of Eucalyptus is not recommended in water scarce areas, riparian areas, wetlands and marshy areas." Although he does not say so explicitly, the obvious reason is that he knows perfectly well that eucalyptus trees consume vast amounts of water.

However, he goes on to add that the public has "been made to believe that the tree is responsible for the national drought conditions being felt and have been discouraged from further planting of the species and given a go ahead to uproot eucalypts wherever they are." To our knowledge, no-one has accused eucalyptus of causing a drought. What the public knows through experience, is that in a drought-prone country such as Kenya, planting eucalyptus trees will only exacerbate the problem by depleting the little water available for other uses.

His final words are enlightening as to whom the Guide is aiming to support, when he says: "I hope this document will assist the Eucalyptus tree growers nationally." We sincerely hope it doesn't.

Most of the Guide is in fact a conventional plantation forestry guide, explaining how to obtain seeds, how to produce seedlings, how to prepare the soil for planting, how to plant and how to manage the plantation until harvest. Most of the rest is related to marketing eucalyptus plantations' products.

Regarding the issue of water –which is what started the debate in Kenya- what the Guide in fact does is to mislead the public. Given the importance of this issue, we consider it necessary to include and comment all the relevant quotes from the document.

In section 1.3.1 ("Eucalyptus and water use"), the Guide explains that "a lot of concern has been expressed on the effect of Eucalyptus spp planting on the hydrological patterns with various claims that their presence on the landscape is causing the drying up of water sources, rivers and springs. These claims have not been conclusively supported by scientific evidence."

In spite of the above, the Guide itself implicitly agrees that those claims are true by recommending “Areas where Eucalyptus should not be planted” (4.3.2), including:

- i. Wetlands and marshy areas
- ii. Riparian areas
 - a) Along rivers (reserve not less than 30 meters as stipulated in the Survey Act Cap 299 of the Laws of Kenya. In addition allow for an extra 20 meters to ensure that the trees do not adversely interfere with the water source.)
 - b) Areas around lakes, ponds, swamps, estuary and any other body of standing water.
- iii. Irrigated farm lands.
- iv. Areas with less than 400mm of rainfall.
- v. In farms next to water sources, planting should be minimized by inter-planting with indigenous tree species or in mosaic plantations between indigenous trees with the latter occupying a greater percentage or strip planting of eucalyptus with natural vegetation.”

The obvious question is: why should eucalyptus not be planted in those areas if there is no scientific evidence to support the claim that the presence of eucalyptus “is causing the drying up of water sources, rivers and springs”? The answer is equally obvious: because there is more than sufficient evidence regarding the impacts of eucalyptus on water.

In support to the above, it is interesting to note that in section 4.3.3 (“Areas suitable for Eucalyptus planting”), the Guide recommends planting in “Water logged areas for purposes of draining the area”, thus highlighting the role of eucalyptus trees in sucking up vast amounts of water.

Much of the arguments provided by the Guide on water use by eucalyptus are clearly aimed at misleading the public, such as illustrated in the following quote:

“However, studies have established that Eucalypts exhibit high efficiency in water use for biomass accumulation”, adding that “it has been established that eucalyptus requires less water to produce one (1) Kg of biomass than most crops”. The examples provided by the Guide are the following:

- “- Eucalyptus species require on average 785 litres
- Cotton / coffee / bananas each require 3,200 litres
- Sunflower requires 2,400 litres
- Maize, potato and sorghum require 1,000 litres each”

The above is clearly aimed at making the public believe that all those crops consume more water than eucalyptus, which is in fact absolutely false. The only thing that those figures prove (assuming they are true) is that some plants need more or less water for producing 1 kilo of biomass, which is totally irrelevant to the discussion about the impacts of eucalyptus on water. What was really needed were figures on how much water is consumed by each of those crops per hectare/year. And those figures were not provided by the authors of the Guide.

The real debate is not about which crop is more “efficient” in producing biomass from a litre of water but about the total amount of water used by eucalyptus and on whether it depletes or not the water resources. According to research from the Kenya-based International Centre for Research in Agroforestry (ICRAF), one single 3-year old eucalyptus “drinks” 20 litres of water per day. During the following years, consumption exponentially increases and at age 20 the tree will “drink” 200 litres per day. Using the lowest figure (20 litres), this means that one single tree will consume 7300 litres of water per year and that during that same time a typical plantation (1100 trees/hectare) will consume

8,030,000 litres of water per hectare/year. Which of course explains why eucalyptus is described in Kenya as the “water guzzler”.

The Guide goes one step beyond misleading the public, by saying something completely untrue: “Comparisons of Eucalyptus species with other forest plants demonstrate that eucalypts do not consume more water than other native forest tree species as shown in the Table 2.”

What Table 2 actually shows is that eucalyptus consume much more water than the other three species mentioned. According to the column “Water consumed (litres/yr)”, *Acacia auriculiformis* consumes 1231.50 litres, *Albizia lebbek* 1283.90 litres, *Dalbergia sissoo* 1534.05 litres and *Eucalyptus hybrid* 2526.35 litres. Which proves –contrary to the above statement- that eucalypts do consume more water than other native forest tree species.

In that context, the real aim of table 2 is to try to hide the fact that eucalyptus consume more water than other tree species by using the concept of “high efficiency in water use for biomass accumulation”. Thus, the final column provides figures proving that eucalyptus consume less water **per gram of biomass produced**. Even if one accepts that eucalyptus are “more efficient” than other tree species in producing wood with the same amount of water, this does not answer the real question: how much water do eucalyptus use? And the answer –ignored by this Guide- is provided by research carried out by ICRAF in Kenya itself: between 20 and 200 litres of water per day during the whole year.

Regarding the impacts of eucalyptus plantations on biodiversity, the 27-page Guide (plus annexes), only dedicates one paragraph to this important issue (“1.3.2 Eucalyptus and bio-diversity conservation”). The paragraph says:

“The greatest positive contribution of eucalyptus is perhaps in replacing indigenous species for fuel-wood, thereby preventing further degradation of natural forests. Although it is claimed that there is limited biodiversity in eucalyptus plantations, their cultivation saves biodiversity elsewhere by preventing the destruction of natural forests. Furthermore, certain *Eucalyptus* species, by quickly producing firewood, would eliminate the causes which frequently may have led to land degradation and desertification.” And that is all!

One would have assumed that a “A Guide to On-Farm Eucalyptus Growing” would have at least included some simple guidelines on biodiversity conservation –flora and fauna- in plantation areas (biological corridors, measures for protecting threatened species, plantation of native species, etc.). However, the Guide only subscribes to the questioned concept that “plantations alleviate pressure on native forests”, giving a green light to biodiversity destruction by monoculture plantations of alien species in non forested areas.

Finally, the Guide includes two paragraphs on another crucial issue: “Eucalyptus and soil fertility” (1.3.3).

The Guide starts by saying that “when eucalyptus is grown as a short rotation crop for high biomass production and removal, soil nutrients are depleted rapidly which conforms to conventional scientific argument.” Good start indeed, but obviously not very useful for promoting eucalyptus plantations.

The Guide therefore adds the following very confusing arguments: “However, areas under eucalyptus **have been found** [emphasis added] to have higher levels of micronutrients [and what about macronutrients?] compared to areas under crops **such as tea** [emphasis added] of similar

age. Long term planting of eucalyptus **has been reported** [emphasis added] to improve soil fertility while comparative studies of soils under eucalyptus and adjacent grassland have found no significant differences **if the trees have a rotation of more than 10 years.**" [emphasis added]

The second paragraph proves nothing but gives the message that eucalyptus are useful in soil conservation: "**Studies have indicated** [emphasis added] that on degraded hillsides and wastelands, the net soil contribution of eucalyptus through litter fall **is likely** [emphasis added] to be positive. Eucalypts also **exhibit good potential**[emphasis added] for topsoil retention on degraded hillsides."

In spite of all those confusing arguments aimed at supporting eucalyptus plantations, the fact is that in Kenya "eucalyptus is grown as a short rotation crop for high biomass production and removal" and therefore –as the Guide says- soil nutrients will be rapidly depleted.

In sum, there is nothing in the Guide proving that "if the prescriptions contained within this Guide are observed then the negative environmental impacts will be minimized." The expansion of eucalyptus plantations will result in further water depletion, biodiversity destruction and soil degradation.

There are alternatives to eucalyptus in Kenya, such as several native tree species that conserve water and that can provide multiple benefits –including fuelwood- to people and the economy. Knowledge about those trees exists and ICRAF is there to provide it. What is needed is the political will to promote –as ICRAF suggests- the planting of trees in integrated "tree-crop" systems, in which agriculture and forestry are practised on a single piece of land.

In the meantime, it would be very useful to have "A Guide to On-Farm Growing of Native Trees". Would the Forest Service be willing to produce such a Guide?

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