

# Water, Development, and Nature in Korea: Struggling towards Sustainability

Gavan McCormack

Traditional Korea, like Edo period Japan, gave highest priority to avoiding growth or change. Frugality, recycling, and avoidance of waste were fundamental, local communities functioned as sustainable ecological units, meeting energy requirements from the adjacent forests and recycling wastes so as not to pollute the rivers and ground-water.<sup>1)</sup> Renewable energy, recycling of materials, and zero waste were the principles that underpinned the balance between human society and nature, and that balance was sustainable, and it was indeed sustained until the fabric of the East Asian order was torn apart and re-assembled during the tumultuous nineteenth and twentieth centuries.

Despite the convulsions at the level of the state and the global system, the old order of Korean rural society only slowly declined. Late in the nineteenth century it was convulsed in rebellion, but before any revolutionary transformation could take place, the national subjugation under Japan began. The impact of Japanese colonialism (1910-1945) on the physical environment was dramatic. With the dramatic rise in population came urbanization, road, rail and harbour, infrastructural development, large-scale land reclamation and a measure of industrialization. However, the collapse of the Japanese empire in 1945, followed shortly afterwards by the Korean War (1950-1953), saw the country devastated, set back by decades. When a regime committed to development as a national strategy was installed in 1961, it had to begin from something like a clean slate.

Developmentalism then washed over Korea in a long, tumultuous and all-enveloping wave that reached every corner of the country, through military dictatorship and democratic regime alike, until the system foundered in crisis and near collapse in 1997. Under its influence, frugality and resource conservation turned to wastefulness and resource exploitation; the constraints of nature were rudely set aside. Mobilization of people and resources for growth became the national religion.

In the span of a mere three decades, Korea was transformed from agrarian to industrial society, its economy lifted from sub-Saharan African levels to Asian 'Tiger' status. During the period 1963 to 1990, relentless growth maximization policies were pursued by a dedicated group of technocrats, first under the military dictatorship of Park Chung-Hee (which brooked criticism or opposition from neither capitalist nor worker) and then under various regimes during the transition to democracy. GDP over these almost three decades grew at an average annual rate of 8.8 per cent.<sup>2)</sup>

Such was the social commitment to growth that few questioned the appropriations from nature, especially of the marine and mountain environment, or the onslaught on

nature by the virtually unfettered release of industrial, household, and agricultural wastes into air, rivers, soil and sea. Only the steady worsening of living conditions and spread of environmental pollution-related illnesses from the 1970s, and the slow maturation of civil society and transition to democracy, especially after 1987, served to rein in the frenzy for development. In the 1990s came the call to count the cost and weigh options for the future.<sup>3)</sup>

The bureaucrats who presided over the development ‘miracle’ were heavily influenced by Japanese models, not only that of Japan as it achieved industrialization and its equally ‘miraculous’ growth in the 1960s but also by its earlier model of prewar growth, especially as presented by the phenomenon of industrialization in the 1930s ‘puppet’ state of Manchukuo. From 1972 they adopted the ‘Comprehensive National Territorial Plan’ [*Kukt’o chonghap kihoek*] as the master-plan for harnessing the natural environment, based on the Japanese Zensō.<sup>4)</sup> The fourth such Plan was adopted in January 2000, as the masterplan for the two decades to 2020.<sup>5)</sup> By the time the crisis of 1997 struck, Korean per capita GDP had risen to around 10,000 dollars and many began to long for a relaxation in the frenzied pace of industrialization so that its fruits might be enjoyed and its costs reassessed. It was time, in that view, to end the ‘develop-at-all-costs-ism’ and seek a sustainable path, in harmony with nature rather than at odds with it.<sup>6)</sup>

The developmental blueprint, however, remained in place, with plans for trebling GDP over the coming two decades, which would mean also trebling energy demand, industrial waste output and CO<sup>2</sup> emissions, turning much of the country’s remaining mud-flats on the West coast into farm, factory, or town site land, building 50 more nuclear power stations (to add to the 12 already functioning) and nearly trebling the number of large large, multi-purpose dams (from 12 to 32) over the same span.<sup>7)</sup> Financial factors were undoubtedly paramount in the crash of 1997, but the underlying crisis was of a more fundamental order. The process of rethinking the meaning of growth, and indeed the meaning of life, was stimulated in Korea as elsewhere by the evidence of the fragility of the system as a whole.<sup>8)</sup> Yet the crisis, as Han notes, seems to have had the effect of pushing the Korean leadership away from their tentative ventures along the sustainability path and back to ‘productivity, competitiveness, recovery, growth, and jobs’.<sup>9)</sup>

There are large political, economic, and social issues at stake here, but in this essay we are concerned primarily with the footprint of development on the Korean natural environment, especially with rivers (and their mountain watersheds) and coast. Korea is a narrow peninsula, two-thirds mountainous and forested, with many short, fast-flowing rivers and a jagged, island-studded coastline. The exploitation of nature, including the rivers and coast, for food (irrigation), energy, transportation and town-water was kept up during the great rush to development. Large dams and reclamation works played a central role, as elsewhere in the world, as symbols of modernity and science. By 1986, Korea, with an area equal to that of the single US state of Ohio, had 690 large dams, ranking No. 7 in global terms.<sup>10)</sup> There were few places to which the hand of development had not reached, and they were either remote mountain areas or the coastline, especially to the south-west. Even in these areas, the process of transition from the bio-diverse realm of nature to a complex of highly engineered and controlled

human facilities, resting on concrete foundations, seemed to have an unstoppable momentum.

Three projects are here considered here: the Tong River dam, the Shihwa and Saemangŭm wetlands reclamation projects, and the various Imjin River (and DMZ) development projects.

### **1. Tong River**

Korea enjoys a rainfall that is relatively high by world standards (its annual precipitation of 1,283 mms puts it at 30 per cent above the global average), but it is concentrated in certain periods, especially the summer monsoon, and when calculated in terms of ‘preserved amounts’ of water per head of population the figure falls to only 10 per cent of the global average.<sup>11)</sup> Two-thirds of it falls during the summer monsoon season. For UN purposes, Korea is a ‘water stress’ country, its degree of shortage officially declared to be as chronic and serious as anywhere in the Asia-Pacific with the exception of Singapore.<sup>12)</sup> The Korean government predicts that demand will outrun supply by 2011, and recurrent droughts in the years spanning the transition between the centuries suggested that even that might be optimistic.<sup>13)</sup> By 1990, 10 major multi-purpose dams sat astride Korea’s main rivers (plus one estuary dyke on the Naktong River), and the government was committed to building many more.<sup>14)</sup> Its 1995 plan envisaged an additional 28 multi-purpose dams to be in service by the year 2011, 6 of which were already under construction.<sup>15)</sup>

Seoul, from a small town with a population of less than three hundred thousand people early in the twentieth century grew to a massive conurbation of 18 million by the 1990s.<sup>16)</sup> At the mouth of the Han River, it faced problems of pollution, flooding — due to the violent summer storms that sent torrents of water crashing down from upstream mountain areas — and diminishing reserves of town water. Following severe floods in September 1990 (400 mms in 3 days) in which many lives were lost and property damage was immense, a debate opened on a possible dam on the Tong River, a turbulent, upstream tributary running through limestone karst, feeding into the Han River several hundred kilometres east of the capital in Kangwŏn province. The Tong is only 51 kilometres long and much of it so remote as to be inaccessible by road. In 1997 the Ministry of Construction and Transport’s design for the Dam was adopted by cabinet. The projected dam, at its site, a place called Yŏngwŏl about 200 kilometres southwest of Seoul, would involve a 98 metres high retaining wall, 325 metres in width, holding back a reservoir of 690 million tons of water, forcing the evacuation of some 526 households and submerging villages to 52 kilometres upstream from the site. Its primary purpose was to solve the flooding problem, but it would also generate 19,600 KW of electricity and contribute to the supply of town water to the Seoul city area.<sup>17)</sup>

Prior to the 1990s, once such a plan had been commissioned by the water bureaucrats and adopted in cabinet, the dam would have been constructed without further delay. This plan, however, came just three years after the revolutionary transformations of 1987, in which the military dictatorship was overthrown by burgeoning civil society movements, and those movements quickly spread from the narrow political focus on regime to environmental and quality of life matters. The decline in the air and water environment was palpable and environmental illnesses

were commonly reported.

Originally the project was opposed only by small groups of local residents, angered at the prospect of loss of their homes and livelihood, plus a few environmentally conscious activists, but the longer a start was delayed on the project, the more opposition spread. By the summer of 1999 the opposition encompassed a majority of provincial governors (including the governor of Kangwŏn-do), 10 mayors of downstream villages and towns directly affected, and a majority of the people in the region concerned. Pro-dam were the mayors of Seoul and Inchon and the Governor of Kyŏnggi-do, the key officials of the downstream and Seoul city area, and the bureaucrats of Ministry of Construction and Transport and the Korea Water Resources Corporation.<sup>18)</sup> One influential study concluded that, even in purely economic terms, the damage would outweigh the benefits.<sup>19)</sup> Another, based on close sociological and anthropological research, found that the dam would bring zero benefit and considerable negative consequence to residents of the area.<sup>20)</sup> Through 1998 and 1999, many of the country's most famous public figures joined in issuing statements of opposition, or participating in various opposition demonstrations.<sup>21)</sup> International environmental groups also became actively involved.<sup>22)</sup>

Statements from the president, Kim Dae Jung, who vacillated between sympathy with the anti-dam cause and criticism of the media for giving voice to it, mirrored the national uncertainty. In 1997 and 1999 he publicly opposed the project, though refraining from any step to actually cancel it, while in 1999 he also intimated that, for flood prevention, there was no alternative.<sup>23)</sup> In August 2000, the Prime Minister tried to cut the Gordian knot by appointing a task force to examine and advise. The 33-member committee was made up of an equal number of officials from the Ministry of Construction and Transport on the one hand and of environmental activists and academics nominated by the Korean Federation of Environmental Movements (KFEM) on the other. In the end, the committee recommended against construction. It did so, however, only by reaching a consensus agreement on the need to preserve natural and cultural values, construed in the broadest sense, treating Yŏngwŏl as a special case and thus avoiding an outcome there that might prejudice the national dam-building program.<sup>24)</sup> In the end, what was decisive was not the safety or technical or economic aspects but the magnitude of the social and environmental losses that construction would entail. Environmental studies have found the watershed of the Tong River extraordinarily rich in fish and bird life, and in flora and fauna, with 30 species of plants, 30 of mammals (including the elusive otter, now extinct in neighbouring Japan and thought to be a litmus test of the health of nature), 72 species of birds (including not only many wild duck and heron but also the golden eagle, several species of owl and of woodpecker), and 34 species of fish, including 17 that are indigenous.<sup>25)</sup>

On Environment Day, June 5, 2000, Kim Dae Jung announced the cancellation and ordered officials to undertake a search for alternative methods of addressing the need for flood control and town water supply. He also, following a Clinton administration initiative, set up a Presidential Commission on Sustainable Development, comprising cabinet ministers, civic leaders, and academics, to advise on environmentally friendly and sustainable development. It amounted to a victory for social scientists and

anthropologists over engineers and bureaucrats, but was done in a way that allowed the latter to avoid loss of face.<sup>26)</sup> Whether it would prove a watershed in the broad struggle for sustainable over exploitative models of human-nature interaction remained to be seen.

As the new century began, no new dam construction had been undertaken in Korea since 1996, and the grandiose plans for massive developments carried over from the 1990s were on hold.<sup>27)</sup> The cancellation of the Tong River dam for environmental reasons did mark a kind of watershed, being the first time development had been sacrificed to environment. It is somewhat of a miracle that the cuckoo, the otter and so many other species should have survived, unharmed in the Tong River fastness, despite the whirlwind of economic growth. The degree of commitment to preservation of their Tong River world that can be reached by Korean society in the early twenty first century will be a litmus test of its commitment overall to sustainability over growth.

But the contest over values continued. Can they not only survive, but thrive? In the twenty first century such an outcome would come to be seen as no less miraculous than was economic growth in the twentieth. Developmentalist officials of provincial and county governments concentrated their efforts on finding a development substitute for the dam, turning the Yŏngwŏl area into a tourism center, expanding car parks and other facilities which might in the end threaten the fragile environment just as much as a dam. Conservationists see this as ‘cashing in’ in the crudest sense on the assets. They favour declaring the district an ‘Ecological Protection Zone’, strictly supervised by the Environment Ministry. Contemplating gloomily this renewed confrontation over the Tong River, Han remarked that ‘[i]t is not unlikely that Korea may fail to preserve the environment even after canceling the dam.’<sup>28)</sup>

## **2. Wetlands**

### **(a) Sihwa**

In Korea (including the politically-opposed North as well as South Korea), as in China, the practice of high-growth and environment-careless Japan tended to be followed uncritically, as much admired as Japan’s prewar and wartime record of militarism and imperialism was reviled. That practice included the maximum creation of ‘cheap’ land for agriculture, transportation (including airports), and urban development, and was followed religiously. Korea’s West coast maze of tidal flats, complex inlets and many small islands, washed by a tide that in the north, around Inchon, reached 10 metres in depth, and comparable in area to the Wadden Sea in Western Europe, seemed a prime case of nature lying dormant and under-utilized, waiting to be developed.<sup>29)</sup> Geologically, it was the product of relatively recent (most likely around 10,000 years) time, fed by the sediment load of China’s Yellow River as well as Korea’s own rivers. The possibility of drawing straight, engineered lines across from land point to land point, incorporating small islets and even islands, building levees and then draining to create new land, had been noted and practiced by colonial Japan in the 1920s and 1930s, primarily for the creation of rice-growing agricultural land at a time when the policy imperative was maintenance of the supply of cheap rice for Japan. An estimated 40 thousand hectares was reclaimed then under the Japanese

regime, and a further somewhat greater area, including the site of some of the country's major industrial complexes on the south and east coast, in the 1960s and 1970s.<sup>30)</sup> Under a National Reclamation Master Plan drawn up in the 1980s, the goal of eventually reclaiming 85 per cent of remaining tidal flats was set out by the year 2018 was set out.<sup>31)</sup> Quite apart from the economic incentives, the idea that Korea's narrow mountainous territory could be significantly expanded in this way appealed to the nationalist spirit of the time. In the 1990s, Korea led the world in reclamation.<sup>32)</sup> By the 1990s, the area of surviving tidal wetlands was estimated at about 285,000 hectares (with a slightly larger area in adjacent North Korea).<sup>33)</sup> The wetland area in South Korea alone was thus nearly 6 times greater than what remained in Japan, estimated at about 51,000 hectares.<sup>34)</sup> By the end of the century works were underway to reclaim an additional 76,000 hectares.

As the twentieth century came to an end, the contest between human engineering and scientific rationalism and insatiable developmentalist hunger on the one hand and nature's complex, apparently irrational and extravagant, crooked and twisted patterns on the other was fought nowhere more determinedly than on Korea's West coast. Shihwa and Saemangŭm constitute two crucial sites.

In 1986 the plan was adopted to seal off and reclaim the 17,000 hectare area of Kyŏnggi Bay, only about 35 kilometres south-west of Seoul, known as Shihwa, a single site which dwarfed Japan's Isahaya by more than five times. So vast is this expanse that it incorporated more than 100 kilometres of winding coastline. The reclaimed sea was to be used to create about 5,000 hectares of agricultural land, 1,300 of industrial sites, 4,000 of town and residential, and a freshwater lake of 6,100 hectares. The dyke was completed and drainage began in 1994. At the time, there was virtually no opposition, and the residents of the area were inspired by the promise of growth, modernity and prosperity.<sup>35)</sup> Work commenced the following year on construction of a 12.6 kilometre-long dyke between Shihŭng City and Taebu Island.

The outcome shocked the country. With the outlet to the sea blocked, industrial, agricultural, and household wastes flowed into the lake and were simply trapped and accumulated there. Once fertile seas were turned into a stinking and polluted mess of cadmium, chrome, copper, lead and agricultural chemicals; ethyl mercury was detected on the lakebed. Countless organisms died. The disaster spread as KOWACO (the Korean Water Resources Corporation) began secretly and illegally discharging severely polluted water into the surrounding sea, causing considerable damage to fisheries.<sup>36)</sup> The water quality was so poor as to be useless even for irrigation. COD level pre enclosure of 4 mgs per litre rose by 1997 to more than 20 mgs,<sup>37)</sup> and levels of nitrogen and phosphorous also rose precipitously. The newly created 'lands' sprouted a scrubby undergrowth, but salt levels remained too high for them to be of agricultural use. Locally, residents were aghast. Nationally, a television documentary in 1996 drew attention to the unfolding disaster. In 1997, Korea signed the Ramsar Convention on protection of wetlands and in December 1998 passed a special law to give effect to it. In the southeast of the country the Ŭip'o Wetlands, largest in the country, was given a Ramsar designation (March 1998), and in July 1998 a huge (55,000 hectare) reclamation design on the Yŏngsan River in the southwest (flowing into the sea at the city of Mokpo) was canceled.<sup>38)</sup> A tidal shift in values and assumptions about growth

was underway.

In the context of this dramatic switch in national mood, the government in November 1998 announced that the project would be radically revised. The sluice gates were opened and the ‘freshwater’ lake idea abandoned. Thereafter, the quality of water steadily improved, COD levels dropped (to 4.3mgs per litre in 2000),<sup>39)</sup> fish and shellfish returned to the lake’s waters and so, gradually, did the birds that feed on them.<sup>40)</sup> A government survey in 1999 found significant populations of rare and endangered species, including Saunder’s gull, black-winged stilt, ruddy shelduck, whooper swan, swan goose, and black-crowned night heron.<sup>41)</sup> As the reclaimed land slowly stabilized, even though not used for its planned agricultural purpose, nature slowly adapted to the changes and boar, rabbit, raccoon, deer and other forms of life settled in the scrub.<sup>42)</sup>

Only belatedly were Koreans coming to perceive mudflats not just as a potential extension to the national territory or a source of relatively easy economic benefit but a cradle and nursery crucial to fisheries, a water-purifying filter of almost inestimable value, and a source of biodiversity whose ultimate economic worth could never be known. Aesthetic and recreational value also came to be freshly appreciated. As Nial Moores, Kyungnam University researcher and ecological planner with Korean Wetlands Alliance, wrote (of a section of bay slightly north of Sihwa):<sup>43)</sup>

‘In Kyeongii Bay, at Panweol tidal-flat, for example, researchers found as many as 47,000 benthos per meter square ... crowded into an area not much bigger than a television set. Such high densities mean that tidal-flats are amongst the most productive eco-systems on earth—as valuable and full of life as even the Amazon Rain Forest. Beyond this the shallows act as fish nurseries, while the biomass thrives on nutrients that would otherwise reach levels threatening to human health.’<sup>44)</sup>

#### **(b) Saemangŭm**

Although the conspicuous failure of Kowaco’s design at Shihwa seemed to have occasioned a fundamental rethink of the value of tidal flats, one huge project, dwarfing even Shihwa in scale, still continued into the early twenty first century. There, it seemed that the coalition of national and provincial developmentalist bureaucrats and local vested interests had dug in its heels and might still have the political weight to push to completion the world’s greatest reclamation.

The Saemangŭm tidal-flats fan out for 25 kilometres from the mouth of the Mangyŏng and Tongjin rivers off Pyŏnsan in North Chŏlla province (about 220 kms southwest of Seoul). This vast, teeming and prolific realm of abundance and beauty is one of Korea’s most bio-diverse wetlands. An astonishing 158 species of fish have been recorded there, and the bird-life, including many species that stop over here on the long migration between Siberia and Australia-New Zealand, is probably more prolific than anywhere in the country.<sup>45)</sup> The loss of many precious sites in Japan redoubles the importance of remaining sites such as this, and the obligation under the Ramsar Treaty to protect sites would seem squarely and unambiguously to apply to Saemangŭm.

The idea of reclaiming the region was first proposed in 1975, then planned in detail

in 1986 and launched in 1991, with an initial completion date of 2004. It involved building a 33 kms long seawall to reclaim a vast 40,000 hectare section of bay, thereby expanding the national territory by an area the size of the country's second city of Pusan. In place of the tidal-flats would be 28,300 hectares of farmland plus 11,800 hectares fresh-water reservoir for irrigation.<sup>46)</sup>

Like Shihwa, Saemangŭm was surrounded by controversy. A nation-wide coalition developed around it, a documentary film about it attracted attention, and a special investigative task-force was formed to investigate and advise on it. Dutch engineers and Korean experts warned that the lakes would be severely polluted, like Shihwa, and the water unusable.<sup>47)</sup>

However, Saemangŭm is much further than Shihwa from Seoul, and is located in one of the poorest prefectures, where the hunger for growth is strong and 'green' politics thinly based. Through the long decades of growth developmentalism under military dictatorship and the transition regimes that ruled from 1961 to 1987, the political and bureaucratic elite was formed from the provinces of the south-east, while Cholla in the southwest was regarded as a troublesome and dissident zone, discriminated against and starved of development funds.<sup>48)</sup> The major indices, especially of population and share of national GDP, show North Chŏlla's steady economic decline over the three decades from the 1960's.<sup>49)</sup>

	1960s	1970s	1985	2001
Population	9.6	7.7		4.0
Regional % of GDP	6.6		5.0	3.5 (2001)

To the visitor, the sense of traveling back in time as one heads southwest from Seoul to Chŏlla is strong, and it is not difficult to understand the sense of 'backwardness' and the desire of people to grasp at straws offered by national and provincial governments to redress it. In Chŏlla, as for example in Japan's Okinawa, a growth and development coalition dominates local politics while the rest of the country slowly moves beyond it. In both areas long neglect, absence of secondary industry, high rates of unemployment and dependence on government-funded public works, and the assumption that the government is almighty, prevail. A dependent ethos, born of a history of discrimination and backwardness, tends to unite common people and local government and political, business, and media elites, around a strategy of soliciting national investment in infrastructure and public works and promoting to local leadership those thought best able to influence the center to achieve it.<sup>50)</sup> Unlike Japan's Isahaya, fishermen do not spearhead the opposition in Korea, even though the losses have been roughly comparable.<sup>51)</sup>

It was the sentiment of local pride that seems to have motivated many of the half million people in Cholla (roughly one in four of the population) who in October 2001 signed the demand that the reclamation works go ahead. Thus mobilized, pride functions paradoxically to entrench external dependence, especially on the national government. As Okinawans under reformist and conservative governors alike, continued to believe that Tokyo would bless them with huge projects — a Cosmopolitan City, an IT center, a research university — to bring them up in line with

the rest of the country, so Chölla people tended to believe that reclamation would bring them a vast industrial complex, the status of ‘hub for Northeast Asia’,<sup>52)</sup> complete with harbour and airport, even though the official design included no such things.<sup>53)</sup> It seemed, to a journalist from *The Korea Herald*, that the people had ‘gambled their collective destiny entirely on the reclamation project.’<sup>54)</sup> It is to Korea what the Three Gorges Dam was to China, with the qualification that while the crucial factor in China is national prestige, in Korea it is provincial prestige.

In 1998, the authorities yielded to widespread pressure by first halting the works temporarily, then in 1999 setting up a 22-member advisory commission, composed of experts, journalists, NGO representatives and academics, but unlike Shihwa this committee ended its two years of deliberations indecisively. The newly set-up Presidential Commission on Sustainable Development urged the president to delay the decision pending further study, but on May 25, 2001 the works were resumed, the government intent on completion, the date for which was now pushed back to 2011. It had cost one trillion won, and would yet cost an additional two trillion.<sup>55)</sup> NGO estimates of the cost are much greater. Assuming overruns characteristic of such infrastructural projects, they project a final figure of 16 trillion won.<sup>56)</sup> As trees and flowers are planted along the newly expanded roads, and the resumed works are officially represented as ‘ecologically friendly’, Kyung-Koo Han described it as tantamount to ‘humanistic torture’ or ‘beautiful murder’.<sup>57)</sup>

During 2001, the two camps consolidated around the resumed works. A ‘Peace Alliance of Tidal Flat-lands for the Saemangeum Reclamation Works Suspension’ brought together 60 civic, religious and environmental organizations united around the goal of conserving the exceptional biodiversity of the tidal wetland and rejecting the promise of land and water as false and misleading, false in the case of the water because it was almost certain to be just as polluted as at Shihwa, and misleading in the case of the land because the agricultural land was not needed and its expensive creation contradicted Seoul’s policies of an open agricultural market. They also pointed out that the reclamation works wrought complex damage not only on the marine environment but on the mountains too, because the 33 kilometre-long dyke requires a vast quantity of construction materials, amounting to 130,000 15 ton truckloads of rock and soil from three nearby mountains.<sup>58)</sup> For them, no economic gain could compensate for the harm that would be done to nature if the works were completed.

### **3. The DMZ and the ‘Imjin Dam’ Project**

Along with the pockets of mountain or coastal land upstream on the Tong and downstream around the mouth of the Mangyöng and Tongjin rivers, the single great undeveloped zone in Korea is the one best known, however misleadingly, as ‘Demilitarized’. The ‘Demilitarized Zone’ (hereafter DMZ) stretches for 248 kilometres across the peninsula and comprises a belt on either side of the demilitarized line which since July 1953 has served as the ceasefire line dividing northern and southern control. For nearly half a century this strip has been literally a ‘no-man’s land’, free of developmental impact.

As the freeze in North-South relations gradually thaws, especially following the June

2000 visit to the North Korean capital, Pyongyang, of South Korean president Kim DaeJung, the future of the DMZ becomes an issue. Nominally a strip of 4 kilometres, two on each side, in some places the zone actually stretches for 20 kilometres.<sup>59)</sup> Although not subjected to 'normal' development pressures, it is far from being a true wilderness. The Korean War was fought savagely across it, turning much of it into a charred wasteland from which recovery is still incomplete. Since it ended in 1953, much of it has been heavily mined and parts of it deliberately burned or defoliated to improve military vantage. Nevertheless, many rare and protected species do survive.

To the west, the zone abuts the rich tidelands already discussed above, where development has encroached steadily. Incheon International Airport, that opened in March 2001 on a 5,700 hectare reclaimed tidal-flat site offshore at Incheon, 50 kilometres west of Seoul, is a conspicuous example. The huge airport, with two 4,000 metre runways, and two more to be constructed in the coming decade, operates on a round-the-clock basis and with no noise restrictions. It was expecting an initial load of 27 million passengers per year (the equal of Japan's Narita Airport in 2000), followed by a steady increase in due course to 100 million, double that of Chicago's O'Hare (the world's biggest). Whether this can be accommodated without major disruption of the delicate and fertile marine environment of this huge coastal region seemed doubtful. Supersonic and natural rhythms do not easily co-exist. The complex planned to surround the airport includes a theme park, casino, golf links, convention center, marina, international financial center and shopping mall.<sup>60)</sup> Close-by, in the DMZ zone just south of the North Korean city of Kaesŏng, following the North-South demarche of 2000, Hyundai Corporation has been involved in construction of roads and infrastructure for a giant new industrial complex. Although all sections of the Incheon tidal-flats surveyed by the Korean Wetlands Alliance meet the criteria for identification as 'internationally important', and therefore trigger the obligation on the Korean government to protect them, many birds, including critically endangered species such as Nordmann's Greenshank and whimbrel, have registered a significant decline in numbers since the reclamation.<sup>61)</sup> Few of the passengers passing through the terminals of the new Incheon International Airport are likely to spare a thought for the avian long-distance travelers for whom Incheon also counts as a stopover.

To the north, North Korea has long been pursuing strategies identical with South Korea for expanding its national territory, sacrificing fisheries and marine environment for new industrial, urban and especially agricultural land.<sup>62)</sup> Natural disasters through the 1990s dealt heavy blows at North Korea's attempts to construct its 'socialist' system, but the symmetry of developmentalist commitment on both sides of the border during the three decades from the 1960s through the 1990s is as notable as is the political and military opposition.

Developmentalist bureaucrats and businesses eye the resources and potential of North Korea with keen interest. Immeasurably more undeveloped than Cholla, the water bureaucrats of Kowaco estimate that they could build 40 large dams over 15 meters high in the basins of North Korean rivers.<sup>63)</sup> They are especially interested in the idea of building a large dam on the Imjin River, which flows from headwaters in North Korea across the DMZ just to the east of Panmunjom before joining the Han River and flowing into the Yellow Sea. The projected dam, whose reservoir would

flood a large tract of land just north of the DMZ, would contain a 1.5 billion tons of water and be capable, they say, of preventing the chronic floods that from time to time devastate the northwest of Kyōnggi province.<sup>64</sup> It would also, however, flood much of the rich ecosystem of sandbanks, mud and sandflats, habitat for a number of rare and endangered species of birds, refuge for thousands of water fowl, wild geese, cranes and eagles, including occasionally the rare Stellar's Sea eagle.<sup>65</sup>

#### **4. Construction State vs. Conservation State**

The projects considered here—Tong River dam, Shihwa and Saemangŭm reclamation, and Imjin River and Inchon tidal flats development projects—were designed to answer problems of water and land: urban and industrial water shortage and flooding, that is, both deficiency and surplus of water, and deficiency of land, by creating new stocks of fresh water and more land. Is Korea really so deficient in land and water as to need these works, and is there no alternative to cope with flooding other than the large dam?

The Korean government insists that Korea is water poor. During the 1990s, per capita supply rose slightly, from 376 to 382 litres.<sup>66</sup> The Korean Water Resources Corporation insists that it will be necessary to increase that to 411 litres by the year 2011; the construction of new dams is seen as the only way forward.<sup>67</sup>

The logic is puzzling. It may be that the average North American consumes around 773 litres (170 gallons) per day, but that is more than seven times the per capita average in the rest of the world and nearly triple Europe's level. The WHO recommends a minimum of 100 litres per day, and commonly a figure of between 200 and 300 litres is regarded as more than adequate.<sup>68</sup> The figure for Germany is 132 litres, for Denmark 246 and for France 281 litres; by Korean government statistics, somewhat astonishingly, Korea tops the OECD in water consumption.<sup>69</sup> The real Korean domestic consumption figure, according to the Ministry of the Environment, after due allowance is made for wastage (which in the case of Seoul accounts for around 40 per cent of supply),<sup>70</sup> is actually around 290 litres.<sup>71</sup> The scope for conservation and recycling of water should also be considerable. Industrial and agricultural usage, 74 per cent of overall water demand, leveled off from 1994, and there is no reason to think that household demand has not also leveled off and that demand cannot be held to current levels or reduced, while efficiency is drastically increased. There are strong policy reasons for adopting such a path.

The second water consideration is the very serious doubt over whether the bureaucratic prescription would actually serve to meet any such need. Shihwa's water proved unusable, even for agriculture, and there is no reason to think that Saemangŭm's would be any different, while even the Tong River water seems to be not suitable for drinking (according to the Institute of Forestry Research).<sup>72</sup>

As for the Tong River and Imjin River dams as flood control devices, again there is reason to be skeptical. First, floods originating in North Korea owe much to deforestation, which in turn is the consequence of poverty and mismanagement, i.e. it has political causes and most likely can only be solved by political changes leading to more sustainable land management practices, especially perhaps the eventual unification of the peninsula. A large dam upstream from Seoul, especially one such as

that envisioned for the Imjin, might as much threaten as reassure the capital. The only dam that could be of use for flood control would be one left empty, and therefore of zero use for water supply; the two ends are contradictory. A huge dam, poised above the capital and full of water, would represent a potential catastrophe for Seoul. Close cooperation by Seoul with Pyongyang in re-forestation and agricultural reform might do much more to solve this problem than dam construction. The experience of river management internationally, where the construction of large dams is now commonly thought to have increased the danger and scale of flooding,<sup>73)</sup> may have much of relevance for Koreans faced with the severe flooding of recent years.<sup>74)</sup>

So far as the requirement to extend the national territory, whether for the nominal goal of creation of farmland or the hidden goal of creating industrial and transportation sites, this too seems doubtful. Much farmland is under-utilized regionally and nationally, and the countryside is being slowly de-populated due to industrialization. Each year 30,000 hectares of farmland is lost due to changes in land-use.<sup>75)</sup> Surely it would make more sense to save a single year's loss, retaining 30,00 hectares, rather than to take such elaborate measures as are being taken over decades of intense engineering at Saemangŭm to create it? With the Korean government embracing the World Trade Order as gospel,<sup>76)</sup> it is difficult to imagine how the huge costs of reclamation could be absorbed and a globally competitive agriculture emerge at Saemangeum, at least in the near future, from the sodden, salty fields that can be expected there.

It also appears that the bureaucratic calculations take no consideration of the recent international rethinking about the economic value of ecosystems. Wetlands, especially tidal and estuarine wetlands, in their natural state, are now calculated to be of huge economic value—for water regulation, nutrient recycling, waste treatment, disturbance regulation, erosion control, food and raw material production, and recreation and leisure. Coastal estuarine waters such as Saemangŭm and the Imjin River tidal-flats are thought to be worth a minimum of 22,832 US dollars per year, a figure likely to rise as, or if, 'natural capital and ecosystem services become more stressed and more "scarce" in future'.<sup>77)</sup> A more recent estimate puts the value of tidal flats as 100 times that of the equivalent area of farmland.<sup>78)</sup> Such calculations seem to have played no part in the planning of either Shihwa, Saemangŭm or the Imjin flats. Korean tradition, which values agricultural production above all, seems still to be entrenched in bureaucratic and much of popular thinking.

As for the possible creation of land for industrial sites, cities, airports, harbours, etc, which seems so to inspire the officials and people of North Chŏlla, it is hard to imagine what particular benefits will accrue to land specially created by reclamation that would prove competitive against the burgeoning industrial sites along the China coast (or, for that matter, North Korea, in the increasingly likely event of Korean unification within a generation or so). The notion of industrialization that inspires Chŏlla is rooted in a twentieth century model of economic growth that seems already archaic as part of a blueprint for the twenty first.

In these contests over water may be seen the deep-rooted global contest over value and meaning that characterizes the transition from growth to sustainable civilization. Korean planners tend still to look at the growth trajectories of the past and assume they

must be replicated in future. Their assumption that the graph line for water supply and water consumption, like industrial production and GDP, must continue to rise — by 21.9 per cent between 1998 and 2011<sup>79)</sup> — is a statement of faith and continuing belief in the dogmas of the growth-obsessed twentieth century, contradicting the government's pledge of commitment to sustainability. The difficulty of adjusting to the civilizational shift from the modern to the sustainable for Korea is accentuated by five decades of division and militarization, and three decades of explosive GDP-expanding growth. The dynamism and vision of Korea's civil society, however, amply demonstrated in the struggles analysed in this paper, gives reason to hope that the transition may yet be made.

#### Notes:

- 1) Kim Jung Wk, 'Korea, land of environmental risk', *Korea Journal*, 39, 1, Spring 1998, 220-240, at 235.
- 2) Jong-Il You, 'The Korean model of development and its environmental implications', in V. Bhaskar and Andrew Glyn, eds, *The North, The South, and the Environmental Ecological Constraints and the Global Economy*, (Tokyo, New York and Paris, The United Nations University Press, 1995), 158-183, at 160.
- 3) Su-Hon Lee and David A. Smith, 'The emergence of South Korean environmental movements: a response (and challenge?) to semiperipheral industrialization', Walter Goldfrank, David Goodman and Andrew Szasz, eds, *Ecology and the World System*, (Westport, Ct., Greenwood Press, 1999), 235-256, at 241-3, 251.
- 4) You, p. 169. On the Japanese plan system, see Gavan McCormack, *The Emptiness of Japanese Affluence*, 2nd Revised edition, (New York, ME Sharpe, 2001), chapter 1.
- 5) [www.moct.go.kr/MOCTEnglish/vision2000/](http://www.moct.go.kr/MOCTEnglish/vision2000/) (accessed 17 May 2002)
- 6) Kyung-Koo Han, 'The sustainability of sustainability: struggling to overcome the develop-at-all-costs syndrome in Korea', unpublished paper, 'Ogasawara Forum 2002', Chichijima, March 2002.
- 7) Kim Jung Wk, 'Korea, land of environmental risk'.
- 8) Lee and Smith, *passim*.
- 9) Han, 'The sustainability of sustainability.'
- 10) Patrick McCully, *Silenced Rivers: The Ecology and Politics of Large Dams*, (London and New Jersey, Zed Books, 1996), 3. [Note, however, that the figure of 1,213 dams built or under construction is cited by KFEM spokesperson—'World water Day', *Korea Now*, 6 April 2002, 33]
- 11) Kowaco (Korean Water Resources Corporation), 'Water Resources in Korea' [http://www.kowaco.or.kr/english/e\\_c/e\\_c2\\_02.html](http://www.kowaco.or.kr/english/e_c/e_c2_02.html) (accessed 22 May 2002).
- 12) Sung Kim, 'National water resources planning in Korea: experiences and perspectives', Korean submission to 4th Regional Consultation of World Commission on Dams, Hanoi, 26-27 February 2000. (<http://www.dams.org>).
- 13) 'Worsening spring drought', editorial, *The Korea Times*, 1 April 2002.
- 14) Table in Kowaco, 'Basic features of water resources in Korea—History of dam constructions', [http://www.kowaco.or.kr/english/e\\_c/e\\_c2\\_06.html](http://www.kowaco.or.kr/english/e_c/e_c2_06.html) (accessed 22 May 2002).
- 15) 'Kowaco, 'Basic features of water resources in Korea—Water resources development', <http://www.kowaco.or.kr/english/ec/ec203.html> (accessed 22 May 2002).
- 16) Population of 277,711 in 1912 (Bruce Cumings, *Korea's Place in the Sun—A Modern History*, New York and London, W.W. Norton, 1997, 154). It rose to 1.5 million by 1949, on the eve of the Korean War, then to 7.5 million in 1977 and to 18 million by the early 1990s.
- 17) See-Jae Lee, 'Movement against damming the Tong River', Unpublished paper presented to 'International Environmental NGO Forum, Okinawa University, 13-17 July 2000.
- 18) Soon-Yawl Park, 'Conflicts around the Yongwol dam construction in Korea', unpublished paper, Australian National University, 2001.
- 19) Benefits would be 630 million, and losses 111.8 billion won. Seung-Joon Kwak (of Korea University), 'Tonggang dam to cost 111.8 billion won environmentally', *Korea Times*, 20 May 1999.

- 20) Seejae Lee, 'Environmental Sociology in Korea', *Environment and Society*, (Newsletter of the Research Committee, International Sociological Association), No 19, January 2002, 5. See also Seejae Lee, 'An analysis of the social impact of the Donggang Dam construction plan', *Eco*, September 2001.
- 21) In July 1998 and March-April 1999, Park, 'Conflicts'.
- 22) Opposition was declared by Sierra Club, Greenpeace, Friends of the Earth, Worldwatch Institute, International Rivers Network and other local or regional groups. (International environmentalists call for halt to Tonggang Dam plan', *Korea Times*, 21 April 1999 ([http://www.koreatimes.co.kr/14\\_1/199904/t4151280.htm](http://www.koreatimes.co.kr/14_1/199904/t4151280.htm)).
- 23) 'Tonggang dam construction likely to be carried out', *Korea Times*, 14 July 1999.
- 24) Kyung-Koo Han, 'How the decision to preserve Tong'gang (East River) was made: a participant's observation on the task force of the Prime Minister's Office', unpublished seminar paper presented at the Australian National University, 24 October 2000. (Dr Han was secretary of the Culture Committee' in the Task Force and rapporteur for the General Committee, in which capacity he drafted key sections of the final report.)
- 25) Details in Ma Yong-woon, 'Tong River', in Korean Wetlands Action (Nial Moores), ed, *National NGO Wetlands Report: Ramsar 1999*, Seoul, Korean Wetlands Association and Yullinmaul, 1999, (hereafter: '99 Ramsar NGO Report'), 123-4. Also Park, 'Conflicts'.
- 26) Han. 'How the decision'.
- 27) The last dam constructed was the Tamjin (in Changhŭng, South Chŏlla province), built between 1996 and 2002. (Kowaco, 'Basic features of water resources in Korea — History of dam constructions', [http://www.kowaco.or.kr/english/e\\_c/e\\_c2\\_06.html](http://www.kowaco.or.kr/english/e_c/e_c2_06.html) (accessed 22 May 2002).
- 28) Han, 'The sustainability of sustainability'.
- 29) See map and details in Chul-Hwan Koh, 'The Korean tidal flat — a brief introduction to geomorphology, reclamation and conservation', '99 Ramsar NGO Report', 12-21, at 16.
- 30) Koh, 13. (The figure of 40,000 in the 1960s and 1970s is for the West Coast alone, so the total must therefore have been considerably more.) See also the table in Manick Hwang, 'Coastal land-use change by reclamation of tidal-flats along the Western coast of the capital region in Korea'. (Environment Agency of Japan, 'NIES workshop on information bases and modeling for land-use and land-cover changes studies in East Asia', Tsukuba, Japan, January 1999, <http://www.cger.nies.go.jp/lugec/Proceedings/pcdscontents.htm>)
- 31) '99 Ramsar NGO Report', 96.
- 32) Han Kyung Koo et al, *Umi o utta hitotachi—Kankoku shikakō kantaku jigyō*, (Tokyo, Nanpō shinsha, 2001), 32.
- 33) Koh, 16.
- 34) Murayama Yoshiaki, 'Kankoku shikakō wa tansuika o dannen, Isahaya no torubeki sugata ga miete kuru', *Shūkan kinyōbi*, 2 April 1999, 16-19.
- 35) Han et al, *Umi o utta hitotachi*, 57.
- 36) '99 Ramsar NGO Report', 11.
- 37) Jung-Geel Je, ed, *Let's save the natural ecosystem and attract tourists - 2000 Citizen's Proposal to Establish the Shihwa Eco-Park*, Hwasung-Shihung-Ansan Citizens' Coalition for Shihwa, a Lake of Hope, n.d. (2001?), 6.
- 38) '99 Ramsar NGO Report', 15.
- 39) Ikemi Tetsushi, 'Kenshō—mizu to tori no rakuen fukkatsu', *Asahi shimbun*, 8 May 2001.
- 40) 53 varieties of sea birds, a total of approximately 171,000 birds, recorded in the winter of 2001, as against 136,000 and 87,000 in 2000 and 1999 respectively. (Ikemi, cit.)
- 41) Je, 12.
- 42) Je, 8.
- 43) Nial Moores, 'Inchon's tidal-flats: life-givers to both birds and people', [http://wetland.kfem.or.kr/html/inchon\\_tidal\\_flats.html](http://wetland.kfem.or.kr/html/inchon_tidal_flats.html) (accessed 20 June 2000).
- 44) Benthos are 'bottom-dwelling animals like crabs, shellfish or polychaete worms.' Moores observes that mud-flats in Europe are significantly less fertile, containing no more than 30,000 benthos in the same volume of mud.

- 45) A minimum of 87,000 and a possible 350,000 shorebirds, and 23 species of waterfowl, including at least 12 in internationally significant concentrations. 'Saemangeum' and 'Saemangeum, an introductory overview', in '99 Ramsar NGO Report', 70, 96.
- 46) 'Responsibility for Saemangeum', Chosun Ilbo (Digital Chosun), 13 January 1999, <http://www.chosun.com/w21data/html/news/199901/199901120256.html>, accessed 14 July 1999.
- 47) '99 Ramsar NGO Report', p. 70.
- 48) Soon-Yawl Park, 'Eco-Government in Korea: The Case of Saemangeum Reclamation Project', unpublished paper, Seoul National University, 2002. (My thanks to Mr Park, doctoral candidate at Seoul National University's Sociology Department, for a copy of this paper.)
- 49) Figures taken from Park, 'Eco-Government in Korea'.
- 50) On the growth coalition in Cholla, Park, 'Eco-Government in Korea'. On Okinawa, see Gavan McCormack, 'Okinawa and the structure of dependence', Glenn D. Hook and Richard Siddle, eds, *Japan and Okinawa: Structure and Subjectivity*, (London, RoutledgeCurzon, 2003), 93-114.
- 51) Between 1989 and 1996 the Saemangüm mud-flat harvest of shellfish and short-necked clams fell from 5,899 to 978.4 tons and from 1,000 to 60-70 tons respectively. (KFEM, 'The Saemangeum mud-flat should be alive', May 2000, <http://english.kfem.or.kr/hot/hot1.htm> (accessed 17 May 2002).
- 52) 'Responsibility for Saemangeum', Digital *Chosun ilbo*, 13 January 1999.
- 53) Park, 'Eco-Government in Korea'; Kim Hye-won, 'Torn between politics and the environment', *The Korea Herald*, 6 April 2001.
- 54) Kim Hye-won, 'Torn between politics and the environment'.
- 55) 'Seawall Push', *Korea Now*, 2 June 2001, 21.
- 56) Park 'Eco-Government in Korea', 2.
- 57) Han, 'The sustainability of sustainability'.
- 58) KFEM, 'The Saemangeum mud-flat should be alive'.
- 59) Kim Kwang-bok, 'The Demilitarized Zone: home to nature evolving in an unforeseen direction', *Koreana*, Vol. 15, No. 2, Summer 2001, 18-29.
- 60) 'Construction of airport access railroad starts', *Korea Now*, 18 May 2002.
- 61) Nial Moores, 'The critical value of Incheon's tidal-flats: reversing the declines at Yong Jong Is', '99 *Ramsar NGO Report*, 108-114.
- 62) Stewart Lone and Gavan McCormack, *Korea since 1850*, (New York, St Martin's Press, and Melbourne, Longman Cheshire, 1993), 186.
- 63) 'KOWACO says some 40 big dams can be built in N. Korea', *Korea Herald*, 1 February 2000.
- 64) Ibid.
- 65) Nial Moores, 'The critical value of Incheon's tidal-flats: reversing the declines at Yong Jong Is', '99 *Ramsar NGO Report*, 108-114.
- 66) Ministry of the Environment, *White Paper 2000*, quoted in PCSD, 'Economic Aspects of Sustainable development in the ROK', 10.
- 67) Kowaco, 'Basic features of water resources in Korea', [http://www.kowaco.or.kr/english/e\\_c/e\\_c2\\_04.html](http://www.kowaco.or.kr/english/e_c/e_c2_04.html) (accessed 22 May 2002).
- 68) Jessica McCallin, 'Making the blooms desert', *Palestine Monitor*, 21 May 2002.
- 69) 'World water day', *Korea Now*, 6 April 2002, 33.
- 70) World Resources Institute, 'The Urban Environment', *World Resources 1996-97*, [Http://www.igc.org/wri/wr-96-97/ee\\_f2.gif](http://www.igc.org/wri/wr-96-97/ee_f2.gif) (accessed 24 May 2002).
- 71) Park, 'Conflicts around the Youngwol dam construction in Korea'.
- 72) It contains 140 times more bacilli and 5.6 times more mineral matter than the standard for drinking water. (Park, 'Conflicts around the Youngwol dam construction in Korea').
- 73) R.E.Criss and E.L. Shock, ('Flood enhancement through flood control', *Geology*, 2001, vol. 29, 875-878) observe that 'for the same total amount of water flowing down the Mississippi—its discharge—the annual floods in the St. Louis region have been getting steadily higher since 1860.' (Quoted in Philip Ball, 'Defence worsens flooding', *Nature* (Science Update), 23 May 2002. <http://www.nature.com/usu/011004/011004-1.htm/>
- 74) The 400 mms in three days on the southern Han River in 1990 was a record, but since then 600 mms fell in the Hantan River basin in 1996, 620 mms in Seoul in two days in August 1998, over 700 mms in

- the capital vicinity in 1999, and in 2001 the 'heaviest rain in 100 years' fell in North Korea. (various media sources).
- 75) According to Ministry of Agriculture, quoted in KFEM, 'The Saemangeum mud-flat should be alive'.
  - 76) 'The Republic of Korea recognizes that stabilization of the free trade system under the guidance of the World Trade Organization (WTO) ... is essential to promotion sustainable development', (Presidential Commission on Sustainable Development, 'Economic aspects of sustainable development in the Republic of Korea', 15 March 2002, <http://pcsd.go.kr/eng/pds01/boarddsp.html?seq=28page=1>)
  - 77) Robert Costanza, et al, 'The value of the world's ecosystem services and natural capital', *Nature*, Vol. 387, 15 May 1987, 253-260, at 256.
  - 78) Kim Hye-won, cit.
  - 79) Kowaco, 'Basic features of water resources in Korea', cit.