**Saving Bhutan’s forest**

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Underdeveloped and lacking capital, Bhutan saw its forest resource as a low-hanging fruit in the early period of modernization. The 1974 National Forest Policy ruled:

A major share of the contribution to the national exchequer will have to be from forests. Therefore, the starting premise of this policy should be that the entire forests belong to the State and there should not be any private right to any part of them. The economic policy contemplates a growth rate of 10% per annum in the generation from forests.

Forest cover figures became known to the Government for the first time in 1981. It was based on analysis of aerial photographs from 1956-58 which showed the forest cover of 57.14% of the total land area. Since then, there have been many land cover exercises, the last being the Land Use and Land Cover of Bhutan (LULC) 2016 by the Department of Forests and Park Services. It recorded the forest cover at 83.90%.

**Forest Expansion Hits Its Geographical Limit**

In the olden days, forests were common property resources, assets that are neither private nor state property. Forests were free to all people to take what they required for their simple rural life. People set fire to forests regularly to remove undergrowth and encourage grasses to regenerate for their cattle to graze.

When the country opened its doors to outside world, the Government started to look at forests as a source of revenue for the state, nationalizing all forests in 1969. Forest rules were framed which required people to pay royalty for their timber, and timber allocation was rationed. Additionally, people were prohibited to take fish from the rivers, kill wild animals or set fire to forests. These state forest protection measures were very successful. In the six decades from 1956 to 2016, forest cover increased from 57.14% to 83.90%. In absolute terms, country added over 1 million ha forest.

Today’s forest cover at 83.90% has reached its geographical limit as 13.04% of the country’s land consists of permanent snow, mountain peaks, water bodies and alpine meadows where forest cannot establish for obvious reasons of the limitations imposed by ecology and climate. The balance of 3.06% comprises agricultural lands and human settlements.

**Forest Definition & Forest Cover Reporting**

Forest cover reporting over time has suffered from some inconsistencies, leading to confusion amongst people. In common parlance, forest is any land area containing both trees and shrubs. However, in recent years, Forest Department has adopted the FAO definition of forest. According to FAO, forest means a land area spanning more than 0.5 ha with trees higher than 5 m and a canopy of more than 10%. Forest therefore means a land area with trees only. The definition excludes the shrub. Consequently, Bhutan’s forest cover is 83.90% when shrub is included, and without shrub, 70.77%.

From the point of FAO which has a global mandate to assess the world’s forest resources, theirs is the best forest definition to facilitate a globally valid and simple reporting of forest data. However, embracing the global forest definition affects our concept of forest with significant policy implications. For instance, the FAO definition promotes the view of forest being an area of land containing only trees, disregarding the biological value and ecosystem services provided by non-tree ecosystems such as seasonal/perennial plants and grasslands. It is inappropriate to measure the health of our natural environment by the metric of only trees. Nature is more than forest and forest is more than just trees. So it is only right to include shrubs and alpine meadows in our forest cover reporting.

**The Timber Reserve in the Country**

The timber reserve is determined by growing stock and growing stock is the volume of all living trees in a given area. Data on growing stock, increment and felling has provided information on the sustainability of timber production over time. The National Forest Inventory 2016 determined the total growing stock to be 1,001 million m³. The growing stock from the first NFI in 1981 was only 529 million m³. Over the 35-year period from 1981 to 2016, the national forest added a net 472 million m³ of wood with a net annual increment of 13.5 million m³.

The total timber harvested from national forests annually is maximum of 0.5 million m³, which is 4% of the net annual increment (13.5 million m³) or 0.05% of the total growing stock (1,001 million m³). For long-term sustainability, annual timber harvest should not exceed the net annual increment but we are hardly doing any significant timber harvesting. Low rates of felling over the years has resulted in overstocked forests. Timber export is banned since 1999.

**Negative Effects of Overstocked Forest**

An overstocked forest means trees in a stand are crowded and stand too close together, and they compete for light, water and nutrients. They provide a poorer habitat for wildlife, birds and plant diversity. Other negative effects include:

More Trees Mean Less Water: A water crisis is unfolding in forest-rich Bhutan and climate change is going to make the water crisis worse.  Trees lose water through evapo-transpiration, thus they consume much more water than agricultural crops and other vegetation. For instance, a large Douglas Fir tree is said to consume 3,000 litres of water in a day and a mature oak tree 189 litres. In an experiment in UK, researchers found that for every 10% of an upland catchment that was covered by conifer forest, there was 1.5 to 2.0% reduction in water yield in the downstream. The sponge theory that trees absorb and store water in the rainy season, and then release it gradually in the dry season, is only true to some extent as it depends on the local geology and rainfall.

Catastrophic Forest Fires: Half a century of forest fire control by Government has kept forest fires to a minimum. Without fire, forest stands have grown dense with fuel built-up. Fires burn in overstocked forest with an unnatural intensity and duration. We saw the destructive forest fires in California and Greece play out on TV. Bhutan has been so far lucky with small forest fires but there is a real risk of California-type destructive forest fires striking us in near future.

**Wood: A Renewable Resource with Less Carbon Footprint**

Steel and concrete are common building materials, and we think they are better for the environment than wood because they save forests. But steel and concrete represent about 8% of man’s greenhouse gas emissions. On the other hand, use of wood in buildings offers two solutions to climate change i.e. trees remove carbon from the atmosphere during the growing period and wood products lock up the carbon with 1m³ of wood storing 1 ton of carbon.

There is a return to wood as a renewable resource in richer countries. To address climate change, there is a vision being advanced that future skyscrapers and cities be made from wood. Several wooden skyscrapers have already been built across major cities in the world. More ambitious projects include the 70-storey wooden skyscraper in Japan and the 80-storey building in London. It is reported that a 20-storey cement and steel building will result in emissions of 1,200 tons of carbon. The same building built of wood will sequester about 3,100 tons making a net difference of 4,300 tons. Engineered wood products such as cross-laminated timber (CLT) which is made from young trees and small pieces of wood glued together, makes it possible to build skyscrapers with wood.

**Sometimes We Need To Cut Trees To Save Forests**

International efforts aim to protect forests and expand areas under forests because forests are crucial for soil, water, biodiversity conservation and carbon sequestration. But forest-rich Bhutan faces special forestry challenges as with people when the problems of a poor man differ from those of a rich man. We have been hardwired to see dense forest as signs of a healthy environment and to leave the forest and trees alone. However, sometimes the best way to keep a forest ecosystem healthy is to cut down some of its trees, and this could actually be a good thing for the environment.

Increased forest cover in the country has come at the cost of agricultural lands and grasslands. For instance, agricultural lands decreased from 9.26% in 1970s to 2.75% in 2016. Similarly, meadows declined from 4.07% in 1995 to 2.51% today. These non-tree ecosystems are rich in biodiversity and support high densities of domestic animals and wildlife, and their loss and resulting habitat change remains a serious threat to our national food security and the ecological integrity of our natural environment. It is important we recognize the restoration of agricultural lands and grasslands as a new environmental issue for the country.

Further, overstocked forests with suppressed, unhealthy and stressed trees are unable to sustain and fight themselves when they are hit with repeated years of drought. They are more susceptible to pests and diseases, and risk mass dying in drought years. About 10,000 ha of fir forest in the country on the upper ridges of mountains were killed by the drought-triggered bark beetle infestation in the 1980s.

Overstocked forests are also more susceptible to catastrophic forest fires. Forest thinning and small controlled burns can reduce the impact and threat of catastrophic forest fires. They also help restore the vigour of the overstocked forest by freeing up more resources – water, sunlight and nutrients – for the remaining trees and improve the habitat for wildlife and birds.

Too many trees disrupt groundwater supplies. The extra forest cover gained means forests are consuming more water than they did in previous years. Currently we look at trees as part of a solution to water conservation rather than a cause of falling water yield in springs and streams. Forest thinning could boost water supplies for people and ecosystems in a changing climate.

A forest experiment in the US found that total carbon was nearly the same in both un-thinned and thinned forests. The un-thinned forest had more trees, but the thinned forest compensated with bigger trees.

**Filling 12th FYP GDP Growth Gap**

We take immense pride and the international community lauds the 60% forest cover principle enshrined in the Constitution. We are always in fear that this important forest principle will be breached, but, the fear is unfounded. Firstly, the safety margin is huge, 60% vs 83.90%. Secondly, sustainable timber harvesting is not the same thing as deforestation. Deforestation, by definition, is when a forest is permanently converted to non-forest land-use e.g. permanent agriculture. Thirdly, the temporarily cleared area following timber harvesting is still considered forest as the tree cover will be re-established, and forestry continues to be the land use. Fourthly, land that is legally designated as a forest is still defined as forest even if no trees are growing on it. According to the legal definition, 97% of the country’s land area is forest.

We are a poor and aid-dependent country with donor grants and loans financing over 40% of the government’s annual budget. We face a large current account deficit, high public debt, rural-urban migration, high youth unemployment and stagnant government pay. We exported wood products worth Nu 0.35 billion in 2015 but imported over seven times more wood worth Nu 2.60 billion, this for a country with 83.90% forest cover and 1,001 million m3 of timber reserve.

The GDP growth projection for the 12th Five Year Plan has been downgraded from 10% to 6% primarily on account of commissioning delay with two hydropower projects. The country’s abundant forest resources have the potential to fill this gap.

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