A green re-awakening for the blackened magic of the Gobi

***Omar Sattaur** meets Mongolians learning the value of ancient conservation laws*

THE GOBI is magical, even for Mongolians. Its intense sunshine, with temperatures of up to 45C (113F) in summer, conjures up mirages of lakes when there is nothing but grey-brown gravel. When you least expect it, you may come across a round felt tent, or *ger*, with a herd of two-humped (Bactrian) camels lazing outside.

People in Ulan Bator will tell you not to miss the dunes of South Gobi, especially at sunset when they glow like liquid copper. But the magic can turn black if the dunes expand, driving away the little vegetation and water, as the people of South Gobi province have discovered.

In the 1970s, a farming co-operative in Dond Gobi, the province directly north of South Gobi, began to grow vegetables. The farmers diverted a river to provide them with irrigation water for their project. By the early 1980s, a lake in South Gobi province began to shrink.

At that time, there was little environmental awareness in the provincial governments, each one a rule unto itself. No government would consider, for example, that its mountains could affect lakes and rivers in neighbouring provinces. The lake was drying up because the river that fed it had been diverted, but few in South Gobi knew about the Dond Gobi vegetable project. The lake eventually disappeared.

Four other Gobi lakes have gone since the 1970s. The public outcry that followed their disappearance prompted the government in 1988 to form a new Ministry of Environmental Protection.

Now there is a fledgeling Green movement, too: following the pro-democracy protests in the winter of 1989 and spring this year, new political groups apart from the ruling Communist party became legal.

For many Mongolians, concern for the environment is part of rediscovering their culture. Mongolia's ecological conscience was alive and well even at the turn of the eleventh century, when it passed the world's first law to protect the environment. The country's strong Buddhist history contributes to its ecological awareness, too. Buddhism has a strict code of conduct that prohibits, for example, the polluting of a river with waste. But finally, the technology that Mongolia hoped would transform its agrarian society scarred the land. Many Mongolians now blame socialism.

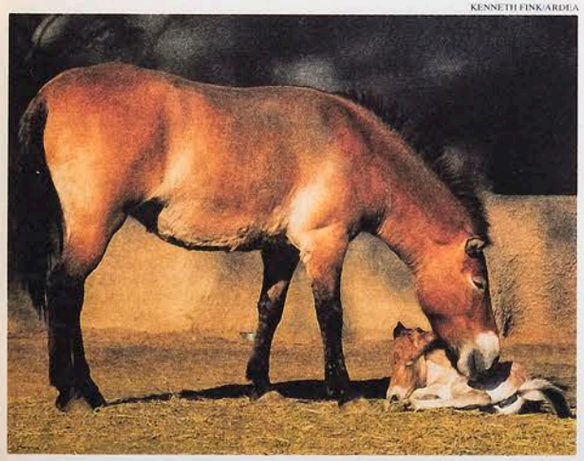
Since its revolution of 1921, Mongolia has looked to the Soviet Union for technology, which has developed its industrial base. But pollution has arrived, too: you choke at night in the fumes of partially burned, unrefined brown coal. Mongolia's imported Comecon technology is either ecologically dirty or culturally inappropriate, or both.

"Development" in the Gobi over the past 70 years has changed the landscape. Behind the romance of the desert is the harsh reality of an inhospitable land. Winter temperatures plummet to minus 40C; droughts are frequent; sandstorms and twisters can spring up without warning.

Perhaps because they live in such an unforgiving and unpredictable climate, nomads have learned a valuable lesson. They know how to adapt to the ecosystem rather than attempt to dominate it.

For example, they usually burn animal dung for heating and cooking, but at one time they also used a wood called dzag (known botanically as *Haloxylon ammondendron*). They had evolved laws to conserve dzag forests which prohibited grazing and the cutting of living wood. One South Gobi pastoralist claimed that, when he was a young man, "there was so much dzag that it was difficult to travel by camel". But as building in the desert increased, the demand for fuel and dzag wood rocketed. Within a single lifetime, the land changed dramatically.

KENNETH FINK/ARDEA



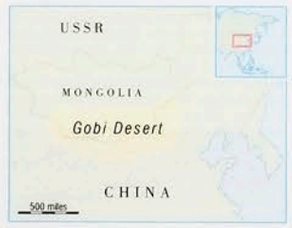
Dzag, or black sacksaul as it is also known, tolerates high temperatures, salty water and droughts. It changes to suit the environment – the perfect tree for the Gobi, where the intense heat can evaporate the water to leave a patina of salts on the soil. The wood is said to burn as well as brown coal; its foliage is good livestock fodder and it provides shelter under which other plants can grow. Perhaps most importantly, it stabilises deserts. The trees prevent erosion by the wind and hinder the expansion of the sands.

By 1970 the government had recognised the importance of dzag in limiting the spread of the desert. Chimeddorjiin Chuluun, who heads the Department of Environmental Protection in South Gobi province, said that the Bayan Dzag, a forest whose name translates to "rich in dzag", had shrunk considerably. Some of the other dzag forests in the province had disappeared altogether, he said.

The Ministry of Environmental Protection has already begun to make a positive impact. Its man in South Gobi, Nyamyn Hishgee, is passionate about the Gobi trees, especially the jigd tree: "When the jigd tree blossoms, the whole town smells nice." The regional capital of Dalandzadgad lost all its jigd trees. Hishgee started to replant them in 1971. He told me that jigd is not only Mongolia's rarest tree, but the "rarest in the world".

Elaeagnus angustifolia turns out to be native to China, Soviet Mongolia, Afghanistan and Kashmir and is widely planted all over Europe, the United States and Central America. Hardly the rarest in the world, but I can appreciate why jigd must have had such a special place in Hishgee's mind.

The tree has all sorts of uses. Jigd wood makes good furniture. Mongolians dry its berries and eat them as we would raisins, and Soviet factories produce 13 litres of spirit from each kilogram of the sweet fruit. The berries ease stomach pains, the leaves are said to be good for the lungs, and the roots and stems are supposed to cure colds and flu. The tree fixes nitrogen from the air into the soil, replenishing it and increasing its fertility.



Apart from deforestation, Mongolia faces other environmental problems as a direct result of technology unsuited to its terrain. For many years, farm co-operatives in the steppe broke the land with inversion ploughs, which turn the soil upside down to create deep furrows.

The soil on the steppe is just 5 to 10cm deep because the hard granite underneath takes so long to weather. The dry climate and strong winds blow the soil away. The country's 120 million hectares of pasture are already overstocked. The Greens estimate that almost all the land under cultivation is degraded; Davaajii Basandorj, chairman of the Mongolian Greens and a lecturer at the Institute of Civil Engineering, claims that 230,000 hectares have been completely destroyed.

The lack of metalled roads in almost all the country has allowed clanking juggernauts to churn up and destroy half a million hectares of land. In the cities, people wear home-made surgeon's masks to keep out the exhaust fumes and dust. In the windier seasons of spring and winter, the dust level peaks at two to three times the permissible level and people suffer from sore throats and runny noses.

The two power stations in Ulan Bator burn brown coal inefficiently and belch black wastes directly over the city. The 40,000 tents scattered around the edges of the capital do the same thing on a smaller scale. At Erdenet, 240km north-west of Ulan Bator, is a vast copper mine built by the Soviet government. The copper comes from a hill that has been systematically sliced away over the past 12 years.

At Sharyn Gol, 150km east of Erdenet, the incidence of respiratory diseases is almost double the national average. The dust from the opencast coal mine there is giving people the lung disease emphysema.

None of the water used domestically or by industry is recycled. Wastes go untreated into lakes and rivers. The water is contaminated with heavy metals, oil products, phosphates and nitrates. The vice-chairman of the Green party, Monhtuushinjiin Ganbat, said that ammonium and nitrate levels were 40 to 50 times the permissible limits.

The ground water in the capital is running low. Wells are falling deeper than 70 metres and the administration has been forced to sink another 30 to cope with the extra 89,000 cubic metres that people in the city demand every day.

Because of its diverse geography, Mongolia has a rich and varied wildlife. But the natural wealth has also been squandered as people have begun to recognise the rarity value of certain species to wealthy American, European and Japanese hunters.

The Greens claim that the population of Mongolian antelope, *Saiga tatarica mongolica*, which numbered three million in the 1940s, has now plummeted to one tenth of that. Nine species of bird and 38 plant species are on the verge of extinction, but perhaps the best-known casualty of modern times is Przewalski's horse.

Nikolai Mikhailovich Przewalski, a Russian explorer in the late 1870s, described the discovery of a species of horse new to humankind. In Western Mongolia, he came across a dun-coloured animal resembling a coarse pony. He promptly shot it and presented its hide and bones to a museum in St Petersburg.

Przewalski had discovered a new species, now called *Equus przewalskii*, which has two chromosomes more than the domestic horse, *Equus caballus*. (Chromosomes are bundles of genes found in body cells, and they always come in paired sets. The number of chromosomes is a distinguishing feature of a species.) This type of horse was last sighted in Western Mongolia in the 1960s, although there are about 1,000 animals in captivity around the world. The Mongolians now want to reintroduce the horse to the West Gobi. Marwell Zoo, at Winchester in Hampshire, and Whipsnade have about 100 of the animals between them.

John Knowles, director of the Marwell Preservation Trust, which owns and operates the zoological park, is working with Mongolian scientists to achieve the reintroduction, but there are problems. It cannot be a true release because the wild animals mate successfully with domestic horses. It is a "biological misfortune", as Knowles puts it, that the hybrids are fertile.

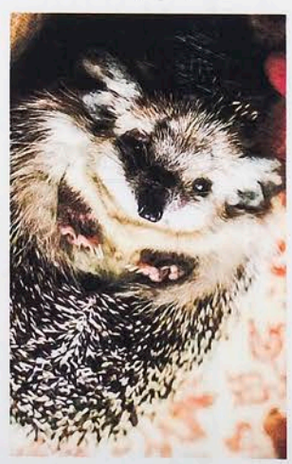
Each male controls a harem of 10 mares. Since the ratio of males to females at birth is equal, the losing stallions will seek domestic mares to make a harem. The result would be the loss of the distinctive genetic characters that make Przewalski's horse unique.

Scientists also expect that the rarer genes will have been lost after 90 years in captivity. But according to Georgina Mace of the Zoological Institute, since the pedigree of every animal is known, it is possible to estimate how many genes should have been lost. Mace says many of the rare genes are still present, while Knowles observes that the animals still show some primitive instincts – such as co-operating to fight off a pack of foxhounds, as they would probably have to fend off wolves in the Gobi.

The idea is to fence off an area for 12 horses in the first year, then add to them over the following three to four years from collections all over the world. The project will cost about £1m to start up, but Knowles says the Mongolians are very keen. He is going to visit the proposed site in October, when he hopes he can help to reinstate Przewalski's horse and return some of the magic of the Gobi.

TIM MALYON

The sand dunes of the Gobi glow like liquid copper at sunset, but their beauty belies the threat they pose when they spread to the greener and more fertile areas of Mongolia (above left), destroying much traditional vegetation



Mongolians plan to reintroduce Przewalski's horse (left), discovered by a Russian explorer in the 1870s and now found only in captivity, to the Western Gobi with help from Marwell Zoo at Winchester. The animals are genetically distinct from other horses and still show primitive instincts such as co-operating in packs to fight off foxhounds. They were last sighted in Western Mongolia in the 1960s. Nyamyn Hishgee (right) believes passionately in the reintroduction of the jigd tree and the dzag tree (centre right), the perfect species for the Gobi, where nomads had once evolved rules to conserve it. Reforestation can help to stop the encroachment of the desert, which threatens some of the unique animal life of Mongolia, such as the long-eared hedgehog (far right). Imported Comecon technology, with its choking fumes from brown coal, has proved ecologically damaging and culturally inappropriate for the centuries-old agrarian society