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-"Unbearable Legacies: The Politics of Environmental Degradation in North Korea"
By Peter Hayes

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I. Introduction

Peter Hayes, Executive Director of the Nautilus Institute, writes, "There is no shortage of options, and an infinity of needs. And ways exist to work around the barriers that divide North Korea from the rest of the world. There's no time to wait, or these enduring legacies will become unbearable, and feed into a vortex of chaos and collapse in North Korea, with unimaginable consequences for humans and nature alike."

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II. Report by Peter Hayes

-"Unbearable Legacies: The Politics of Environmental Degradation in North Korea"
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Nearly 15 years ago, I wrote Enduring Legacies: Economic Dimensions of Restoring North Korea's Environment. This essay not only described a set of urgent environmental problems in North Korea, but also described its institutional and legal framework for environmental management. At the time, I had no idea that so many years would pass with no improvement in North Korea's situation. It has actually become far worse than I could then imagine.

In 1994, I led a UN mission charged with helping North Korea to compile its first greenhouse gas emissions inventory for its national report under the UN Framework Convention on Climate Change, which North Korea had signed. Part of the justification

for providing Global Environment Facility (GEF) funding for greenhouse gas reduction projects in North Korea was the creation of other benefits such as biodiversity. For this reason, I was looking into reforestation in North Korea as a way to capture carbon from the air as a way to preserve and restore biodiversity.

I was talking over dinner with the head of North Korea's biodiversity program about such a project. He offered to pour me a shot of liquor from a bottle containing a snake. I demurred but he insisted, saying the snake liquor for public sale was low grade whereas this one — a snake with a diamond head not a square one — was the real thing, made from a rare and endangered species!

The following year, I sent another GEF mission to North Korea to inspect forests. North Korea provided extraordinary field access to the proposed fast-growth forests (in the sensitive northeastern mountains), provided scads of data and answered many penetrating questions by one of the world's leading development foresters. The project worked its way through the GEF system, receiving positive reviews, only to be withdrawn from final consideration by GEF's Governing Council.

The reason? It was the year that conservative US Senator Jesse Helms had taken the US budget hostage, and the US Treasury Department wanted no red flags at GEF that might draw that bull to charge. A quiet word by the US representative on the Governing Council was enough to pull the plug, and the project was quietly killed, even though North Korea had met or exceeded all requirements.

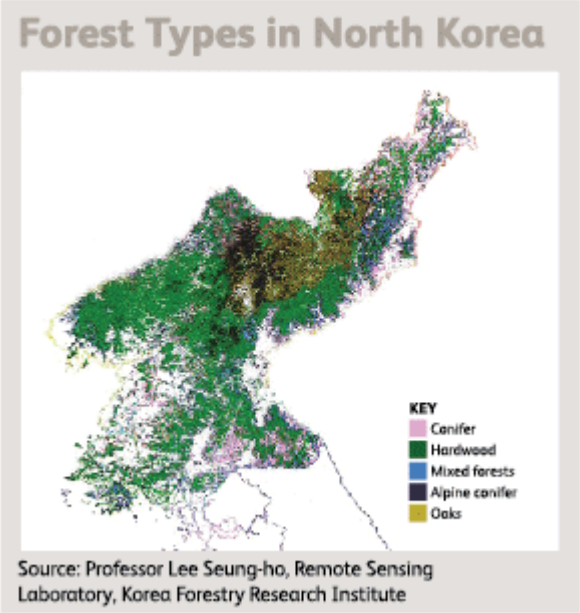
In the years since then, North Korea has experienced extraordinary floods, famines and bushfires (many caused by drooping aluminum power lines setting fire to trees). North Korea is also afflicted by being downwind and close to China, thereby experiencing high levels of acid rain; and by climate change that may aggravate already extreme weather on the peninsula. But the bulk of the environmental losses and vulnerability experienced by North Koreans derives from the disastrous state of its economy and the mass poverty of the population, the shriveled status of its administrative and institutional capacities, the high levels of tension created by the nuclear issue and the continuing division of the Korean Peninsula.

One of the most acute environmental problems in North Korea is deforestation. This problem has a long history, stretching back to over-cutting by Japanese colonialists, the impact of the Korean War and poor reforestation practices by North Korean agencies. The reforestation effort relied on mobilized adult and youth mass labor units working with simple tools. Specialized nurseries and well-trained foresters grew seedlings, but without good fertilizer and seed stock, the success rate was small, especially on steep, north-facing slopes.

These basic problems were made worse by land-use decisions in the early and mid-1990s when food shortages led authorities to direct farmers to cultivate steep slopes, to convert forested areas into agriculture, and in some cases, to actually re-engineer landscapes. When unprecedented floods hit North Korea, much of the topsoil in these areas was

washed downstream (also thereby silting up many of the run-of-the-river hydro-electric dams in North Korea).

Is it possible to estimate the scale of the reduction in North Korea's forest resources? In 1990 North Korea reported that it had about 9 million hectares of forest out of about 12 million hectares in national territory. In 1994, the GEF forester who I sent to North Korea estimated that the nominal North Korean forest in 1993 actually was about 9 million hectares, but that only 7.8 million hectares were "in practice" forested. Overall, North Korea itself says that its forests are about 42 percent coniferous, 35 percent deciduous/hardwood species, and 23 percent mixed conifer and deciduous forests. Pine species dominate the coniferous forests, and oaks dominate the deciduous species. However, the conversion and usage described below may have shifted these ratios far from the official figures.



Source: Professor Lee Seung-ho, Remote Sensing Laboratory, Korea Forestry Research Institute

Luckily, these days we don't have to rely on official North Korean data to estimate the country's forest cover. Both international and South Korean remote sensing techniques using satellite imaging have been used to evaluate the status of North Korea's forests. Using these sources, Professor Lee Seung-ho from the Korea Forestry Research Institute in Seoul has estimated North Korea's total forest cover as follows: 9.77 million hectares (Mha) in 1970 (North Korean source), 8.97 Mha in 1987 (FAO source), 8.45 Mha in 1994 (KFRI Satellite Image Analysis), 7.53 Mha in 1997 (North Korea from UNDP Round Table Meeting) and 7.53 Mha in 1999 (KFRI Satellite Image Analysis).

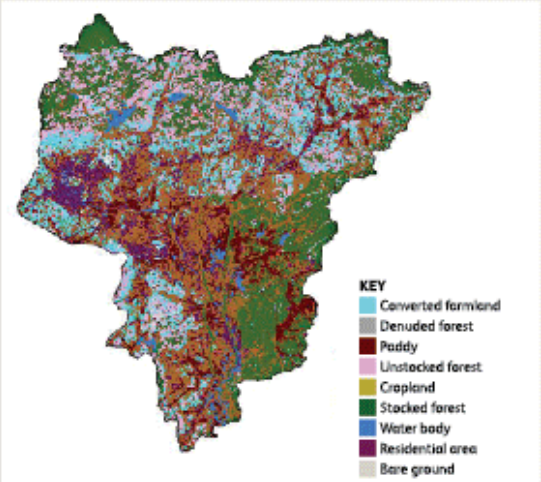
An additional time-series of North Korea's forest area from the UN FAO 2005 Global Forest Resource Assessment shows a trend from 8.20 to 6.82 to 6.19 Mha in 1990, 2000, and 2005, respectively.

A very local snapshot of this trend from 1999 (using Landsat) and 2004 (using Quickbird) in the Kaesong area is shown on the previous page and reveals the rapid conversion of forested areas into agricultural and other uses shown in Table 1 — a pattern replicated in many parts of North Korea.

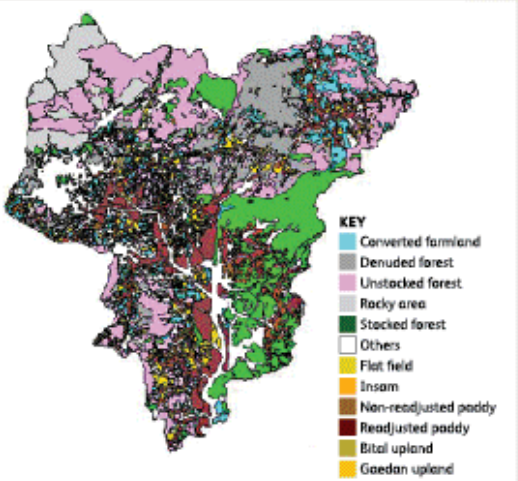
FIGURE 1

Land-type maps created from satellite images of the Kaesong Area in the DPRK

Landsat 1999



Quickbird 2004



Source: Professor Lee Seung-ho, Remote Sensing Laboratory, Korea Forestry Research Institute

TABLE 1

Land-type data from remote sensing studies of an area of DPRK, 1999 and 2004

CLASS	LANDSAT™ (1999)		QUICKBIRD (2004)	
	Area (ha)	Ratio (%)	Area (ha)	Ratio (%)
Stocked Forest	8344.08	23.23	5124.91	17.93
Unstocked Forest	4345.11	12.09	7791.51	27.25
Converted Farmland	4186.44	11.65	2470.97	8.65
Denuded Forest	753.93	2.10	3754.73	13.13
Rocky Area	–	–	1828.37	6.39
Paddy	2834.64	7.89	4574.85	16.00
Cropland	11574.18	32.22	2921.62	10.22
Others	3882.06	10.81	127.76	0.45
TOTAL	3592.44	100	28594.72	100

Source: DPRK State of Environment

Why does the area and status of North Korea's forests matter? First, forests have essential environmental functions. These include maintenance of watersheds by capturing, slowing and cleansing rainwater for downstream use, including human drinking water, irrigation, and industry; provision of habitat for most of the wild animals and plants that survive in North Korea; supply of key ingredients of traditional medicines, all the more essential at a time when many man-made pharmaceuticals are unavailable in North Korean clinics and hospitals; and as a source of substantial supplementary food scavenged by adjacent rural populations who have access to forests (unlike rice growing areas in the southern and coastal areas).

Second, rural populations use forests for wood fuels that substitute for coal and agricultural wastes formerly used for heating, cooking, and fertilizer, but that are now diverted to survival energy needs. Finally, forested mountains are culturally important to Koreans, embodying the spirit of the Korean soul. Not only has the total forested area fallen by roughly one-third over 15 years leaving denuded and poor quality agricultural

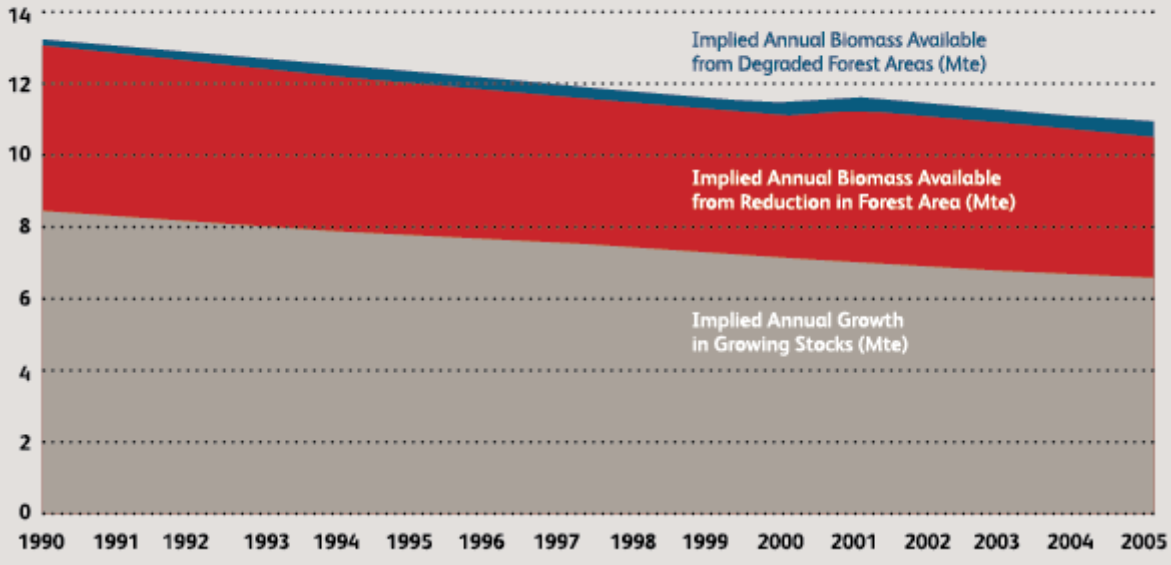
land in its stead, but much of the remaining forest is also degraded by these multiple uses. I will now briefly visit each of these aspects in greater depth.

North Korea has rich biodiversity including many species that are endangered. It also supplies habitat to a number of migrating species, especially birds such as the cranes that fly from Japan via Korea to Siberia and beyond. As a signatory of the Biodiversity Treaty, North Korea declared in its 2003 State of the Environment report1 that for higher vegetation, it has 10 critically endangered species, 42 endangered species, 76 rare species and 26 species of region-based populations, giving a total of 158 species, representing 4 percent of threatened higher vegetation species worldwide. In the case of vertebrates, 9 critically endangered species, 29 endangered species and 119 rare species account for around 11 percent of global vertebrate species under threat. The degradation of ecosystems and forests due to land-use conversion combined with unregulated extraction of forest resources are the primary cause of the threat to so many species. How much of the conversion today is due to local demand, and how much to the cutting and exporting of timber to China, is an important but unknown factor.

The second dimension of economic sustainability that links human survival to forests in North Korea is the use of fuel wood. Various analysts have looked closely at the use of biomass in North Korea. Nautilus analysts have reviewed all these sources in detail and find that the total available woody biomass in North Korea decreased from over 13 million tonnes in 1990 to just under 11 million tonnes in 2005, but of those totals, about 4 to 4.5 million tonnes were biomass from forest areas cleared for one purpose or another. (See Figure 2)[2]

DPRK truck powered by a coal (and/or biomass) gasifier.
Source: Nautilus Institute

FIGURE 2 **ESTIMATED TREND IN SOURCES AND AMOUNT OF WOODY BIOMASS AVAILABILITY IN THE DPRK, 1990 to 2005**



Separately, we have reviewed estimates in North Korea of wood fuels usage. Official North Korean estimates set wood for charcoal production at 0.8 to 1 million m3, wood for construction at 3-5 million m3, and approximately 500,000-650,000 m3 for industrial fuel wood and for paper production. Based on our assessment of North Korea's forest resource base (see Figure 2), we use lower estimates for 1990 in some of these categories — 650,000 m3 wood for charcoal production, and 1 million m3 wood for construction — but use 650,000 m3 for industrial fuel wood and for paper production. Overall, we estimate that today, fuel wood (as wood and converted to charcoal) accounts for about a quarter of North Korea's primary energy supply — about the same as South Korea in 1965.

This data suggest that by 2005 some 35 percent, at least, of North Korean biomass use was unsustainable—that is, cut from forest stocks, not from annual forest growth. Our estimate for total wood use for all purposes in North Korea in 2005 is 5.6 million tonnes. Thus, it appears that North Korea's population is already using the bulk of the nation's available supply of wood as fuel and for other uses. North Korea's government has undertaken massive reforestation projects with mixed results, but clearly reforestation and related forest and soil conservation activities constitute an area where international assistance and capacity building would be useful. Reforestation for carbon capture is an area that developed countries could finance in North Korea using the Clean Development Mechanism, thereby introducing a climate change driven solution to North Korea's deforestation problem.

Mountains and forests also hold a special place in Korean culture and spiritual life. Thus, it is significant that even in and around the world heritage site of Mt. Paekdu — a symbol of Korean nationalism and the legendary birthplace of Kim Jong-il — rapid and significant degradation is observable.

Agricultural activities around Paektu San

September 1977

September 1999

20 Kms Source: UN Environment Program

These two satellite images reveal the degree to which agricultural activities have expanded on and around Paektu San (Mt. Paekdu), particularly on the North Korean side of the border, where intensive land development has served to both increase food production and underscore North Korea's territorial claims. In these images, green represents natural vegetation while grayish-brown areas are bare agricultural lands in which crops have not yet emerged from the soil.

Areas of deforestation and other types of land clearing appear pink and are dissected by the fine lines of mountain streams. Near the center of the more recent image, there is further evidence of land-cover change along the border between the two countries where a dam has been constructed.

CONCLUSION

There are many other critical environmental issues in North Korea. The country, it turns out, is still producing globally significant amounts of persistent organic pollutants such as DDT (about 230 tonnes per year) and similar pesticides that accumulate in food chains and ecosystems thousands of miles downwind.3 Disposal of toxic wastes, work-place occupational health and safety, acid rain, greenhouse gas emissions and many other environmental issues must be solved in North Korea.

The results of these efforts will be a long-term legacy that will be inherited by a future generation of Koreans. They will have to preserve what's left of wild North Korea; conserve what's in use; and restore what has been abused. The continued isolation of North Korea has led to a rapid degradation of the ecological assets that existed at the end of the Cold War, and it is certain that the fastest way to destroy what's left of North Korea's ecology would be war.

Many of these ecological issues are technical and apolitical, and even at the height of international tensions due to the nuclear issue, North Korea's leadership has kept them separate and accepted external engagement and assistance. Should a way forward emerge at the geopolitical level to resolve the nuclear issue on the Korean Peninsula, many environmental issues will become channels for cooperative engagement between North Korea and external agencies.

Perhaps the ultimate ecological agenda will be realization of a vision for the future of the Demilitarized Zone, with a coalition of South Korean and international agencies arguing that a

"peace park" should culminate in a set of biodiversity corridors that stretch from North Korea's borders with China and Russia to the north, to the tip of Jeju Island in the South.4 So far, North Korea has given no sign of interest in this concept, trespassing as it does on the Korean People's Army turf. But more than 100 peace parks exist in conflict zones around the world, and if tensions fall, perhaps even the KPA will support a constructive agenda for managing this still-wild area that crosses the peninsula.

Meanwhile, many small and urgent steps can be taken to reduce the rate and scale of environmental damage in North Korea due now as much to grinding poverty as to institutional failures in the past.

Perhaps the DMZ peace park could start with a joint US-North Korean-Russian project on avian flu sampling in the Tuman River wetlands. Other options include sustainable livelihood projects that restore habitat for migratory birds — at least one of which is already underway; eco-tourist projects wherever pristine habitats remain; sustainable agriculture; renewable energy; and climate mitigation and adaptation projects, especially at the community and city levels.

There is no shortage of options, and an infinity of needs. And ways exist to work around the barriers that divide North Korea from the rest of the world. There's no time to wait, or these enduring legacies will become unbearable, and feed into a vortex of chaos and collapse in North Korea, with unimaginable consequences for humans and nature alike.

Peter Hayes is Director, The Nautilus Institute for Security & Sustainability, Center for the Pacific Rim, University of San Francisco. He is a member of the Editorial Board of Global Asia.

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III. Footnotes

1 UN Environment Programme, North Korea State of the Environment Report,2003, at: http://www.unep.org/PDF/DPRK_SOE_Report.pdf

2 D. von Hippel and P. Hayes, Fueling DPKR Energy Futures and Energy Security: 2005 Energy Balance, Engagement Options, and Future Paths, Nautilus Institute, p. 150, at: http://www.nautilus.org/fora/security/07042DPRKEnergyBalance.pdf

3 UNITAR, Germany, Switzerland, and the Secretariat of the Stockholm Convention, Consultation on Issues Related to the Stockholm Convention on Persistent Organic Pollutants in the Democratic People's Republic of Korea (DPRK), Shanghai, People's Republic of China, 24-25 Nov 2008, p. 8, at: http://www.unitar.org/cwm/node/226

4. H.Healy, "Korean Demilitarized Zone: Peace and Nature Park," International Journal on World Peace, Vol.24, No.4, December 2007, pp.61-83.

IV. Further Reading

P. Hayes, Enduring Legacies: Economic Dimensions Of Restoring North Korea's Environment, prepared for the Fourth Annual International Symposium on the North Korean Economy ,Center for North Korean Economic Studies, Korean Development Institute, Seoul, October 18, 1994, at: gc.nautilus.org/Nautilus/about-nautilus/staff/peter-hayes/cv/1994/north-korea-environment.html/richdocument_view

D. von Hippel and P. Hayes, Fuelling DPRK Energy Futures and Energy Security: 2005 Energy Balance, Engagement Options, and Future Paths, Nautilus Institute, p. 150, at: www.nautilus.org/fora/security/07042DPRKEnergyBalance.pdf UN Environment Program, North Korea State of the Environment Report, 2003, at: www.unep.org/PDF/DPRK_SOE_Report.pdf

V. Nautilus invites your responses

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