Land and Water Use Change

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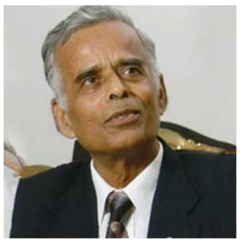


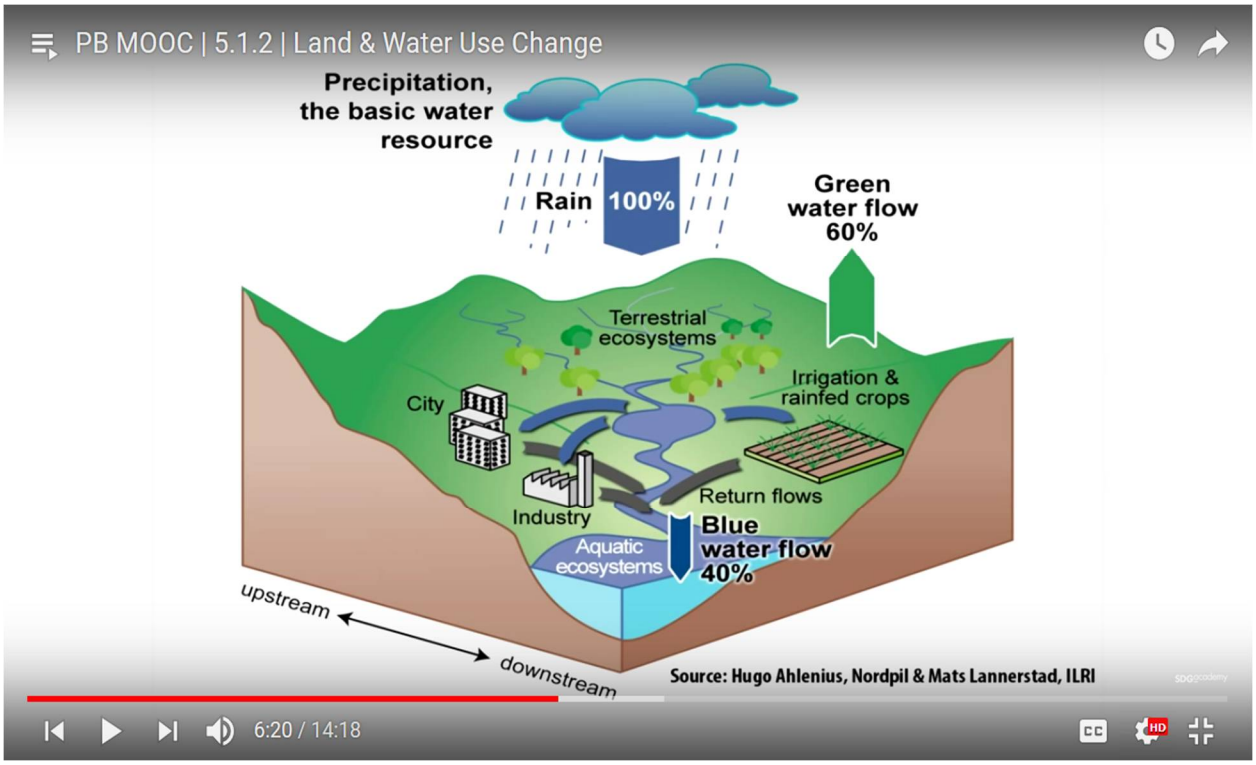
Dear Friends,

This month, we shall talk about Land and Water Use Change. The key word is 'Change'. Mother Earth has bestowed land and water resources for all life on earth, but we human beings, with the aid of mechanical power made available to us by technology, have brought in huge changes in using these two resources for our own needs. During the past 150 years, humanity has converted approximately 40% of forest cover primarily into agriculture and urban areas. Scientific evidence shows that 'forest systems regulate fresh water formation, flows of different nutrients, and provide habitats for biodiversity'. It is 'the number one biome system to regulate the stability of the Earth'. We cannot escape the consequences of our actions, as the reduced forest cover leads to reduced precipitation and fresh water formation. The situation would surely get further aggravated by the year 2050, when we are going to be 9 billion people on Earth and our land and water resources would be severely stressed, with likelihoods of causing irreversible, life threatening changes in the ecosystem. Let us try to understand why and how.

Why do they constitute PBs?

All life on Earth has evolved over billions of years and water is essential for life. We are familiar with the hydrological cycle that generates fresh water every year. As you may see from the figure below, 60% of the precipitation comes from our forests and trees and the remaining 40% comes from the oceans. Reduced forest cover means reduced precipitation.

Coming to water, 70% of human water consumption goes for agriculture, and scientific evidence all over the globe estimates that 25% of all river systems do not reach the oceans due to human over-exploitation. The tail ends of the river basins become dry land due to over exploitation upstream.



Their nature and relations with other PBs

Prof Rockstrom calls them ‘Slow Variables’. In simple terms, it means that the impact of exploitation of forest cover and fresh water usage may not be seen within a few decades, but when we consider their impact in conjunction with other boundaries like climate change, bio-diversity loss and nitrogen and phosphorus loading, we can see how important it is to keep our exploitation of forests and fresh water usage within limits.

The forest cover on Earth have been classified into three different ‘biomes’: the rainforests, the temperate forests, and the boreal forests. Scientific evidence suggests that we must keep 85% of the rainforests and boreal forests and 50% of the temperate forests, with an overall figure of 75% of all forest systems. But we have only 62% forest cover left, and we are already in the ‘danger zone’.

The boundary for fresh water usage is framed as percentages of maximum allowable withdrawal of fresh water at each river basin in the world. It is estimated that 25 to 50% of fresh water must be kept in the rivers, lower values for permanent basins, and higher values for intermediate and other basins.

I can cite two examples at a local scale that clearly shows the irreversible results. One example is the border region at the western end of Tamilnadu and Kerala that may be identified by two small railway stations on either side: Madukkarai and Ettimadai in Tamilnadu and Walair and Kanjikode in Kerala. The terrain is obviously similar, but deforestation for agricultural use in Tamilnadu is to any passenger travelling the stretch. Amrita University campus is near the

Ettimadai station, and we can see very deep but dry waterways running across the campus. These waterways are evidence of past rainfall in the area, which have now dried up almost completely, except during heavy rains. In contrast, one can still see several small rivulets on the Kerala side for at least six months in a year. Fortunately, the University has planted about 150,000 trees, and rainfall in the campus area is significantly more than the neighboring village area. Similar greening of dry land has been achieved by the meticulous silvi-culture projects at Auroville, Viluppuram district of Tamilnadu.

Recognition by SDGs

The importance of both these parameters have been recognized through three Sustainable Development Goals: #14 Life below Water, #15 Life on Land and #6 – Clean Water and Sanitation.

What can we do?

We can make our individual 'squirrel's contribution' by reducing our needs for housing area used, and planting and nurturing trees wherever we live. Projects like Green Rameswaram are excellent initiatives for participation. Producing a part of our vegetables in kitchen / terrace gardens is yet another possibility. Individually they may be small, but when adopted by millions of households, the contribution may be substantial.

Sources:

PB MOOC | 5.1.2 | Land & Water Use Change

https://www.youtube.com/watch?v=lNTKzorU2Gw&index=30&list=PLExYXELRcSgGsOBrE2GCdLggbuR4yopxq

https://www.thebetterindia.com/132379/50-years-auroville-matri-mandir-pondicherry-history/

Extracts from above.

"Farmlands owned by Auroville produce crops consumed by the township in addition to working as research centres for sustainable agriculture and water conservation. For instance, Buddha Garden is a farm that experiments with sensor-based precision irrigation system — the first crop cycle saw an almost 80% drop in water consumption!

"Moreover, thanks to years of meticulous silvi-culture, Auroville's sprawling forests are counted among India's most successful afforestation project. In fact, its experts have been using this experience in afforestation projects such as the one being implemented with Irula tribesmen near Chenglepet in Tamil Nadu and the National Wastelands Commission in the Palani Hills."