The Steel Dragon Through My Land Railroad and Future of Qinghai-Tibet Plateau

Environment Thursday, October 11, 2007



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Qinghai-Tibet Plateau: Water Tower of Asia



2.5 million square km, 8 million people, average altitude of 13,000 feet, alpine wetlands regulate weather patterns, store and release water to Asian rivers

Golmud to Lhasa Pathway



- Chaidamu basin (salt lake, desert, permafrost)
- Alpine wetland and grassland
- Dangxiong Lhasa agriculture and animal husbandry

Qinghai-Tibet Railway



Wonder of Modern Technology



- 960 km 4,000 m above sea level, highest point 5,072 m
- Longest plateau railroad, 1,956 km from Xinging (Qinghai) to Lhasa
- Longest stretch along permafrost, 550 km
- Highest railway station, Tanggula at 5,068 m
- Highest tunnel through permafrost, Fenghuoshan at 4,905 m
- Longest tunnel through permafrost of Kunlun Mountain, 1,686 m
- Maximum speed 120 kmph on non-permafrost, 100 kmph on permafrost

Ten Nature Reserves







- Wild Yak
- Black Crane
- Hoh Xil (Kekexili)
- Sanjiangyuan (Three River Headwaters)
- Qiangtang alpine wetland and grassland
- Others



Construction Logistics



- 2647 bridges, total 118 km
- 11 tunnels, 8% of the total track
- Steel, concrete and other materials: unavailable
- 30 billion Yuan (\$3.7 billion USD), 2 billion Yuan for environmental reservation (\$270 million USD)
- 24-hour protection by 5000 security guards

Transportation Into Qinghai-Tibet by Train



- 75-90% coal, gas, steel, wood, construction materials, food, clothes, and other daily goods consumed in Tibet
- Tourists: 5 million annually by 2010

Transportation Out of Qinghai-Tibet





Agri-products: sheep, yak, herbs
Minerals: copper, lead, zinc, iron, gold, salt, magnesium, crude oil
Water: the most precious resource

Highway Railroad System on Plateau



Qinghai-Tibet plateau already faces serious environmental damage. Can the plateau's fragile ecosystem sustain the explosion of population and development brought by the railway?

Xining: Beginning of the Plateau Railway



Capital of Qinghai Province, conjunction to all the trains to Lhasa: Beijing, Shanghai, Lanzhou, Chengdu, Chongqing

Qinghai Lake: China's Biggest Salt-water Lake



- 3,000 m above sea level, feeding ground for migrating birds
- Half-million hectares of grassland lost to overgrazing and industry
- 85% of rivers that flowed into the lake have dried up
- Water dropped 3.7 m in the past 30 years

Guide County on the Yellow River









Golmud: Salt-lake City Where Rivers Ran Together



- Highway and railroad conjunction for 75-95% of goods to Tibet
- Desert with China's largest deposits of salt, gas, magnesia, zinc, gold
- Rapid growth a serious threat to adjunct nature reserves

Kekexili: China's largest uninhabited Nature Reserve



- Oxygen 50% of sea level, temperature below 40 C, the "3rd Pole"
- Alpine wetland and grassland regulate weather patterns and store carbons
- Endangered species: Tibetan gazelles, wild horses, black-neck cranes

Kekexili: Where Tibetan Gazelles and Wild Horses Run



- Female gazelles gather in May and migrate to Kekexili's lakes to give birth
- Hunted nearly to extinction for its wool to make shawls for western markets

Kekexili: China's largest uninhabited area



Desertification due to global warming, gold panning, herb gathering, poaching

Sanjiangyuan (Three River Source): Highest Wetland



- Average altitude 4,000 m
- Global significance for biodiversity conservation and carbon storage
- Supplies water for Yangtze (25%), Yellow River (49%) and Lancang (15%, becomes Mekong in Vietnam)

Desertification at Three-River Headwaters



- Global warming, glacier receding, overgrazing and industrial development led to severe soil erosion, rat infestation and desertification
- 33% grassland (6.4 million hectares) severely degraded, 70% in other areas

Maduo County: the Story of Eco-collapse



- Rat infestation and desertification from overgrazing, herb gathering, wetland drainage
- In 30 years, Maduo lost China's best grassland, became an eco-refugee county with no drinking water or electricity
- The source of the Yellow River dries frequently

Desertification of Ruoergai: World's Largest Alpine Wetland



- East edge of Tibet, Ruoergai stores Himalayan melt-water and feeds the Yangtze and Yellow River
- Desertification from drainage, overgrazing, peat extraction for fuel, fertilizer, rooftop "greenification"

Receding Glaciers on the Plateau



Nagqu (Nakchu): City of the Black River



- 81% Tibetan lakes, altitude 4,500 m
- Tibet's best wetland, grassland and agriculture land
- Qiangtang Nature Reserve rich in minerals, herbs, birds, fish, mammals

Nakchu Desertification



- 50% Tibetan desertification takes place in Nakchu wetlands
- Desertification from overgrazing, road construction, mining, herb gathering, receding glaciers, and warm winters

Namtso Lake



- World's highest salt lake fed by melting glaciers
- Sacred lake for Tibetan pilgrims
- Receding glaciers and shorelines

Namtso Lake



Conflicts between land and tour economy, nomads and migrants

Dangxiong: God's Chosen Place



- Tibet's richest grassland
- 150 km to Lhasa

Dangxiong Horse Race



When All Roads Lead to Lhasa



The Impact of Development on Plateau and People













The Price of Monasteries



- Gande Monastery: 25 Yuan
- Zegong, Sela, and Drepong Monastaries: 50 Yuan
- Potala Palace: 150 Yuan (at gate), 1,500 Y scalped

The Prices of Monasteries



Sign on the tree: "IF YOU TAKE PHOTO IN THIS THE DEBATINE COURTYURD, YOU SHOULD PAY FIFTEEN YUAN PLEASE"

Markets











Tibetan Driver and His Family



- Tibetan peasant's son from Muozugong County, adopted by his monk uncle
- Truck driver between Golmud and Lhasa for many years
- Chauffeur for a Tibetan incense company
- Hometown land sold for mining
- Illiterate (so is his wife), but determined that his children go to college

Nakchu Nomad and His Family



- Lost parts of his land to road construction
- Degraded pasture due to lack of land to rotate his cattle
- Solar heater: compensation for his loss to the railway

Railroad System Expansion



•Gansu - Tibet line

•Sichuan - Tibet line

•Dian (Yunnan) - Tibet line

•Qinghai - Lhasa line: extension to Shigatse, Gar, and Tsetang

Plateau Railroad & China's Water Diversion Projects



- East line: divert water to Beijing from the lower Yangtze via Grand Canal
- Middle line: divert water to the Yellow River from the middle Yangtze
- West line: divert water to the Yellow River from the Yangtze headwater and other parts of the plateau

The Yarlung Tsangpo River (the Brahmaputra in India)



- 9.3-mile long tunnel through the Himalayas at the hair-pin bend
- 2190 m water drop creates world's biggest hydraulic dam (over 60 million KW capacity, 3X bigger than Three Gorges Dam)
- Water pumped over a distance of 800 km to Northwest China for agricultural and industrial expansion

Qinghai-Tibet Plateau: Blue Treasure of the World



Development at What Cost?



At Whose Cost?





Research supported by Freeman and Lannan Foundation
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