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AFRICAN FORESTRY AND WILDLIFE COMMISSION
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NEAR EAST FORESTRY COMMISSION
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KHARTOUM, REPUBLIC OF THE SUDAN

FORESTS AND WATER RESOURCES

INTRODUCTION

1. Forests influence the amount of water that is available for use from groundwater, surface watercourses and water bodies by intercepting precipitation and capturing transpiration of soil moisture and evaporation from vegetative surfaces. In watersheds, forests influence the timing of water delivery and extend water discharge over a longer period. This decreases upstream erosion and downstream sedimentation, facilitates infiltration in the water table and maintains the water-storage capacity of soil. In addition, upstream and riparian forests serve as a buffer by trapping sediments and deleterious pollutants from upland activities.

MYTHS AND FACTS ABOUT WATER AND FORESTS

2. The relationship between forests and water has not been fully understood in the past. Recent research in forest hydrology has challenged common wisdom and many misleading policy assumptions. As part of the Global Forest Resources Assessment (FRA) 2005, FAO conducted a review of the current understanding of interactions between forests and water in different forest ecosystems. Key findings are summarized below.

3. Upstream forest cover does not always enhance water availability downstream. Forest ecosystems are in fact major water users. Hence, downstream water yields are higher when forests are replaced by a less water-demanding land cover, such as agriculture and graze-land. Hydrological advantages of maintaining forest cover are higher in tropical areas, where the main problem is regulating downstream flow and preventing floods, than in arid or semi-arid areas, where maximum downstream water harvest has to be obtained during a short rainy season.

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4. The effects of upstream forests on water release and the prevention/occurrence of downstream floods is a matter of scale. In small to medium-sized watersheds, forest cover may significantly contribute to the regulation of discharge and the prevention of flash floods and landslides triggered by upland precipitation. However, at the river basin scale, the protective effects of forest cover are negligible in the face of extreme weather events.

5. At any scale the most important effects of forest cover are related to water quality. Healthy forest cover can diminish the sediment levels in water. Forest cover in upstream watersheds and along the banks of rivers and lakes is effective in preventing eutrophication and non-point pollution of watercourses. Therefore, forests are the ideal land cover for ensuring the quality of drinking water. According to the World Bank and World Wide Fund for Nature (WWF) (2003), a third of the world's largest 100 cities rely on forests in protected areas for a substantial proportion of their drinking water.

WATER, TREES AND FORESTS: REGIONAL PERSPECTIVES

6. Many areas of Africa and the Near East feature a rugged landscape, exposed to erosion and landslips, associated with seasonal precipitation and extreme weather events. With their strong and deep root systems, forests are the best land cover for the control of soil erosion and minimising the risk of shallow landslips and landslides. This is of particular importance in seismically active areas. In landslip-prone areas where forest cover has already been removed, well-managed agroforestry or sylvopastoral systems could be an alternative. The ideal tree density needed for a significant slope stabilization effect is not yet known. However, it can be assumed that the more trees, the greater the protection against soil erosion.

7. Soil salinisation is a widespread problem in semi-arid or arid areas of Africa and the Near East. Evidence exists that deforestation plays a major role in soil salinisation, by enhancing evaporation of soil humidity, decreasing infiltration and, hence increasing salt concentration. Soil salinisation can be reduced by reforestation or the introduction of agroforestry systems. Tree planting increases infiltration/evaporation and re-establishes the hydrological regime. Planting blocks of trees rather than scattered and isolated trees or narrow belts of trees has proved most effective in this regard.

8. In both Africa and the Near East Regions, riparian zones are intensively populated. Forested strips along stream and river banks and lake shores may significantly contribute to improving the quality of water for domestic, agricultural and industrial uses. Forests play an important role in trapping sediment moving towards the flowing water areas as well as harmful substances from fertilizer or pesticides. Forest riparian buffers can also stabilize the banks. Their width is constantly being scientifically re-evaluated. A twenty-fifty meters strip is usually considered appropriate.

9. Many countries of the Near East have opted for planted forests for the reclamation of degraded and deserted areas. Irrigation of such planted forests depends heavily on the use of ground water and mostly the recycling of waste water. Further research is needed on the integrated management of water and trees in arid and semi-arid ecosystems in most of these countries.

10. Swamp forests are widespread in Sub-Saharan African and in some riverine or coastal areas of the Near East. Swamp forests have a unique role in ecology. They absorb and store water during wet periods and release this water slowly during periods of low rainfall. Thus, swamp forests are very important in the maintenance of the hydrological balance. Inland swamp forests protect watersheds from floods, while coastal swamps play a major role in protecting coasts against tides and rising seawater. By interacting with bio-chemical cycles and the food chain, swamp forests contribute significantly to the provision of distinctive habitats for biodiversity and are an important source of fish, timber, and fuel wood for local people.

DISCUSSION ITEMS FOR THE NEAR EAST FORESTRY COMMISSION (NEFC) AND THE AFRICAN FORESTRY AND WILDLIFE COMMISSION (AFWC)

11. In order to maximize the role of forests and trees in contributing to water quality and quantity, AFWC and NEFC members are invited to consider the following action, and specifically determine the priority issues and the kind of support and cooperation needed:

- better integrate forestry and agro-forestry issues in water resources management plans and policies;
- address rehabilitation of degraded lands and reclamation of arid lands and related water resources management;
- identify slip-prone areas and designate them for forest plantation, agroforestry or sylvopastoral use with fairly dense tree cover;
- determine action to avoid deforestation or promote reforestation and agroforestry plantations in areas with saline sub-soils or groundwater;
- designate environmentally sensitive swamp forests as protected areas; and
- provide guidance on how to advance integrated watershed management specifically in the Nile River and Fouta Djallon areas.