



Interaction between forest and water: common beliefs being challenged

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Forests and hydrological functioning – public perception

Roots



Stabilise soils

Increase
infiltration

Canopy



Affect cloud
formation and
rainfall

Forest floor



Reduce
erosion

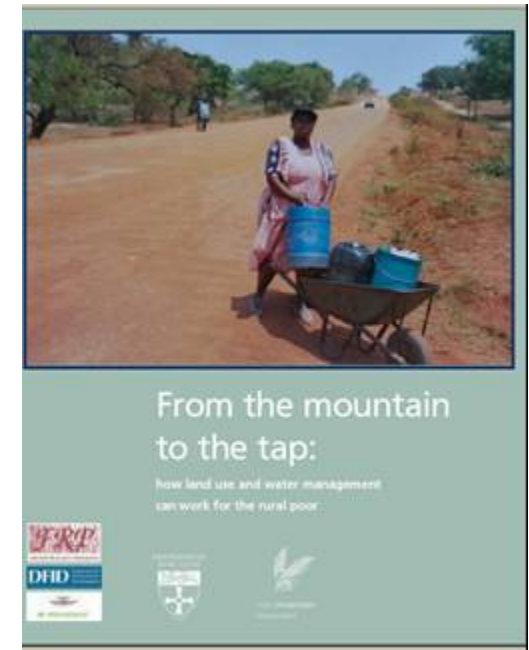
Improve water
quality

The links between forests and water have recently been questioned – cont.

Down with trees
Jul 28th 2005
From ***The Economist***
Planting trees can
exacerbate drought and
fail to tackle climate
change



Logging does not raise flood risk
By Richard Black
Environment Correspondent, **BBC News** website
October 12 2005



Forests and water quantity

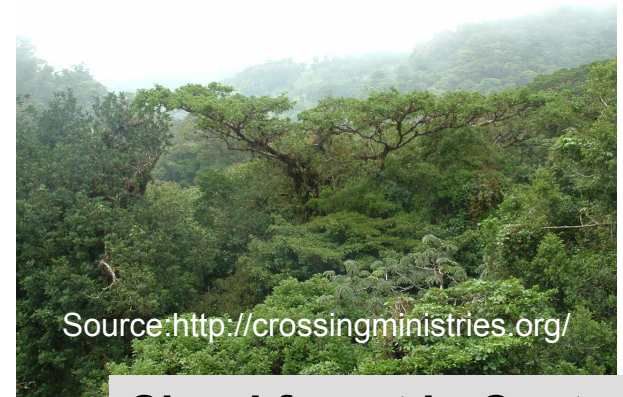


Forests and water quantity – cont.



**« Water for Work »
programme in South Africa**

Source: www.voanews.com



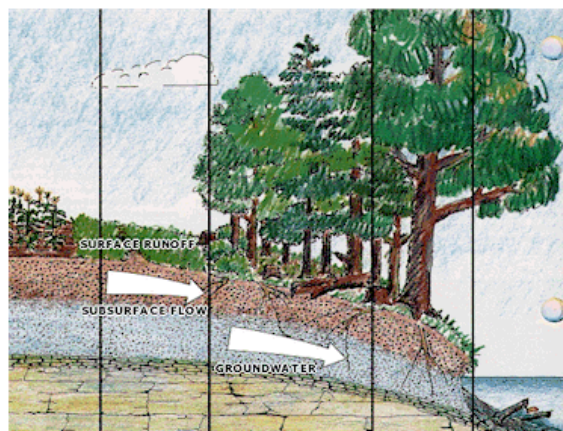
Source: <http://crossingministries.org/>

Cloud forest in Costa Rica

Whether forests increase or decrease the overall annual runoff depends on a number of variables, such as:

- **the age of the forest**
- **topography**
- **species composition**
- **soil properties**
- **meteorological conditions**
- **forest location within the watershed**

Forests and water quality

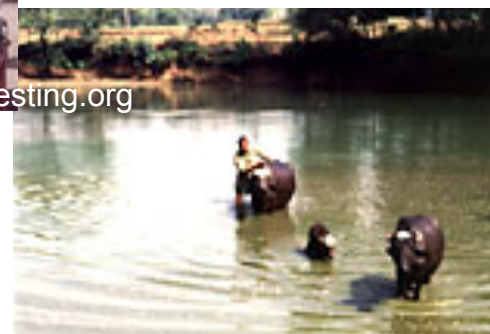


Riparian buffer zones



Sukhomajri in India

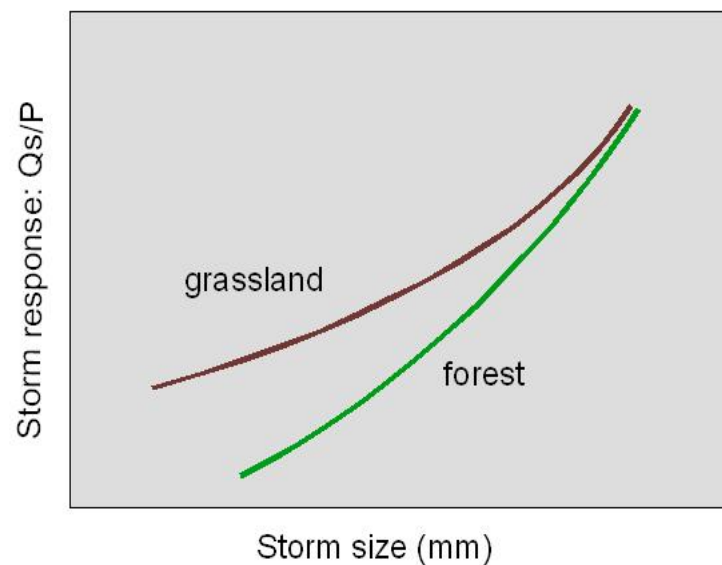
Source: www.rainwaterharvesting.org



Studies show that:

- **Buffer zones typically remove 50-90% of pesticides and nutrients**
- **However, sometimes results are contradictory to expectations**

Soil wetness is a crucial factor for runoff response



Source: Scott et al. (2004)

Scientific experience shows that:

- **Reforestation reduces small to medium storm events but cannot prevent extreme events**
- **Studies show that the economic losses of cumulative small- and medium size storm events are as big as those of the rare extreme events (Munich Re, 2006)**

The importance of scale



Source: www.photop.net/



“The severe floods in Eastern India and Bangladesh are not the result of a natural disaster, but of a ruthless exploitation of wood which has been practiced over centuries in the forests of the Himalayas“. Basler Zeitung, 15.9.1998



Source: <http://www.dfid.gov.uk/>

The importance of scale – cont.

Measurability of land-use effects by basin size (FAO, 2000)

		Basin size [km ²]						
Impact Type		0.1	1	10	10 ²	10 ³	10 ⁴	10 ⁵
Quantity	Average flow	x	x	x	x	–	–	–
	Peak flow	x	x	x	x	–	–	–
	Base flow	x	x	x	x	–	–	–
	Groundwater recharge	x	x	x	x	–	–	–
Quality	Sediment load	x	x	x	x	–	–	–
	Nutrients	x	x	x	x	x	–	–
	Organic matter	x	x	x	x	–	–	–
	Pathogens	x	x	x	–	–	–	–
	Salinity	x	x	x	x	x	x	x
	Pesticides	x	x	x	x	x	x	x
	Heavy metals	x	x	x	x	x	x	x
	Thermal regime	x	x	–	–	–	–	–

Legend: x = Measurable impact; – = No measurable impact

Source: Discussion Paper 1

- **No single explanation for the water-forest relationship does not mean that there is no relationship**
- **Transferring costs of public policy based on such uncertainty to upland rural poor should be avoided**
- **Scientists should avoid overstating research findings**
- **Underlying assumptions and uncertainties of such findings should be made explicit**
- **Simplistic messages should not be replaced with equally simplistic ones**
- **The multifunctional nature of forests in a landscape should be recognized**



**Protected
Primary
Forest**

Degraded Primary Forest

Plantations

Secondary forest

Secondary forest

**Degraded
Forest Lands**

**Permanent
pasture**

**Permanent
pasture**

**Intensive
agricultural land**

**Permanent
pasture**