

# INTO THIN AIR

## Climate change on the Roof of the World

Retreating glaciers, low water levels in lakes, worsening floods and decreasing lean season flows in rivers will not only affect Tibetans.

**By Pushpa Adhikary**

**T**he Tibetan plateau is the headwater of rivers that flow down to half of humanity. The Yellow River and the Yangtze start in

northeastern Tibet and flow across China, the Mekong originates in eastern Tibet as do the Irrawady and Salween that traverse down to



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*Rarefied atmosphere on the Tibetan plateau.*



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*Fluctuating levels in recent times - fording a river in Tibet.*

Burma. The Tsang Po starts near Tsho Mipham (Lake Manasarovar) and travels eastwards for nearly 2,000 km before cutting through the Himalaya to become the Brahmaputra and empties into the Bay of Bengal. Most major rivers in Nepal originate in the Tibetan plateau and cut deep gorges to flow down to the Ganga. And there is the Indus and its tributaries which also start near Lake Manasarovar and flow westwards into Pakistan and empty in the Arabian Sea.

What happens to the water towers of the Tibetan plateau has a bearing on about three billion people in China, Southeast Asia, and South Asia. It is the snows melting on the Tibetan plateau in summer in the dry season that keeps these rivers flowing. There is

also growing evidence that the Tibetan Plateau has a bearing on world climate. The elevation of the plateau cuts the jet stream in half during the northern winter, and it is the northward movement of the jet stream in spring that allows the monsoon rains to gradually push itself into the South Asian subcontinent.

Apart from the South polar ozone hole and evidence of depletion of stratospheric ozone over the Arctic Circle, Chinese scientists have recently also found evidence of ozone depletion over the Tibetan plateau. It is not yet certain what is causing this depletion at a point where the thickness of the atmosphere is reduced because of the plateau's elevation.

Professor Ying Xuexiang from

Chinese Academy of Social Sciences has been researching changes in the global climate and says that the same breakdown of ozone molecules by solar high-energy particles that takes place over the poles could be happening in the stratosphere above Tibet. Atmospheric ozone depletion takes place mainly because of the release of artificial CFC (chloro-fluoro-carbons) chemicals used in the computer and refrigeration industries.

More alarming is the fact that glaciers across the Himalaya and Hindu Kush mountains as well as the Tibetan plateau are receding. Glacier snouts are higher up the mountains, and large lakes have formed from snowmelt dammed up by terminal

moraines from the slopes of Kanchenjunga to K-2. What is unclear is what is causing this - is it global warming, or is it the cyclical warming up of the earth?

Consider other evidence:

- Before emptying into the Yellow Sea, the 5,464-km long Yellow River runs from northeastern Tibet through nine provinces and autonomous regions. Since the early seventies, the mighty river has failed to reach the sea for progressively longer periods. During 1997 it was dry for 226 days.
- Recent surveys show that the water level in Eling and Zhaling lakes, the main source of Yellow River in



*Kiyang run wild in the fragile ecology of the Tibetan plateau.*

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northern Tibet, was one meter below the 4,268 meter level in 1993. The flow rate has also fallen drastically from 7.8 cubic meters per second to 2.7 cubic meters per second.

- Madoi County in China which covers an area of 25,000 sq km, once had 4,077 lakes measuring more than one sq km each. Today, over 2,000 smaller lakes that used to dot the grasslands and river valleys no longer exist.

Northern Tibet boasts the largest animal husbandry area in China. But recently, natural calamities such as drought, snowstorms, high winds and low temperatures have kept its grass and livestock output unstable.

Outside of the North and South Poles, Tibet is one of the few places on earth that is still predominantly wilderness. The highest mountains, deepest gorges, vast grasslands, many lakes and the uncharted, primeval cloud forests of southeastern Tibet are what give the roof of the world its uniqueness.

There are indications that the plateau climate has gone through successive periods of frost and thaw. The latest warming cycle seems to have begun 8,000 years ago. There are longer, warmer summers and there is more rain. Forest coverage has increased in southeastern Tibet bordering India and Burma. Some of the lakes dried up and grasslands expanded in the west.

Professor Zhang Jiang Hua from the Chinese Academy of Social Sci-

ences in Beijing believes that global buildups in the levels of carbon dioxide and other greenhouse gases are accelerating the current natural warming cycle in Tibet.

"The global warming phenomenon is the main reason for receding snow in the mountains," says professor Zhang. "Tibetans alone cannot control it. For that there should be global initiatives." While a lot of what happens on the plateau is dependent on global atmospheric trends, Zhang believes China can do its share by protecting forests and controlling fossil fuel burning.

### **Protect watershed**

Prof Ying agrees that it is important to protect the Tibetan watershed since it has such a large impact on regions downstream. He says: "Global warming can lead to adverse consequence either leading to floods because of excessive snow melt or causing droughts due to decrease in precipitation. Neither scenario is encouraging but there is little people in Tibet can do. The only thing we can do is to try to protect what we have."

The plateau is one of the few wilderness areas left in the world besides the poles. Tibet's population density is only two persons per sq km, and although pollution is virtually non-existent, modernisation is fast catching up.

New factories and cement plants have brought smokestacks to the plateau. More worrying is the destruction of forests in the southeast. Since 1976, logging in Bomi district

in Eastern Tibet has been intensified and ecologists say it has worsened floods downstream in the Yangtse plains.

In 1992, Tibet promulgated a local decree concerning the protec-

tion of wildlife, stipulating legal measures to curb hunting and logging. Nature reserves were introduced and today are a key component of environmental protection in Tibet.



PANOS/Kunda Dixit

*Mt Everest - what if most of this snow begins to melt?*