



# TIBET IN COPENHAGEN

Number 1 in a series of 10 briefings on climate and Tibet

This series of briefings is about why Tibet matters, in the Copenhagen negotiations for the planetary climate. Because the six million Tibetans are silenced, forbidden to form their own organisations, people think Tibet is small and unimportant on a global scale. Actually, of every square kilometre of land on earth, 17 hectares are Tibetan. Climate scientists have recently realised the Tibetan Plateau is the planetary Third Pole, an island in the sky so vast it deeply affects circulation, draws the Asian monsoons deep inland, affecting even storm tracks of the north Pacific and Atlantic Oceans.

Tibet matters, because not only are its glaciers melting fast but the Plateau is warming faster than other areas on earth, resulting in more extreme and unpredictable weather across Asia. If the most glaciated part of the planet may lose its glaciers in decades, the whole of Asia, downstream and downwind of Tibet, will suffer more extreme weather.

Climate change is not an impersonal, inexorable force of nature. It has known human causes, and available solutions. But the biggest emitters continue to avoid taking effective action, each arguing that first the other must do more.

At Copenhagen, the biggest greenhouse gas emitters are China and the US. China argues quite rightly that it took centuries of industrialisation in the rich countries to build CO<sub>2</sub> levels to where they are now. But does that mean China should be largely exempt from the binding carbon emission reduction targets which should come out of Copenhagen? The US argues, rightly, that all industrialised and rapidly industrialising countries should contribute to the carbon emission reduction, because the problem is now so serious.

So it goes round and round, each major emitter making valid points to avoid doing much, even to claim the right to massive payments to do anything. While the major emitters argue, the losers are those who never emitted much, who persist with a sustainable subsistence economy, a modest way of life that does not demand ever increasing production, pollution and consumption.

This includes the six million Tibetans and the 2.5 million sq km Tibetan Plateau, in the heart of Eurasia. The nine briefings in this series assess what is at stake at Copenhagen, from a Tibetan angle. They explain the impacts of climate change on Tibetan lands and livelihoods. They look at what climate change in Tibet means for Tibet's neighbours in coming years, from failed monsoons to extreme floods. They look at the Tibetans who have long cared for the land, the farmers and pastoral nomads and at new Chinese policies which expel nomads from their lands, as if this is the only way to conserve watersheds. This series of nine briefings offers a complete picture, including alternative solutions which include rather than exclude the nomads as part of the solution, rather than labelling them mistakenly as a cause of the problem.

Each Briefing stands on its own, with a list of sources of further information and data validating the assessments presented. Taken together, the nine Briefings, with little overlap, offer a rounded picture of how the latest science understands the Tibetan Plateau and the Tibetan people.

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# HEATING THE CLIMATE OF THE THIRD POLE

Number 2 in a series of 10 briefings on climate and Tibet

Everyone knows Tibet is high, and glacially cold, which is why many scientists call it the Third Pole.

But, unlike the other Poles, Tibet is intensely sunny, and Lhasa, the capital, is actually closer to the equator than Cairo, Baghdad, New Orleans or Shanghai. So the thin, clear sunny skies of Tibet can also heat dramatically in spring and summer, making Tibet an engine of global climate.

The heating of the Tibetan Plateau is so strong that scientists have recently discovered how much Tibet drives the monsoon rains that all of Asia's farmers, and cultures, depend on. The heating of the Plateau generates such an intense low pressure, over a land as big as western Europe, that heavy rain clouds building up over distant tropical oceans are drawn deep inland, even to Tibet itself, which also gets most of its rain from monsoon clouds somehow getting through the Himalayan barrier.

The role of Tibet as driver and regulator of planetary climate is quite unique, and it is only in recent years that science has begun to understand this remarkable climate engine. Only now is there sufficient data to put together the picture of how events in Tibet, in spring, determine whether the summer monsoons across Asia will be plentiful, or disastrously- whether the monsoon will fail or, at the other extreme, flooding rains will devastate downstream farmers and towns.

This means Tibet, the entire plateau covering one quarter of China's total area, is uniquely susceptible to climate change; its ancient role as regulator and driver of the monsoons susceptible to man-made interference. Climate change in Tibet is of concern not just to the six million Tibetans, but to the planet. Even the monsoon rains in Australia, in the Southern Hemisphere, are much influenced by Tibet.

An intense scientific effort, by Chinese and international scientists, in the past decade, has focused on the critical role of snow cover on the ground across Tibet, especially in spring. If snow persists into spring, without melting at the usual time, the consequences are many. For nomads, spring snow is bad news because animals, weak from overwintering in pens, urgently need freshly growing grasses, but they remain buried under snow, the ground too cold for regrowth to begin and snow too deep for weak animals to paw through. For Asia as a whole, unusually heavy spring snow on Tibet means the sunlight reaching Tibet bounces off the white snow cover, rather than being absorbed by growing green grasses and sedges. This perpetuates the cold air temperatures, delaying the heating of Tibet, thus weakening the monsoon. Scientists are now convinced they have strong evidence that spring snow on Tibet makes for a weak, late or even a failed monsoon months later.

The surface of Tibet matters. A natural surface of snow peaks and glaciers at high altitude, alpine meadows below, with many lakes, wetlands and rivers lower still, has long guaranteed Asia's climate. Now man-made disturbance and degradation are evident everywhere. The human impacts on Tibet over the past 50 years are dramatic. The forests of southeastern Tibet were destroyed, permanently reducing rainfall in the most fertile corner of Tibet best able to attract monsoon rains. Rivers are dammed, increasingly in endless cascade series to capture and impound water for hydropower, especially on the great rivers of Asia as they tumble down from the plateau. The innumerable lakes of Tibet are dropping, according to dozens of scientific reports, and the glaciers are fast melting.

But the most widespread impact is out on the great rangelands created and cared for by Tibetan nomads over thousands of years, with their herds of yaks, sheep, goats and horses. Those grasslands were grazed sustainably, by moving herds onto fresh pasture, allowing grasses to regrow, for centuries.

But in recent decades, the grasslands have rapidly degraded, the living turf has died, exposing black soil to the biting winter winds and blizzards, until only bare rock remains. Decades of official insistence on building up herd sizes, far beyond what nomads knew to be sustainable has set off a chain of degradation, with almost no official finance for rehabilitation.

The consequences for the nomads are dire. Their mature animals now weigh much less than only a few decades ago, as living turf turns to dead black soil, and invasive weeds take over, and burrowing rodents in plague proportions infest the grasslands.

Careful scientific fieldwork now confirms what nomads have always known: that Tibetan pastures, steadily but lightly grazed, are highly productive and sustainable; that the pasture plants maintain a wide biodiversity when grazed and diminished biodiversity, with more weed invasion and fewer medicinal species, if grazing is excluded, in the name of watershed conservation.

The way to maintain the great rangelands of Tibet as a carbon sink is to allow grazing, and to assist the pastoral nomads to plant grass seeds in areas damaged by fencing them in to areas too small for their herds. These basic methods of grassland rehabilitation have not been tried; nor has China, a country unfamiliar with grassland dynamics, asked the nomads how their traditional knowledge enables them to manage the risks of pasture management.

Tibet is drying, heating and accelerating climate change. A negative feedback loop is in place, exaggerating the global climate trend, to such an extent that Tibet has become one of the fastest warming parts of the planet, according to many scientific research reports. As Tibet turns increasingly from green to black in summer (black rock, black soil) the heating intensifies, but it is too late to generate a healthy monsoon. On the other hand, Tibet also turns from green to white in winter and spring, when oceanic oscillations (the Indian Ocean dipole) make for heavier and later snow than usual.

As Tibet heats and dries, this negative cycle intensifies. Frozen soils hold water, as ice, which melts in spring, just at a time when crops and wetland plants reach down, before the monsoon arrives, for water. Now the permafrost of Tibet is anything but permanent, melting earlier and earlier, depriving crop and wetland plant roots of moisture. As crops and wetlands die, the bare soil is exposed to the gales that blow fiercely in Tibet. The blackening accelerates, the heating intensifies.

China's investments in Tibet are concentrated in urban construction, mines and transport corridors. The vast grasslands have been neglected, attracting almost no investment. The nomads now are compulsorily removed from degrading grasslands on the grounds that regrowth of grass, to protect China's upper watersheds, is possible only if livestock and nomads are removed. The victims of past policy failure, and of climate change, are made to pay for the mistakes of others.

The nomads of Tibet could be part of the solution. If China adopted contemporary best practice, the nomads would be empowered and resourced, given seeds and help to make the black soil green again. Instead, they are blamed and removed, excluded from ancestral lands officially guaranteed to them in the 1990s as a long term promise of legal tenure.

This is a tragedy, not only for the nomads and their intimate knowledge of grassland dynamics, but for the planet. China has done almost nothing to maintain wildlife habitats, as biodiversity biologist Richard Harris points out in his 2008 book *Wildlife Conservation in China*; nor has China invested in rehabilitating grazing lands.

A major tragedy of the 19th century was the herding of American Indians and Australian Aborigines onto reserves, where their skills were redundant, their lives pointless, leaving them vulnerable to diseases of overcrowding, and despair. The Indians and Aborigines not only survived, but those who saw them as primitive, an obstacle to modernity, have learned to respect indigenous knowledge, especially in sustainable management of the vast plains of continental interiors.

China persists in seeing Tibetan nomads as poor, backward, remote, ignorant, greedy, selfish and unaware of the consequences of their grazing practices. They depict the nomads as enemies of watershed conservation, on the simplistic

#### WANT TO KNOW MORE?

This overview introduces a series of briefings on specific topics, in more detail. This briefing summarises the impacts of climate change on Tibet and, via Tibet, on our planet. Other briefings in this series include references to the sources of data used. The briefings rely on the latest scientific findings by international scientists, including many Chinese scientific institutes.



# INDIA'S MONSOONAL CLIMATE AND TIBET

Number 3 in a series of 10 briefings on climate and Tibet

AS LONG AGO AS 1884, AN English meteorologist working in India had the inspired idea that the snows of Tibet and the Indian monsoon are causally connected. Henry Francis Blanford, in the pages of Proceedings of the Royal Society, in London, proposed that the greater the snow cover in the land of snows –as Tibetans call Tibet- the later the Indian monsoon wets the parched earth on India. Conversely, he suggested, the less the winter snows in Tibet, the earlier the snowmelt, and the earlier the monsoon.

This brilliant intuition was unprovable at the time, in fact it took the entire 20th century and into the 21st century before evidence could be carefully assembled to demonstrate there is indeed a strong connection, just as Blanford supposed. Blanford, father of modern Indian meteorology, connected all available observations from the Himalayan hill stations of the Raj, noting the direct correlation between heavy winter snows and the failure, weakness or lateness of the following summer monsoon. He also noticed that when monsoons fail, the winter high pressure over India does not yield to a summer low.

Blanford was remarkably close to getting the bigger picture, of the snows not only on the Himalayan slopes but also beyond, across Tibet, and of the enormous low pressure covering Tibet in spring and summer, which draws the Indian monsoon in from the ocean, across India. Blanford had no access to Tibet, on the far side of the Himalayas. But now, China has set up 115 weather monitoring ground stations across the Tibetan Plateau, plus data available from satellites eyes in the sky, give us the full picture. Now, thanks to a NASA satellite, we have a torrent of downloadable data on the snows of Tibet (<http://nsidc.org/data/mod10a1.html> ).

The Terra satellite measurements show that when snow in winter, lingering on into spring, is unusually heavy across Tibet, not only does it delay the heating of rock bared by melting snow, it actually reflects much more of the sun's light and heat back into space. The delay in heating means delay in the formation of a huge centre of low pressure over Tibet in summer, so intense that it pulls air in to it, from as far as the Indian Ocean, laden with millions of tons of water. This is the monsoon, on which all life in India depends.

The monsoon in turn supplies Tibet itself with most of its rain, which falls as snow in the mountains, adding to the glaciers of the most glaciated part of the planet. Those slowly melting glaciers in their turn, feed the great rivers of Asia originating in Tibet. This is especially true of the Indus, Pakistan's life line, which relies mostly on glacier melt.

As early as the 1870s, Henry Blanford issued drought warnings to India, based on observations of Himalayan snow cover in winter and spring. Summer drought meant famine, giving urgency to his warnings.

He observed much seasonal variation from year to year in the depth and persistence of Himalayan snow, but today those variations from year to year are becoming more extreme, as the global climate warms and Tibet warms especially fast.

As the climate of Tibet becomes more extreme, so too does India experience alarming weather. The 2009 monsoon almost failed, coming far too late for many crops, especially in the densely populated northwest upper Gangetic plain and Punjab grain bowl. India's meteorologists say 2009 seasonal rainfall was 64% of its long-term average over Northwest India, and monthly rainfall was 53% of long-term average in June, a deficit of 47 per cent.

The extreme flooding of southern India late in the monsoon season, the long pause before the rains arrived at all in much of the north, are examples of the long term trend towards more extreme and unpredictable monsoons, as plotted by Indian scientists using data starting in the 1960s (Goswami 2006).

The danger, in the near future, is that such extremes can push the entire monsoon-generating system, including the snow cover of Tibet, past a crucial tipping point of no return, according to a team of scientists speaking at the British Met office conference on climate in Oxford, September 2009. According to Levermann and colleagues there may well be an abrupt transition to a new pattern of monsoon seasons in which, in some years, the monsoon will fail altogether, or be delayed by several months.

India needs Tibet to pull in the monsoon clouds from the Arabian sea, Indian ocean and Bay of Bengal. All of south Asia, from Pakistan, across India, Bangladesh and Burma rely directly on Tibet for the water in the great rivers, all of which rise in Tibet, and for the rain from the sky.

India has always known the Himalayas as abode of the gods and glacial source of pure waters. But even the realm of the gods can suffer from human interference. Tibet is no longer able to provide its environmental services as reliably as before, because the land, rivers and lakes of Tibet are degrading. Fifty years of intensive industrialisation and over-exploitation has desertified much of the grasslands, degrading pastures, altering the water-holding and heat absorbing capacities of the nomadic rangelands. Everywhere across Tibet lake levels are dropping, rivers are being dammed, often in massive cascade series as they drop from the Tibetan Plateau.

Scientists consistently report that Tibet is warming fast, getting less rain in summer, when crops most need it, and more rain in spring and also in autumn after the harvest is complete. Warming means early thawing of frozen earth permafrost, depriving Tibet's many wetlands of water which now drains away before plants, in spring, can reach down for it. The wetlands dry and die. The impacts of climate change in Tibet are multiple, and the climate extremes are more frequent.

India has much to offer China, in the process of rehabilitating Tibet's degraded rangelands. India's rich traditions of citizen mobilisation and participatory development enable farmers, nomads, conservationists and scientists to work together to remediate degraded lands. India has innumerable stories of bottom-up initiatives which work. China knows only top-down command strategies, which fence nomads out of their rangelands, coercing them to sell their cows for slaughter. The nomads now lead useless lives, settled in concrete blocks on the fringes of their ancestral rangelands, their traditional knowledge useless. It is in India's interests to help China find a better way to heal Tibet.

#### WANT TO KNOW MORE?

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# TIBETAN FARMERS FACE CLIMATE CHANGE

Number 4 in a series of 10 briefings on climate and Tibet

The staple of Tibetan life is highland barley. All six million Tibetans depend on this high-altitude crop, not only the farmers but also the nomads, who traditionally barter animal products for the farmers' barley.

Only a tiny part of the great plateau –an area as big as western Europe-is suitable for farming, due to the intense winter cold, the rugged terrain and the concentration of rainfall in summer. Only in valley pockets is there water nearby that can be directed onto fields, on slopes not too steep for farming.

As climate changes, Tibetan farmers seldom have the option of simply moving up or downstream, or up slope. The terrain of Tibet is too steep, too exposed to gales and blizzards and, in most areas, too dry. In the land surrounded by mountains, as Tibetans call their homeland, it is the mountain tops that are forever snowbound, while the valleys are often dry. Although China calls Tibet, where China's great rivers rise, "China's Number One Water Tower", the reality is that most of Tibet is semi-arid. It is amazing that a stable, sustainable civilisation exists at all, at average altitudes of 4000 to 6000 meters, the highest inhabited portion of the planet.

Climate change threatens the livelihoods of the Tibetan farmers, although the farmers did nothing to cause climate change. The entire Tibetan Plateau –two and a half million square kilometres- is desiccating. It is warming and drying, with especially sharp drops in mid summer monsoon rains. To some extent, this is compensated for by increased spring and autumn rain, but it's not that simple.

On the plateau, the growing season is short. Crops need to be sown as soon as possible after winter, so they can grow fast and be harvested before the cold returns, as early as September. But the monsoon rains, the only substantial rain, arrives only in summer. For thousands of years Tibetan farmers have dug irrigation channels and lined them with stone, to get glacier-melt water in springtime onto fields. Farmer's crops are finely attuned to the other source of water: in the frozen earth which thaws in spring just at the time that the roots of crops reach down to tap this storehouse of precious water.

Australian agricultural scientists investigating Tibetan farms reported in 2009 that: "the cash incomes of adults from rural households in Tibet average less than US\$1 per day, such that even households that provide all their own food have little extra money to buy non-food necessities, including inputs to develop agricultural enterprises. The average size of farms in Tibet's crop-dominated zone was found to be just under one hectare, and practically all arable land is already being farmed."

Now the balance has been lost. The spring thaw is earlier and earlier, permafrost is melting away before growing plants can access the water. This affects not only crops but also the native vegetation of Tibet, especially in wetlands and other low-lying areas, now rapidly drying out and dying off. The desiccation death of the many wetlands turns carbon sinks into carbon emissions, adding to the global burden of carbon dioxide and methane into the atmosphere. The loss of wetlands in turn threatens migratory birds used to Tibetan stopovers.

The big crunch will come in a few decades from now, as the melting glaciers disappear. Tibetan rivers which are now boosted by the accelerating glacier and spring snow field melting, will experience a sharp reversal, a sudden drop in flow as glaciers and snowcaps will no longer regulate runoff and ensure year-round release of water downstream.

Chinese scientists have put a monetary value on the services provided to the planet by Tibetan farmers

in Tibet Autonomous Region (TAR), which is half the area where Tibetans live. The actual monetary value of the crops is only 45% of the total. A bigger sum, 2.07 billion yuan, or 46.7% of the total, comes from Tibetan farmers sequestration of carbon in their growing crops, and exhalation of oxygen to the atmosphere. Nutrient recycling and water conservation are also quantified, in this 2008 research report by two Chinese and one Tibetan scientist. Altogether, the work of Tibetan farmers of TAR provides environmental services to the planet worth 2.4 billion yuan each year. If all Tibetan farmers are included, that figure could be at least doubled.

Yet degradation of farmland due to climate change is accelerating, on top of other causes of degradation originating in China's disastrous insistence on growing wheat in Tibet, a crop more familiar to Chinese settlers but unsuited to the tough conditions in Tibet.

The Chinese style of intensive peasant farming of small plots using highly labour intensive methods is not suitable in the frigid climate of Tibet. There are few Chinese style farms, other than some large scale state farms, and small scale greenhouse vegetable growers on urban outskirts, who often exhaust the soil.

Tibetan farmers need new methods, new hybrid seeds, new ways of improving productivity for a fast drying climate and rapidly increasing immigrant population. They need to be allowed, trained and encouraged to set up their own self-managing water user groups and farmers' associations, rather than being instructed from above by officials.

There is much the world could teach China about best practice methods of working in partnership with farmers to ensure co-operative partnerships based on mutual respect.



# TIBET'S NOMADS FACING CLIMATE CHANGE AND DISPOSSESSION

Number 5 in a series of 10 briefings on climate and Tibet

Whatever one makes of China's claims to historic sovereignty over Tibet, no Chinese claim to have exercised actual day to day control over the lives of Tibetans until the 1950s.

Only in the latter half of the twentieth century did China's power extend to the vast grasslands of Tibet, intervening decisively in a rangeland quite unfamiliar to Chinese eyes. At the height of China's revolutionary drive to catch up with the industrialised West, the Tibetan grasslands were suddenly in the hands of Chinese cadres with no experience of pasture dynamics. Productivism was the new ideology, to intensify meat production for China, especially for the influx of Chinese migrants building new towns, oil wells and mines in Tibet.

These cadres took charge, holding the power of life or death, able to withhold rations to punish nomads unable to fulfil predetermined production quotas. In the name of "democratic reform", the old landlords owning nomadic lands had been executed, but the new cadres held greater powers than any landlord had. The nomads were herded into communes, stripped of all possessions, reshaped into production brigades, and given their orders. No production meant no rations. Starvation, especially in 1959, 1960 and 1961, was common.

From the outset, the new class of cadres in command saw the nomads not as stewards and curators of the landscape, but as ignorant, backward and irrational, utterly lacking in enthusiasm for class warfare. The cadres were told it was more important to be red—to show a fervour for revolution- than expert. Out on the grasslands, the idea that nomads were the experts was laughable. Not only were the nomads devoted to the Buddhist lamas, they seldom slaughtered their animals, and allowed wild herds of antelope to mingle freely with their sheep, goats, yaks and horses. Clearly, these nomads were unscientific, unproductive, superstitious and in need of revolutionary regimentation. They must be made to increase herd size, slaughter rates, meat production, fencing and a civilised, sedentary way of life.

Twenty years later, in the late 1970s, the communes collapsed, having failed except for one achievement: the number of animals, in all Chinese official statistics, had climbed steadily every year, to record levels: 30 million sheep and goats, six million yaks.

In the early 1980s nomads were given their animals back, but not their land. As soon as they regained some control over their lives, they cut the number of sheep back to more sustainable levels, as is shown in Chinese official yearbook statistics. Nomads could once more draw on their intimate knowledge of plateau and alpine meadow pastures to regain the mobility that is the secret of both productivity and sustainability.

But Chinese attitudes did not change much. With no tradition of grassland governance to draw on, Chinese leaders persisted in seeing the nomads as primitive and irrational. Meat, wool and dairy production met the subsistence need of the nomads, and their neighbours, the farmers of Tibet; but nomads failed to commercialise slaughter rates. Little meat was available for monetisation.

A rainforest is immediately recognisable as complex, with a huge variety of plants dependent on each other. A grassland, to the outsider, seems far simpler and less wonderful; yet on close observation, the grazed grasslands are as complex and amazing as a rainforest.

Chinese scientists now know that Tibetan nomads gradually cleared plateau forests for pasture over thousands of years, creating complex meadows kept diverse by steady grazing pressure. By skilfully introducing domestic herds, then moving them on, the nomads maintained an extraordinary biodiversity of grasses and sedges, enabling human life to flourish at the third pole. Mobility was crucial, moving on before grazing pressure destroys plants, exposing the dying turf to the icy gales and blizzards of Tibet which can strip soil, leaving only bare rock. Nomadic knowledge of how, when and where to graze, and the nomadic willingness to live in portable woven yak hair tents, summer and winter, with their animals, kept the pasture free of invasive toxic weeds, erosion, shrub invasion, and infestations of pests.

None of this was known in the 1980s, except to the nomads themselves, and no-one asked them how they dealt with the risks of living at the third pole. It is only in the 21st century that Chinese and global science have caught up with what the nomads have always known.



In the 1980s and 1990s it became obvious that everything on the grasslands was going wrong. The living turf was dying, eroding and slumping, only to be torn away in wild weather, back to bare rock or ‘black beach’ as Chinese scientists called it. Burrowing rodent populations exploded, in plague proportions. Toxic invasive weeds multiplied. The rangelands were degrading, including the arid area of eastern Tibet where both of China’s great rivers, the Yangtze and Yellow, rise from glacier melt. And still the nomads failed to commercialise, bypassing the opportunity to get rich, as China abandoned class warfare and embraced capitalism.

In the absence of climate change as the universal explanation, and the absence of both productivity and sustainability, plus ongoing scientific ignorance of basic plateau grasslands dynamics, Chinese scientists and administrators turned to just one explanation. The irrational, ignorant, greedy nomads were to blame. They were overstocking, beyond the carrying capacity of the pastures, and this was the cause of degradation. The compulsory overstocking of the revolutionary years could not be discussed; it was and is off-limits, a shameful loss of face China is yet to look at afresh. So only one cause was possible: to blame the victims.

As the weight of mature yaks declined, nomad livelihoods also deteriorated. Although urban Tibet enjoyed a centrally funded construction boom, nomadic rural Tibet remained poor, with most nomad families trying to earn money away from their herds, roadbuilding, labouring on official projects, selling medicinal plants and mushrooms to Chinese traders.

In the 1990s, new policies again extended the reach of state power out onto the open grasslands, this time in the name of scientific development, not revolution. The nomads were at last given certificated guarantees of long term leasehold to their land, long after China’s farmers had been given such guarantees. This encouraged conservation of pastures, giving nomads a sense of ownership.

But at the same time, other policies, driven by China’s long standing disdain for mobile people, were also implemented. Sedentarisation, fencing, limits on family size and herd size were gradually made compulsory. Mobility was gone. No longer were nomads free to nomadise. Gone was the annual cycle of overwintering in lower plateau pastures and herding up into the alpine meadows in summer.

Forced to live in rudimentary, unsanitary, almost windowless houses, their herds behind fences, the lives of both herds and herders, and the quality of land, all deteriorated. Countless reports by international and Chinese scientists now reveal the cost of concentrating animals and people behind fixed fences. Inevitably the land eroded, the grasses trampled to death, production fell, animal weight fell further, and the nomads experienced the ill effects of overcrowding: higher rates of parasitic infections, dust diseases, tuberculosis and many other diseases.

China’s leaders remained fixedly convinced they were bringing civilization to the nomads, and regularly announced proudly how many nomads had been sedentarised. There were no programs to invest national funds in rehabilitation of degraded grasslands, to engage with nomads as partners in sowing grass seeds to revegetate bare patches. The state had not learned that there was anything to be learned from Tibetan nomads. None of these increasingly restrictive policies achieved the goal of intensifying meat production. The ‘‘come out rate’’ of herders selling animals for slaughter hardly rose, and China’s long held dream of Tibet as a source of meat was fading. A new source of worry was emerging for China: water security. The Yellow River, drained for irrigation and industry as well as urban populations along its length, ran dry in winter, for the first time in history. The Tibetan source became precious. The new slogan was that ‘‘Tibet is China’s Number One Water Tower.’’

After Tibetans, at great costs, made public their frustrations with China in 2008, an independent delegation of Chinese lawyers went to remote areas of Tibet to see for themselves why Tibetans are unhappy. The Gongmeng Open Constitution Initiative Report describes the nomads of Kanlho (Gannan in Chinese): ‘‘The economic structures based on animal husbandry have left Gannan’s Tibetan areas relatively poor, and the standard of living for ordinary farmers and nomads is below the subsistence level. Aside from investing in production, the normal farmer and nomad’s disposable income each year does not amount to much. When researching in Xiahe, local scholars told us that aside from basic agriculture, local industrial systems are practically absent. Former processing industries surrounding agriculture, such as weaving and slaughtering operations, have all closed. There has been far from adequate guidance and investment in agriculture, the main industry in Tibetan areas; and there has been inadequate attention on the production and enterprise of ordinary farmers and nomads. When interviewing farmers and nomads in Xiahe county in Gannan a lot of farmers and nomads told us that they didn’t have the funds to expand production and could only maintain a certain scale of production. If they wanted to raise more sheep or cattle they were restricted by limitations on pasture and funds. They wanted to open a store but had no capital. There were in fact very few Tibetan stores.’’ The fading of the dream of meat, and the rising anxiety to conserve water sources coalesced into a new slogan. As the 21st century arrived, a new slogan gained power as a Marxist explanation of the situation: there is a contradiction between grass and animals. This is a simple observation: the more the sheep, yaks and goats eat, the less grass there is. Thus grasslands policy became a simple zero/sum proposition: if China wants to protect grass to protect watersheds from degradation, and since no meat was forthcoming, the grazing animals have to go, and the herders too.

This is the new policy, tuimu huancao in Chinese, meaning closing pastures to restore grasslands. Like most simple ideas, it is overly simple. It assumes the only way to conserve China's upper watersheds is to remove animals and nomads. Yet China's own scientists have now learned, through patient observation, that the grasslands of Tibet, when grazed moderately and intermittently, moving herds on well before the short summer growing season ends, actually maintains a higher biodiversity than on ungrazed pastures, where toxic weeds invade and biodiversity declines.

It took Chinese scientists 50 years to discover what the nomads have always known, and Chinese policy remains far behind the latest scientific knowledge. The tuimu huancao policy is a disaster. The certificates guaranteeing nomads long term land tenure have been torn up, nullified by the new command. State power has relocated nomads into concrete block settlements on the edges of their former lands, with basic rations to ensure they do not die of starvation. Instantly, all their skills, risk management strategies, environmental services, carbon sequestration, traditional knowledge and biodiversity conservation are gone, redundant, as if they had never existed.

This is a tragedy comparable to the 19th century herding of Indian tribes onto reservations in the US, or Aborigines onto mission stations in Australia. Colonisers justify colonialism as a mission to civilise the backward. We now know the cost.

Until very recently, the nomads of Tibet occupied, sustainably and productively, the entire plateau, the whole two and a half million square kilometres of the third pole, skilfully using all land where plants grow, not just part. That extensive, mobile land use was well adapted to the realities of Tibet.

Now climate change has arrived, explaining everything. No longer need China fear its past policy failures as the cause of degradation of Tibetan rangelands. Climate change explains all, especially in Tibet, where climate change is happening faster than in most parts of the planet, accelerating the drying out of Tibetan lakes, the dying of wetlands and croplands, and the melting of glaciers. Climate change now impacts on the farms, wild animals, lakes, rivers and glaciers of Tibet (see other Briefings in this series). But the most immediate impact of climate change is the exclusion of nomads from their lands, labelling them officially as "ecological migrants", as if they are victims of an impersonal force, called climate change.

Officially, the nomadic way of life is anachronistic, a relic of the pre-climate-change era. The nomads must go, for the greater good of China, to protect downstream water users, who number hundreds of millions. In reality, the vast grasslands of the Tibetan Plateau are a cultivated, curated creation of the nomads and their herds, over a period of 8800 years, not a primordial natural landscape best conserved by excluding domestic animals after 88 centuries of grazing.

Like the dispossession of the American Indians and Australian Aborigines, the compulsory "ecological migration" of the Tibetan nomads is grounded in ignorance, prejudice, a failure to listen and learn. China is far from alone in assuming its nomads are backward, and to blame for degrading land. But around the world, governments increasingly recognize that pastoral nomadic mobility holds the key to sustainability on the dry lands of the world.

There are other solutions to the problems of degradation of Tibetan lands. Tuimu huacao, closing pastures to convert them to grassland, is not the only way. Nor is it helpful to assert climate change as the catch-all cause of all problems. For constructive alternatives to current policy, see other Briefings in this series.

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# CHINA, TIBET AND CLIMATE CHANGE

Number 6 in a series of 10 briefings on climate and Tibet

Tibet and China are physically intimately connected. The yellow colour reserved for emperors comes from the yellow of China's great rivers, known in English as the Yangtze and Yellow, in Chinese as Chang Jiang and Huang He, and in Tibet, where they rise, as the Dri Chu and Ma Chu. The yellow in these rivers is the earth of Tibet, the youngest of lands, uplifted kilometres into the sky by tectonic forces, and still rising.

The high plateau is cut by rivers, bearing enormous loads of silt which form the yellow loess earth of China, from Gansu all the way to the sea. Upstream Tibet and downstream China are intimately connected.

Similarly, in the sky, Tibet is the source of China's bai-yu plum rains, the summer monsoon on which the whole Chinese civilisation is built. Tibet is not only upstream, it is also upwind of the plains and great riversheds of China. China relies profoundly on Tibet, on the environmental services provided by an intact, uncompromised Tibetan Plateau. The physical basis of China's prosperity is provided by the ongoing purity of the Tibetan source.

It is only within the past half century that China has known where its great rivers rise, and only in this century that scientists have demonstrated the connection between destructive floods in China and climatic anomalies in Tibet. The intimate connections are a recent discovery, not yet well known.

China has little historical experience of governing grasslands, nor has it learned to listen to the traditional knowledge of Tibetan pastoral nomads who have long sustained a grassland extending across 1.7 per cent of the earth's land surface. Tibet is too big, too important for all downstream and downwind countries right across Asia, for policy mistakes made by decision makers whose only knowledge of Tibet comes from looking at satellite photos.

China cannot afford to take Tibet for granted. An official slogan of the 1990s was that "Tibet is China's Number One Water Tower", as if Tibet invariably, automatically guarantees China's water supply. In reality, Tibet is naturally much drier than China, even though the spring and summer heating of the Tibetan Plateau is the engine generating the monsoon rains of China.

Until recently, no human interventions in Tibet compromised the seasonal cycle of intense winter cooling and dry high pressure over Tibet, followed by rapid spring heating of the Tibetan Plateau, forming an intense and persistent low pressure so strong it drives the monsoons of Asia. It is the driest parts of Tibet that heat the most in spring and summer. Now, as the entire planet warms, these areas of eastern and northeastern Tibet are rapidly desertifying. This is exactly the area China has in mind when it calls Tibet its' water tower, because that is where both the Yangtze and yellow Rivers (and the Mekong) rise, from glaciers now rapidly melting, high in the mountains of Tibet.

Global climate change can be dealt with only by global responses, by all greenhouse gas emitters, developed and developing, collectively reducing emissions. Tibetans are glad to witness, in Copenhagen, the biggest emitters –both historic and new- considering planetary needs as well as national growth.

Global climate change, according to the scientists, affects Tibet many ways. While southern Tibet, next to the Himalayas, may get wetter, much of Tibet is desiccating, drying out and desertifying as

temperatures rise faster than in other regions. China has the opportunity to respond constructively to these long term trends, which threaten the “number one water tower.” Much can be done in Tibet, as well as in Copenhagen, to maintain the integrity of Tibet’s environmental services to China.

Now that science understands the intimate connections, policy can follow. The grasslands of Tibet are fast degrading, not only due to global change, but also because official policies pushed the rangelands too hard, to carry more livestock, slaughter more animals, commercialise meat production, collectivise the nomads and disempower their traditional knowledge. More recent policies are based on the simplistic idea that there is “a contradiction between grass and animals.” Obviously, the more grass is eaten, the shorter it is, but that does not mean the only way to protect watersheds is to remove both nomads and their herds. Yet that is now the policy, labelling the ex-nomads “ecological migrants”, as if they have voluntarily relinquished their lands, herds and customary knowledge.

Nomads and agronomists know that pasture grazed long enough to maximize production, but briefly enough for sustainability, maintains long term biodiverse complexity, does not erode or desertify, and guarantees water supply. A healthy pasture is rich and complex, with minimal weed and pest invasion, able to withstand not only grazing pressure but also the gales and blizzards of Tibet.

Recent scientific research shows the grasslands of Tibet were formed by nomads, starting 8800 years ago. Tibetan nomads have an accumulated 8800 years of knowledge of grasses, seasons, pastures, meadows, risks and how to keep animals alive, on the hoof, mobile and healthy.

That knowledge has been invisible to China’s planners, and the consequences are disastrous. Now the degradation of the rangelands is so serious that not only are nomadic livelihoods threatened, China’s rivers and bai-yu monsoon rains are also experiencing increasing extremes.

By ignoring and excluding Tibet’s pastoral nomads, fencing them out of their lands and labelling them greedy, ignorant and to blame for degradation, China misses the opportunity to partner with the nomads in the work of rehabilitation. Repairing degrading grassland is labour intensive work, and also expensive. Only China’s central authorities have the finance; only the nomads have the knowledge, love of the land, the ability to live on the high plateau and do the work of remediation.

Chinese scientists are now realising the need for respecting nomad culture. In 2008 a team of seven Chinese researchers said of Tibet: “Policy makers and/or project designers must have a holistic perspective so as to integrate multiple objectives of promoting sustainable socio-economic development, preserving biological and cultural diversities and maintaining the environmentally stable balance of human society, animal population and ecosystem that has existed in the area for centuries.”

Copenhagen can provide the architecture for a global agreement, including the flow of finance from rich to poor to make the necessary changes. On the ground in Tibet, the excluded, victimised nomads can become partners with the state, implementing joint governance of the grasslands. That’s the secret of success around the world where states have stopped blaming their nomads for desertification and switched to working together in positive partnerships for development.



# IS TIBET PART OF THE PROBLEM OR PART OF THE SOLUTION?

Number 7 in a series of 10 briefings on climate and Tibet

In the accelerating global change of climate, Tibet is a substantial portion of the earth's surface. Because Tibet is remote, its six million people silenced, people sometimes suppose Tibet must be small, but the two and a half million square kilometres of the Tibetan Plateau constitute close to two per cent of the land surface of our planet. So if the land of Tibet is not part of the planetary solution to climate change, it becomes part of the problem.

Is the Tibetan Plateau naturally part of the solution, naturally a carbon sink sequestering more carbon than it emits? Or is the plateau, an area as big as western Europe, a net emitter of greenhouse gases, since it has little forest, is mostly grassland or rock, and has tens of millions of livestock, each an emitter of climate changing gases?

This calculation has been done everywhere on earth, but Tibet has been so remote it is only recently clear what part Tibet naturally plays in greenhouse gas emissions, what part industrialisation plays, and whether Tibet overall captures more climate changing gases than it emits, or is it the other way round?

Knowing the natural capacity of the grasslands, forests, wetlands and other habitats of Tibet to capture and sequester carbon is an essential starting point, a baseline in assessing Tibet's future role as a provider of environmental services for the planet, especially for the peoples of Asia who rely on Tibetan rivers and the monsoon rains generated by the annual heating of the Tibetan Plateau.

In 2006 a team of Japanese and Chinese scientists measured the air immediately above the grazed grassland of Tibet, finding that grassland does sequester carbon, naturally contributing to the urgent global need for more carbon sinks. Professor Kato and colleagues found Tibetan grassland sequesters as much carbon as do the pine forests of Finland or subalpine forest in the Rocky Mountains of the US. Since the 1980s Chinese scientists have consistently reported that soils under alpine pasturelands are generally high in organic carbon because of low temperature and well-developed vegetation as a result of natural succession, with a wide but stable variety of plant species. Although a grazed grassland may, to most of us, not look as dramatic as a forest, in fact most of the carbon biomass is below ground, a characteristic of the hardy sedges and grasses of Tibet, which are well adapted to cold, gales and grazing. According to Prof Fan, of China's Key Laboratory of Ecosystem Network Observation and Modeling, in a 2008 report, there is as much as 52 times the carbon underground in Tibetan grassland compared to the amount above ground. A typical Tibetan alpine grazing meadow is one of the world's great carbon stores.

Anywhere in the world grazing livestock produce greenhouse gases, not only carbon dioxide but also methane, and this is true of Tibet's herd of yaks, sheep, goats and horses (and wild antelope, gazelles etc). But overall, Tibet, in the sustainable state of pastureland created by nomads over thousands of years, has been a benefit to the planet, as a carbon store.

However, many scientific studies have recently shown that as Tibetan grasslands degrade, there is a huge loss of soil carbon, plus methane emissions from the dying vegetation, especially in wetlands as they dry and die. As Tibetan soils lose their carbon, due to past policy failure and climate change, they also lose the ability to hold water. Prof Xie and his global team reported in 2008 that "Our estimations suggest that soil organic carbon was lost mainly in the Northwest and Southwest part of China and mainly due to the degradation of grassland."

Although China is now the biggest emitter of climate warming gases in the world, Tibet contributes almost nothing to the total. In 2006 Chinese scientists (Cao) inventoried each Chinese province's carbon emissions, finding only the newly industrialised areas of Tibet around Xining city were significant sources of black carbon particles and organic carbon emissions.

Tibet is fast losing its historic capacity to sequester carbon, as glaciers melt, as erosion replaces living turf with bare rock, as desertification follows in the wake of industrialisation, the fencing-in of nomads, rivers are dammed and mines pile up waste. As wetlands die, in the retreat of the permafrost, methane is emitted from degrading, dying and desertifying pasture and wetlands. China has invested little in reversing or even halting this degradation, blaming it entirely on global climate change rather than past policy mistakes.

Instead of seeing Tibetans leading nomadic Tibetan lives on Tibetan lands as problematic, requiring their removal if watersheds are to be conserved, Tibetans want to be part of the solution.

The nomads of Tibet grieve, not only for their livelihoods but also for their cherished animals and for the land as they see the pasture degrade, blacken and die under the pressure of climate change, extreme weather, decades of state enforced compulsory overstocking, imposition of fencing and other restraints on nomadic mobility and flexibility, a policy of

sedentarisation and now urbanisation.

The nomads of Tibet have seldom been given a chance to show they can be part of the solution. Instead they are removed, without choice, labeled “ecological migrants” by a state that declares their subsistence economy irrelevant at a time when China’s over used rivers run short of water.

Official policies actually blame the nomads for the pest plagues, invasive weeds, pasture degradation and erosion which all undermine the nomadic way of life Tibetans pioneered 8800 years ago, according to the latest archaeological evidence.

While official policies exclude any ongoing role for nomads, NGOs working with Tibetan nomads have shown there can be fruitful partnerships engaging nomads and conservation programs. Marc Foggin reported in 2008 on the success of community co-management in Drito county (Zhiduo in Chinese), in the heart of the area China defines as its water tower which requires rigid exclusion of nomads.

An NGO called Plateau Perspectives [www.plateauperspectives.org](http://www.plateauperspectives.org) has shown how to achieve China’s biodiversity conservation goals of caring for the habitat of snow leopards, rare cranes and wild yaks, not by excluding nomads but by including them in co-management decision making, in which the nomads “promote socioeconomic development as they see fit.” In the academic journal Mountain Research & Development the nomads are clearly part of the climate change/ biodiversity loss problem: “Involving Tibetan herders in community development and conservation planning has never been a fast road to travel, but it is the only route by which a more equitable and sustainable future can be reached. Good progress in community-based development and conservation has been made—in itself a noteworthy achievement. This model for combining conservation and development in the heart of the Tibetan plateau could usefully be applied more widely in China’s grasslands, and possibly more generally throughout western China.”

That’s just one of many international NGOs doing practical work in Tibet, to improve health, raise incomes, improve farmers’ crop yields, lift education quality, conserve wildlife and maintain the viability of the nomadic way of life. NGOs in Tibet are committed to close partnerships with Tibetan communities, with Tibetans making decisions for their future. There are plenty of positive examples now of community co-management of projects which achieve China’s objectives of remediating degraded grasslands while also including Tibetans as genuine partners.

The land and people of Tibet can be part of the global solution to climate change. But right now the land is degrading, increasingly becoming a source of carbon emissions rather than a carbon sink. Right now the nomads are being rapidly excluded from the lands they curated sustainably for centuries. Only if the wider world takes interest in Tibet will China be encouraged to ensure Tibet and Tibetans are part of the solution.

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# SOLUTIONS FOR TIBET AND FOR PLANETARY HEALTH

Number 8 in a series of 10 briefings on climate and Tibet

BRIEFINGS in this series have named the many harmful impacts on Tibet of global climate warming, and official policies which blame nomads and shut them out of their grasslands.

The problems are many, global and local, due to misunderstanding and a prejudice that nomads are uncivilised, of low human quality.

However, it is not too late to repair Tibet and so guarantee once more the many environmental services Tibet provides for all of downstream and downwind Asia, from Pakistan through SE Asia to China and even Japan and Korea. The degrading pastures, eroding watersheds, dying turf, exposed black soils of Tibet can all be rehabilitated before more damage is done.

The only people who know how to inhabit the whole of Tibet are the nomads. For 8800 years they steadily expanded the rangelands of Tibet, making extensive use of all land between the lakeshores and the upper limit of vegetation below the mountain peaks. Only by working with the nomads can the land of Tibet be spared death by desertification, erosion and blizzard. Only by understanding nomads as careful risk managers can new approaches work.

One outcome of Copenhagen is finance for developing countries to reduce emissions. China is pressing hard its right to be paid to introduce energy efficient technologies. China can also invest much, in Tibet, in what it calls its “water tower”, to rehabilitate the land and lift nomads out of poverty. China can learn much from other countries which have begun to respect their nomads, no longer seeing them as unproductive and even as environmentally destructive.

New partnerships begin with learning to listen to the nomads, to appreciate their intimate knowledge of a land of thousands of plateaus, alpine and basin, summer and winter pastures, seasonal cycles, and the dynamics of the grasslands. On the basis of shared knowledge, nomadic and scientific, new policies can turn nomads from problem to solution.

How, in practical terms, can this be done? It begins with understanding the riskiness of nomadic life. The ongoing mobility of herds is essential to making best use of grass as it grows in season, while leaving enough for wild herds and for long term sustainability. This is risky, in a land where sudden unseasonal blizzards and gales occur, hailstorms can devastate crops in seconds, snowstorms can wipe out whole herds.

Nomads will not reduce their herd size—their only wealth, and insurance against disaster— unless the riskiness of their livelihoods can be reduced. In China, there is no social security, no social safety net when illness strikes a family, especially in rural areas. In a capitalist economy, users pay upfront, in full, or are not admitted to hospital. The only insurance is to save, and in Tibet savings are on the hoof. The World Bank has shown that Mongolian nomads can join insurance schemes established, at modest cost, by the central authorities, which ensure nomads can recover from disaster. The World Bank model has shown it is possible to establish insurance which is affordable both for the state and the nomads, has low administrative costs, is immune to exaggerated claims, and succeeds in giving nomads security.

With security of herds, nomads also need secure access to land. Chinese policy in the 1980s and 1990s was to guarantee secure, officially certified access to traditional grazing lands with long term tenure for many decades to come. China's farmers were given similar security of tenure in the 1980s. Although the issuing of certificates to nomads was slow, it did happen, and was intended to give the nomads incentives to care for their land. But as the 21st century began, official, policy reversed, certificates were torn up and the nomads excluded. Rehabilitation of degrading grasslands begins with trust building, enabling nomads and officials to work as partners. Now in China urban land can be privately owned, bought and sold, but rural land remains in state hands. The state can once more guarantee nomadic access to land, both pasture for overwintering and for mobile summer grazing in the alpine meadows. This means reversing the new policy of *tuimu huancao*, “closing pastures to restore grasslands”. It also means supporting mobility rather than current policy of persuading and pushing nomads to settle, with the inevitable result that herds fenced into fixed areas trample and destroy pasture.

With security, insurance and trust, rehabilitation can succeed. Native grasses can be sown onto bare black earth before gales and blizzards blow it away. Mobility is the key. If China, with international help, pays nomads to maintain mobility, and for some to regrow pasture, several objectives are achieved. China achieves its official objective of raising rural incomes, increasing domestic demand and alleviating poverty. With fewer fences and greater mobility, biodiversity protection is achieved, since migrating herds of antelope and gazelle also need mobility and plenty of room. With skilful mobile pastoralism China's watersheds are protected, degradation halted and then reversed. An active partnership between officials and nomads makes for trust and mutual respect, achieving China's primary goal of stability and harmony.

Other international institutions, including the UN Food and Agriculture Organisation, and the European Union, have shown, on the ground, in Tibet, how to build fruitful partnerships with Tibetan nomads and farmers, which succeed in

conserving nature, rehabilitating degraded areas, improving productivity and increasing the incomes of rural Tibetans, all of which are official Chinese policy objectives. The FAO team reported in 2006 on years of careful planning and consultation with Tibetans to design projects in which nomads are not the enemy of China's watershed conservation. The FAO says: "Pastoral risk management has to be incorporated into the mainstream of government development strategy. The success of watershed conservation depends on positive herder involvement. Recommended actions are: Increased government investment. Subsidy payments to farmers should include an element for supporting the maintenance of particular types and characteristics of landscape. If the government wants to protect the watershed areas in order to secure downstream land uses, and protect towns from flooding, it is right that upstream land users and especially herders should be subsidised to achieve this. Build up partnerships between government organisations and herder and community organisation. The community associations are better equipped to manage some aspects of pastoral risk management than government."

Tragically, China not only ignored these proposals but made the Tibetan nomadic victims of climate change and policy failure to blame, to be dealt with by exclusion.

No-one has ever managed to live on the grasslands of Tibet, other than the Tibetan nomads. Chinese settlers stay in the new towns, subsidised by central funding. Chinese farmers have been unable to settle Tibet. The only productive use of this enormous grassland of millions of sq kilometres is by mobile pastoralist herders whose whole way of life is adapted to mobility.

Why is it important that the open rangelands of Tibet continue to have human uses? The only alternative is to shrink human habitation to urban enclaves, transport corridors and mines, where human impacts are concentrated and destructive. In the fragile, challenging environment of Tibet, ongoing human use means a move away from exploitation, back to sustainability. Nomads maintained a subsistence economy, with few surpluses. Wild herds mingled freely with the yaks, sheep, goats and horses of the nomads. Fences were unnecessary.

The future of Tibet is as a provider of environmental services to the planet, of river water and monsoon rains to the whole of Asia, as a carbon sink covered by grasses which capture more carbon than the herds produce. An unspoiled Tibetan Plateau can continue to provide a wide range of environmental services, even as the climate warms, if there is investment in repairing the degraded grasslands before the damage is out of hand. Some areas of this earth are best suited to providing environmental services rather than industrial production, and this is true of Tibet.

#### WANT TO KNOW MORE?

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Also see readings listed in the Briefing paper on Nomads

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# CHINA, GLOBAL CONSUMPTION AND CLIMATE CHANGE

Number 9 in a series of 10 briefings on climate and Tibet

China does everything it can to grow as fast as it can, and that requires engineering the lands and peoples of Tibet to maximise Chinese production.

The industrialisation of Tibet over the past 50 years has focused on creation of resource extraction enclaves, urban centres and transport corridors to connect them all to China across great distances.

The colonisation of Tibet has been energy intensive, requiring massive external inputs to subsidise settlers migrating from China. The dependence of Tibet on artificial external subsidy deepens year by year. If China ceased trucking and railing in almost everything manufactured, from soy sauce to steel girders, from plastic shoes to glass fronted office towers, the millions of immigrants to Tibet would starve.

Worse, the nomads who made light, sustainable, extensive use of alpine meadows and pastures stretched over an area the size of western Europe, are themselves now herded off their land, their livelihoods cancelled by official order, in the name of growing more grass.

While Tibetan productivity and self-sufficiency are cut, Chinese immigrant lifestyles are subsidised to the point that, on Chinese statistics, the urban dweller of Tibet –most of them nonTibetan immigrants- enjoy incomes and consumption levels found elsewhere only in Shanghai and Beijing.

The accelerating curbs on nomad livelihoods reduce those who created the Tibetan landscape and curated its long term sustainability for thousands of years, to paupers, in cinder block reserves, suddenly useless, illiterate and unskilled in modern industrial employment.

Meanwhile China powers ahead, maximising consumption, while resisting any global treaty obligations to play its part in reducing greenhouse gas emissions. Although China is now the world's biggest emitter, it argues that the developed countries are obligated to undertake all the emission reductions for decades to come, before China will be liable for any serious action. Further, China argues strongly, at every opportunity, for multibillion dollar compensation for any moves it might make to reduce the energy used per ton of manufactured product, even though the total tonnage manufactured goes up and up and up.

China embraces a form of capitalism which assumes everyone is motivated by the selfish desire to accumulate wealth at the expense of others. Tibetans have little enthusiasm for this, preferring to regularly redistribute wealth rather than accumulating for its own sake. Yet China assumes greed and selfishness are universals, and that Tibetan nomads care only for their animals, and have no concern for the land. Thus, in order to conserve China's upper watersheds, the nomads must be expelled. This is a tragic mistake.

China boasts, in 2009, that it has successfully boosted car sales by as much as 90 per cent in a month, by providing subsidies to the rich to buy more cars, as part of the official economic stimulus package. "China's passenger-car sales surged a record 90 percent last month, as tax cuts and government subsidies spurred demand, bringing the nation closer to overtaking the U.S. as the world's largest auto market. This year, a 4 trillion yuan (\$586 billion) stimulus plan has shielded China from the global recession, helping car sales jump at least 45 percent for four months in a row. Surging demand helped China's biggest privately owned carmaker, to double profit in the first half." (Bloomberg 9 Sept 09)

China's new rich are in command. They say publicly this is the best opportunity for wealth accumulation in 5000 years of Chinese history, and nothing should get in the way. Environmental costs can be sorted out some time in the future; right now the precious opportunity to get rich is all that matters.

Where does Tibet fit into all of this? Northern Tibet (Amdo in Tibetan, Qinghai in Chinese) was industrialised over a generation ago. From the arid rangelands of Amdo, especially the Tsaidam Basin, China has for decades extracted 2 million tons of oil a year, pumped and railed straight to Chinese refineries. The salts of the many

dry salt lake beds of Amdo have been excavated for industrial salts, including potash, magnesium and lithium salts as well as ingredients for manufacture of chemical fertilisers, pesticides and plastics. Extraction of boron (for use in cooling nuclear reactors) and asbestos, fatal to human lungs, have persisted for decades. More recently gas has been found close to the oil fields, and is now extracted in huge amounts, again piped straight to Gansu in China.

South-central Tibet, further from China, has been slower to develop extractive industries. But now there are chromite mines –the only domestic source of chromium in China- and several mines digging up copper, gold and silver. These are now on such a scale they require huge state subsidies to provide the rail network, power supply, urban infrastructure and workforce for such remote areas.

All aspects of Chinese colonisation of Tibet are energy intensive, unsustainable, expensive, are almost always state financed and transfer massive profits to factories processing Tibetan raw materials, with little employment or financial benefit going to Tibetans. Chinese economists identify the sum total of state subsidies and state favouritism for its biggest state owned manufacturing corporations, as a major distortion, accounting for much of China's rise, exaggerating the cheapness of its manufactures and high profit margins.

In the name of building “national champion corporations”, bulking them up to world scale, China's central leaders intervene powerfully in the market, nakedly favouring the most favoured, at the expense of the poor, the remote and the ethnic minorities.

Senior Chinese economist Yiping Huang has quantified the total cost of all these subsidies, the endless willingness of the state to build and pay for the dams, powerlines, rail tracks, urban centres that maintain immigrant settlement in Tibet. He also identifies the official policies that extract as much tax from the peasants and other poor people, while repressing any inclination of workers to organise to obtain their legal minimal rights at work. He includes the systematic rigging of prices of raw materials and electricity at artificially low levels, to maximise corporate profits.

This is where Tibet fits in to China's gradual shift, away from the coast, to inland manufacturing hubs which will remain low-cost centres for world factory production for decades to come. China calls this policy xibu da kaifa, opening up the west, announced first in 1999. In China's western half, the most favoured city is Chongqing, the most direct beneficiary of the Three Gorges Dam on the Yangtze River. Facing east, downstream, Chongqing can now manufacture and export motorbikes, cars and many other manufactures, on heavy ships, straight downriver to Shanghai and the world. Facing the other way, to the west, upstream, is the source of Chongqing's fact accumulating wealth. The Yangtze rises in Tibet, and China is building several rail lines to improve resource extraction access to Tibet. Copper, gold, silver, chromite, oil, gas and many other minerals will be extracted from Tibet on a much bigger scale than now, according to official Chinese announcements.

If these mines, waste dumps, rock crushing plants, chemical concentrators and even smelters in Tibet at least trained and employed a substantial Tibetan workforce, one could argue there is some benefit. But the reality is that all Tibetans get is the waste dumps, the tailings and toxic residues. In the case of Canadian miner Continental, due to begin extraction from its mine near Shigatse in southern Tibet in 2010, copper concentrate containing only 25% actual copper will be longhauled 2000 kms to a Chinese state owned smelter, only to have three-quarters of all rock transported dumped as waste. The amount of diesel fuel needed to haul trainloads of waste across Tibet, in high altitude thin air that makes engines burn poorly, is extraordinarily wasteful.



# WHERE TO FROM COPENHAGEN?

Number 10 in a series of 10 briefings on climate and Tibet

For Tibetans, and for China, the road from Copenhagen diverges.

Tibetans hope Copenhagen is the beginning of global awareness that Tibet is unique, plays a key role in global climate, especially in generating the Asian monsoon, and in feeding almost all of Asia's great rivers. The Tibetan Plateau is 1.7% of the planet's land surface, a huge island kilometres above all surrounding lands and seas, exerting a profound influence, even on the north Pacific and Atlantic Oceans, according to the latest science.

Despite serious and widespread degradation of Tibetan grasslands in recent years, due as much to policy mistakes as well as climate change, Tibetans are hopeful the eroding pasture land can be rehabilitated.

To restore the fast degrading rangelands will require investment, to guarantee the ongoing provision of environmental services to all peoples downriver and downwind from Tibet. The much needed investment in pasture improvement and nomadic livelihoods has not come from China, which instead invests only in cities, mines and transport corridors in Tibet.

The developed countries at Copenhagen express willingness to assist developing countries to conserve their carbon sinks, guaranteeing their long term future. The willingness of rich countries to pay for environmental services could, if done skilfully, enhance the livelihoods, mobility and sustainability of Tibetan pastoral nomadism, while repairing the grasslands and caring for the water catchments. The prospect is for a true win/win.

But there is a great danger here, because China takes a divergent path from Copenhagen. The very worst that could happen is that, through misunderstanding, international investors actually reward China for coercively excluding nomads from the pastoral plateaus of Tibet. Right now, China is tearing up the long term land rights certificates it issued to Tibetan nomads only two decades ago. The cancellation of long term secure land tenure is part of a new Chinese policy, which has as its sole aim the conservation of the upper watersheds of its great rivers. Instead of achieving this in active partnership with the nomads who have cared for the upper rivers for centuries, the nomads are compulsorily removed, to lead useless lives in cinder block barracks on the edge of their ancestral lands, with no employment prospects, no training in new skills, subsisting on survival rations from the state.

That's tragedy enough, removing productive communities, negating their intimate knowledge of the land, turning nomads into surplus humans, internally displaced in their own country. To make it worse, they are officially labelled "ecological migrants."

That Orwellian inversion of truth hides the reality that the nomads are not voluntary migrants willingly leaving the only life they know, for the greater good. They are coerced and compelled to leave, as several reports have shown. Nor is their removal, and the removal also of all their herds, necessary to attain the ecological goal of conserving the upper reaches of China's great rivers, the Yellow and Yangtze.

Since the nomads are not permitted to speak, there is a danger China could seek payment for having expelled its nomads, and receive rewards for its decades of policy mistakes, beginning with drastic increases in herd size, decades ago, at state insistence.

The current policy of "closing pastureland to restore grassland" (tuimu huancao) is the latest in 50 years of mismanagement of alpine grassland habitats China has little knowledge of historically. Since the 1960s China insisted on increasing herd size far beyond the carrying capacity of the land, while at the same time slaughtering wild animals (gazelles, antelopes, blue sheep, snow leopards) in huge numbers. Since the 1980s China's policy has been to "civilise" the nomads by requiring them to settle into a sedentary life, fenced in, with little room to move, on land too small to maintain herds that need mobility to avoid overgrazing. Little was invested to halt rangeland degradation, but much was spent on poisoning burrowing rodents which are keystone species essential to the entire ecosystem, whose occasional population explosions are actually symptoms of rangeland degradation, not its cause. Another policy mistake.

Further mistakes were made when nomadic pasturelands were dammed and irrigated, excluding nomads in favour of immigrant peasant settlers on tiny plots. On the largely arid Tibetan plateau, the official capture of key water sources undermined nomadic mobility.

While Chinese farmers were granted secure long term land rights in the 1980s it was only in the 1990s that most Tibetan nomads had land returned to them, but those contracts were torn up in this century. Far from working as partners with the nomads, China has consistently viewed nomads as ignorant, primitive and of low human quality, to be governed by decree, from afar. The nomads experience the state as a greedy source of rent-seeking taxes, onerous compulsory labour demands, incomprehensible slogans and policies, penalties and punishments.

Out of this mutual mistrust the new policy of “closing pastures to restore grassland” has come. It is based on observing the rapid acceleration of desertification and degradation across the rangelands of the Tibetan Plateau. Instead of acknowledging past policy failure, the nomads are blamed, as if they are so ignorant and selfish as to trash their own lands.

The new policy is also based on oversimplified science, expressed in the official slogan that “there is a contradiction between grass and animals.” The reasoning is simple: if nomads and their grazing herds are removed, grasses will grow longer, thus conserving and repairing degraded grassland, thus protecting the great rivers of China.

In reality, steady sustainable grazing, as practiced by nomads for thousands of years, does not cause degradation. The accelerating degradation of recent decades, after China took control, has no historic precedent. The tough grasses of Tibet keep most of their living matter (and stored carbon) underground, safe from the teeth of yaks and sheep, beyond the biting cold and wind. The root-to-shoot ratio can be as high as 50 times as much below ground compared to what can be seen above. That is one example of the uniqueness of the Tibetan grasslands, well understood by nomads but invisible to outsiders until very recently.

The official herding of Tibetan nomads off their land is tragic, a mistake as big as the removal of American Indians and Australian Aborigines to reserves over a century ago. Americans and Australians now see their mistakes, even if correcting them is very hard. China makes a similar mistake, but with a 21st century utterly misleading label: “ecological migrants.”

If the industrialised countries at Copenhagen, the historic greenhouse gas emitters, are willing to pay developing countries to conserve forests and watersheds, such payment should go direct to those who actually provide the environmental services, not the central state. In Tibet, this means paying local Tibetan communities to repair their grasslands, care for rivers, maintain water purity, and maintain the nomadic mobility that ensures a light touch on each grassland, moving on before rangeland pastures are damaged.

Tibetans are keen to attract investment finance which will enable them to plant grass seeds on bare black degraded earth, and to continue living mobile pastoral lives that are both productive and sustainable. Rather than rewarding China's central authorities for expelling “ecological migrants”, payments can benefit the people who can do the actual work of carbon sequestration on the rangelands, if the finance is channeled through the many international NGOs working on the ground in Tibet.

#### WANT TO KNOW MORE?

A hyperlinked list of NGOs operating in Tibet can be found at: <http://www.cwru.edu/affil/tibet/NGOProjects.htm>

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