



Functions and benefits of ecosystem services in the Congo Basin forests

by Godwin Kowero, Executive Secretary of the African Forest Forum

The Congo Basin rainforest is the largest continuous rainforest in the world after the Amazon and at the same time an immense watershed.

The forests regulate water supply through their generation of rainfall. The value of this water in terms of sustaining human, animal and plant life in the region is immense.

INTRODUCTION The main functions of the Congo Basin rainforest are production of biomass and soil formation, nutrient cycling and water cycling. These functions are the basis for a whole range of ecosystem services that are important to the well-being and welfare of the people living in and outside these forests. Many such services are already mentioned elsewhere in this book; suffice to highlight a few common benefits to local communities that arise from provisioning services such as wild foods, medicines, building materials, water and fuel wood. Also important are cultural services such as spiritual places and symbols. On the broader national level some provisioning services are key factors, such as supply of industrial roundwood to the timber industry, medicinal plants for pharmaceuticals and hydropower energy are important to national economic development. The potential for hydropower generation is immense, the region could even export some of this energy, if such potential is fully exploited.

The Congo River basin is the second largest river system in the world. It drains a watershed area covering the

Democratic Republic of Congo, Republic of Congo, Cameroon, Central African Republic, Equatorial Guinea, Gabon, Angola, Zambia, Tanzania and Burundi. Both on national and international levels the regulating services such as carbon sequestration to contain global warming and supply of water receive much attention and are increasingly recognised for their role in sustaining life on the planet.

AWARENESS Managing the Congo Basin forests to cater for the provision of these ecosystem services on all these levels is a major challenge. It requires the cultivation of public awareness about the functions, benefits and values of these forest ecosystems as a means to raise national and international understanding, appreciation and support for their sustained availability. This chapter highlights some of the benefits arising from the regulating and provisioning services, given the increasing attention they are receiving; and more specifically their role in human, animal and plant survival as well as in socio-economic development and environmental stability.

The Congo Basin has great potential for generating incomes to its people from the sale of forest carbon.

II REGULATING SERVICES The Congo Basin forests are known for their capacity to generate rainfall, regulate climate and air quality, not only within the region itself, but also in countries beyond. Of key interest is the fact that natural forests act as a pump that can draw atmospheric moisture from the ocean to the mainland. In this regard the Congo Basin forests increase the moisture above them by pumping it from the Atlantic Ocean. This adds to the moisture that is already in these forests and generates rain from evapotranspiration from within the forests themselves. Natural forests have a high leaf area index making it possible for the evapotranspiration from the forest canopy to exceed that from a similar area of the ocean surface water. Since the evaporative force is stronger on the forest canopy than on the ocean water surface, this causes oceanic air which is rich in moisture to flow to the forest. In doing so it ascends, causing precipitation, becomes drier and eventually returns to the ocean through the upper atmosphere. As this process continues it constitutes an atmospheric circulation that is facilitated by the forests; this is then the pump effect that natural forests exert to draw moisture from the ocean to mainland.

Understanding the generation of rainfall, its seasonality, spread in the Congo Basin and links to other regions is complex. In fact the Earth's climate is very much shaped by intense storms over the Amazon Basin, the Congo Basin and the Pacific Ocean. For example, floods over the Amazon Basin are reported to tend to coincide with droughts in the Congo Basin and vice versa.

EVAPOTRANSPIRATION Various reports indicate that 75-90% of the rainfall in the Congo Basin comes from moisture from evapotranspiration that is generated within the region. This implies that the rainfall in this Basin is very sensitive to any disturbances in the forest condition. Deforestation and adverse effects of climate change and other disturbances will most likely compromise this 'pump' effect. This will therefore reduce rainfall and water availability to and beyond the Basin; threatening human, animal and plant survival. While the forests are a watershed to the Congo River

basin and other smaller basins, only about 0.2% of their area is reported as designated for protection of soil and water resources. The forests regulate water supply through their generation of rainfall that is released into streams and eventually into rivers. They also regulate water flow and its quality, by for example controlling siltation and sedimentation. The value of this water in terms of sustaining human, animal and plant life in the region is immense. For example, the water supports household needs, crop farming, industrial production, hydropower and wildlife. The latter is important not only for tourism and game hunting, but forms the major protein source for the majority of the people in these countries. Given these immense contributions of this Basin to water supply within and beyond it, much more needs to be done to sustain this function.

The Congo Basin forests regulate air quality by storing carbon dioxide, a gas that contributes to global warming. Estimates of the total stock of carbon in these forests vary widely, however the Congo Basin is only second to the Amazon in this regard, and has much higher carbon stocks than the Southeast Asia basin. The Congo Basin is therefore not only important as a carbon sink, but has great potential for generating incomes to its people from the sale of forest carbon.

ERODED However, this potential is being eroded by small-scale agriculture and to a lesser extent wood fuel harvesting and development of large scale agribusiness investments in some countries that are driving deforestation in the region. Public forest administrations are seriously constrained by funding and this results in serious weaknesses in enforcing laws and regulations. This has led to the prevalence of many illegal activities in the forest sector, with in particular illegal logging and trade in forest products receiving more public attention; encroachment on the forests for agriculture also remains a major threat. Deforestation, combined with weak efforts to assess and sell forest carbon are denying the region considerable income.



PHOTO MEINDERT BROUWER

III PROVISIONING SERVICES Provisioning services are products and services from the forest ecosystems. They include raw material from trees for the industry, foods (from plants, wild animals, insects, and also from water bodies such as fish), water, minerals (such as gold, diamonds, and copper), biomass (such as firewood) and hydropower energy, ornamental materials (such as furs and feathers), medicines and genetic resources (such as crop improvement genes from wild varieties of the same). Also included are other non-timber products such as medicines from plants (e.g. from *Prunus africana* for treating prostate conditions), fodder for both livestock and wildlife, and wild fruits. These provide the potential areas for investment in value addition for socio-economic development on local and national levels. They tend to attract more private sector investments than the regulating services that appear to

Eau pour tous: water for all. In the Republic of Congo every village has access to clean drinking-water. Three water tanks painted in the colours of the national flag are a familiar sight. The water is pumped up with solar energy. The solar panels can be seen behind the water tanks.

be largely of public sector interest. A characteristic of the Congo Basin countries is that they are rich in forests, but have a low value with regard to adding industrial development of the resource.

TRADE In addition, there is no appreciable intra-African trade in forest products, largely due to a poor infrastructure that hinders broader continental economic integration. Most of the forest products are traded in informal markets,

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a component of the informal forestry sector. It is argued that this sector is much more important to the economies of these countries than the formal forestry sector in terms of quantity of products harvested from the forests, processed and traded, employment and incomes to local people. There are many issues constraining the availability of more benefits from these forests, but the key ones that have to be addressed urgently are: a dismal product value addition, illegal activities in the forest sector, deforestation, and a low priority of the informal forestry sector in national development.

IV THE DRY FORESTS OF AFRICA In Africa the term ‘dry forest’ is used in a very broad sense, covering the spectrum of vegetation types from deciduous forests with a continuous tree canopy to tropical moist dystrophic savannas (e.g. miombo woodland) and to dry eutrophic savannas (e.g. Sahelian wooded grassland). The area of dry forests in Africa is about two and half times that of these rain forests, and the dry forests have about five times more people depending on them. While the dry forests do not receive similar attention and resources, it is important that both these forest types are examined simultaneously rather than at random if we are to address issues related to forests and trees in Africa holistically. In fact, dry forests also occur in some Congo Basin rainforest countries. The degradation and conversion of dry forests is far more advanced than that of the rain forests, largely because they have more people, livestock and wildlife and also per land area unit, and the issues that play a role in them are more related to human and animal survival based on these resources rather than on harvesting them for timber.

KEY Dry forests are a major vegetation type in 63% of African countries. They support far larger human and animal populations than rainforests. Dry forests, much more than rainforests, are a central key to food security and a major component of livelihoods on the continent. They offer the bulk of dry-season fodder to most of the livestock and wildlife populations on the continent, without which livestock

husbandry and wildlife tourism sectors in some countries would be unviable. They provide the bulk of the timber and non-timber forest products consumed on the continent, and are therefore of greater use to humans in Africa. Most rivers on the continent originate from dry forests and many river basins are found in them. They sandwich the agricultural belt in Sub-Sahara Africa, hence they are at the frontier of more agricultural expansion than rainforests and will therefore continue to be exposed to considerable pressures. Most African towns and cities are located within them or in their vicinity, making them very vulnerable to the rapid urbanisation of Africa.

V CONCLUDING REMARKS The significance of the Congo Basin rainforests extends over a much broader area than that covered by the forests, as evidenced by the watershed area spanning nine countries. Without this Basin many ecosystem services would not be available to these countries, putting at risk considerable human, animal and plant life, not only in Africa but in the world as a whole. On the other hand, the sustained supply and wise exploitation of the ecosystem services from the Congo Basin holds potential to significantly accelerate economic development for these countries, reduce poverty for millions of people, stabilise the environment and safeguard biodiversity. The same is true of dry forests. Food and nutrition security, through better rainfall and reliable water supply for irrigated agriculture, will improve the health and well-being of the people in these countries. Reliable and sufficient supplies of hydropower are an important ingredient to socio-economic development and a healthy society. Massive deforestation in the Congo Basin would have an enormous impact on its river system and jeopardize the production of hydroelectric power. In all this it is very important to reconcile very carefully economic development with the sustainability of forest resources.

The rain forests and dry forests are central to life on the African continent. No meaningful and sustainable socio-economic development on the continent can be

THE AFRICAN FOREST FORUM (AFF)



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The African Forest Forum (AFF) is a pan-African individual membership institution that provides a platform and creates an enabling environment for independent and objective analysis, advocacy and advice on all relevant policy and technical issues pertaining to achieving sustainable management, use and conservation of Africa’s forest and tree resources, as part of efforts to reduce poverty, protect the environment and promote economic and social development on the continent. In this regard AFF is guided by three strategic objectives:

- To build and strengthen *networking* among the many and varied stakeholders in African forestry;
- To develop and *implement specific programmes, projects and activities* that address the priority issues and

opportunities in African forestry; and,
c. To raise the profile of forestry, highlight threats to forest resources and the environment, and champion a better management of African forests through *policy and advocacy approaches*.

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conceived without people and these forests at the centre. It is therefore necessary to considerably increase attention and resources to develop, manage and exploit both the rain and dry forests in a sustainable way, because without them considerable human, animal and plant life on the continent

would disappear, which will have a broader global impact. Both forest types provide important international public goods and services such as carbon sequestration, with global effects, rain and supply of clean water in a world where water is getting increasingly scarce.