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Working Papers Series

No. 21

January 2002

The **SEARC Working Papers Series** is published electronically by the Southeast Asia Research Centre of the City University of Hong Kong.

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DEFORESTATION, FLOODS, AND STATE REACTIONS IN CHINA AND THAILAND

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Introduction

Natural forests are disappearing in developing countries, with fateful long-term consequences for those countries and for the planet. Identifying the causes of deforestation is easy. Finding solutions is much more difficult. Solutions are necessarily political, and must be implemented by sovereign states, since no other agency in the contemporary world has the capacity to deal with the causes of deforestation.

State action to halt deforestation in developing countries is crucial, but rarely decisive. Under what conditions would a state in a developing society take action to halt unsustainable depletion of natural forests? Do democratic states take action more effectively, or with better long-term outcomes, than authoritarian states?

Forests and the State

States differ greatly in their approach to forests and deforestation, depending in part on the state's political economy. As the best country-studies show in detail, regulation of tree cutting is influenced by economic and political pressures and interests, and the resulting calculations of gain to various parties, including state officials and their clients and patrons. In general, these pressures and interests have led to a non-sustainable level of tree-cutting world-wide during the 20th century (Williams, 2001).

Pressures to conserve forests, however, have also grown in the late 20th century. There is more international support at the dawn of the 21st century than at any time in the past for forest conservation and sustainable forestry. Scientific research has increased the knowledge base on deforestation, and some of this knowledge has been incorporated into laws, regulations, and the analyses and lobbying of NGOs and conservation-oriented pressure groups. Regimes everywhere are affected by the growing global institutionalisation of environmentalism, in proportion to their links to the international development of environmental knowledge and programs (Frank, Hironaka, and Schofer, 2000).

[1] A longer version of this paper is forthcoming in *The Environmental State Under Pressure*, edited by Arthur P.J. Mol and Frederick H. Buttel, and to be published by Elsevier in 2002. I would like to thank Kevin Hewison and Linda Chelan Li for comments on earlier versions of this paper.

Domestic and international organisations collectively generate pressures toward 'ecological modernization' as some societies gradually develop the technological, legal, and institutional apparatus to pursue less ecologically destructive prosperity (Mol, 1995). Thus, forestry regulation in some countries offers a special case of the more general trends described in the theories of ecological modernisation and global institutionalisation of environmentalism.

The 'treadmill of production' model (Schnaiberg and Gould, 1995), however, suggests that forests will be intensively exploited by economic interests which will resist the imposition of forest regulations which seriously inhibit their operations or reduce their profits, and which will be supported by political elites dependent on growth and revenue generated by these economic interests. In the medium term, forests will be exploited on a non-sustainable basis, despite rising pressures for stricter control. The question of which model is more accurate undoubtedly depends on the economic and political conditions within particular societies, as well as their links with various external forces, including world markets for wood products, and their links with international flows of scientific and conservationist expertise and resources.

There are a number of factors which affect the exploitation and conservation of forests, and which have been described in the literature, such as rural poverty, the political power of forest-harvesting interests, state regulatory capacities, and corruption. But in addition there is also a little-studied 'wild card': *environmental disaster*.

The impact of environmental disasters has not been assessed in most analysis of environmentalist policies, since such events (although likely to occur frequently in the future) are still rare. But they may be exceptionally important if they stimulate strong state action, and they may have this effect if they threaten regime-legitimacy.

Two cases are described in this paper: the 1988 floods and resulting state action in Thailand, and the 1998 floods and state action in China. China and Thailand are two developing societies which possessed extensive forests at the beginning of the 20th century, suffered severe forest depletion as their populations exploded after World War II, and struggled to find ways to deal with deforestation during the closing decades of the century. In both countries, a combination of ***weak proactive*** and ***strong reactive*** state policies can be observed. The weak proactive policies are responsive to a society's political economy. The strong reactive policies occur only when regime legitimacy is threatened by a high-cost disaster attributable to lax or incompetent policy.

It appears that there are differences between the two societies in the effectiveness with which these strong-reactive policies were implemented in subsequent years. The political systems in the two countries help to account for these differences in outcomes in China and Thailand.

I begin each case study with an overview of state regulation of forestry and state responses to deforestation prior to the disasters which precipitated much stronger responses in both countries.

State regulation and deforestation in China

Deforestation in pre-modern China, a result of the increasing expansion of the population onto hillsides and into mountainous regions during the Qing dynasty, continued during the Republican period after 1911. The new Communist regime came to power in 1949 with a program to build up the country, reform the economic institutions of the society for the collective benefit of citizens rather than for the profit of individuals or private organisations, and take strong action against any exploitation which produced collective losses to serve private gains. Not facing periodic elections, the regime could afford to take a long-term view of policies to promote these goals. This kind of agenda gave the regime a particular interest in collective measures to protect the country's agricultural heartland against longer-term degradation, and the role of forests was clearly identified by at least some of the leaders. Programs to conserve forests and plant trees were therefore initiated by the regime in the 1950s. Most of the afforestation proposed by the government was intended to protect agricultural regions from advancing deserts (Richardson, 1990).

Reforestation and forest conservation were periodically disrupted by political campaigns, and the most disastrous period for forests occurred in the late 1950s, during the 'Great Leap Forward'. With the goal of rapid industrialisation, the 'Great Leap' committed workers across the country to setting up neighbourhood furnaces to make steel, and wasted huge amounts of timber which was used to feed these furnaces (Harkness, 1998).

Nevertheless, major campaigns to plant trees for soil conservation were undertaken during the next few decades using the mass mobilisation techniques which the Maoist state was able to employ during that period (Richardson, 1990). These programs produced new forest plantations, and slowed the rate of advance of the deserts. Although the seedlings often had a low rate of survival due to inadequate knowledge or practice, and hence there was considerable waste, the overall impact on forest cover was positive. Other programs involved planting lines or belts of trees to protect fields, villages, roads, and canals.

It seems that as a result of these programs, the total forest cover actually increased for China as a whole, at least since the early 1980s. It has been estimated that the forest cover in China in 1949 was about 8.6 percent of the land area. By the mid-1990s forest cover had been increased to nearly 14 percent through these major afforestation programs.

However, the net growth in forest cover appears to be largely the result of planting protective forest belts and tree plantations, and masks the considerable reduction in natural or mature forests during the same period (Rozelle et al.,

1998). The overall figures also hide episodes of tremendously wasteful forestry practices, and heavy logging of natural forests sanctioned by local officials.

One problem for central government control over logging is that many of the forests are in autonomous regions and prefectures, where Beijing does not exercise the same degree of control as in other areas. For example, 70 percent of the forests in Yunnan province, in the southwest, are in minority areas, and in Sichuan, autonomous prefectures contain most of the remaining natural forests. Conservation regulations are evidently enforced less strictly in these areas, for the sake of political stability, and the Forest Law of 1984 specifically exempts the autonomous areas from the regulations which apply to other areas (Richardson, 1990). Even outside of the 'autonomous' areas, however, central government power may be limited, and national policies may be evaded.

The environmental protection agencies or bureaux at provincial and county level are responsible to the higher-level environmental protection bureaux, but must also serve the needs of the local governments. These lower-level bureaux also typically depend on the local government for funds, facilities, and career advancement (Alford and Shen, 1998). The decentralisation of authority has therefore increased the power of these local governments (Economy, 1997; Brandt and Zhu, 2000), and reduced the ability of higher-level environmental protection bureaux to direct the actions of lower-level environmental-protection bureaux (Rozelle, et al., 2000).

The lower level governments have been given more flexibility mainly for the purpose of promoting economic growth (Cannon, 2000), and thereby protecting social and political stability. In effect, local governments are evaluated by how well they perform in producing economic growth. Obviously, this imperative and the resulting reduction of the vertical authority of environmental or forestry agencies over their lower-level counterparts is not conducive to a simultaneous emphasis on environmental protection. The fact that the local governments also pay the bills for the local environmental protection bureaux makes the latter even more dependent on local regimes whose main priorities are economic growth.

From analysis of two comparable national forest censuses in 1981 and 1988, Rozelle et. al. concluded that while reform policies in the 1980s had evidently increased forest cover, they had not halted unsustainable harvesting of mature forests. The increase in the number of forest reserves in the 1980s, for environmentalist reasons, was also not accompanied by a substantial increase in central funding for maintaining such reserves, most of which are dependent on county and provincial governments for financial support (Harkness, 1998).

The poor funding and weak enforcement in these reserves has also led to an increase in non-sustainable harvesting in areas previously harvested on a more sustainable basis by local collectives. When such forest lands were converted to forest reserves, expropriating the forests from local collectives but leaving the population of the collectives still living in or next to the forest, they responded in

some cases by immediately harvesting as much of the forest as possible to avoid losing everything to the state (Harkness, 1998; Elvin, 1998; Muldavin, 2000).

In short, the impressive statistics on the establishment of forest reserves hide major management problems resulting from inadequate funding of the reserves. The major afforestation programs since the 1950s, and the reform and afforestation policies since the 1980s, have increased forest cover, but have not prevented unsustainable harvesting of natural or mature forests (Yin, 1998; Zhang et al., 2000). The central government, of course, was aware of these problems, and the 1990s saw increased efforts to control logging even before the 1998 floods.

China reduced its annual logging quota by eight percent in 1996 in an attempt to conserve the forests. The Ministry of Forestry also announced its intention to take stricter action against illegal logging. The central government was especially concerned about the possibility that excess logging would affect the capacity of the massive Three Gorges Dam project on the Yangtze River. Consequently, the government announced a plan to add 2 million hectares of forests in the areas around the reservoir, in Hubei and Sichuan provinces (Edmonds, 2000). However, the decline of natural forests continued. Government programs added plantation forests in peripheral regions, and largely ignored extensive, unsustainable, and sometimes illegal logging in mountainous areas around the river valleys. The floods of 1998 quickly led to much more drastic policy announcements.

Floods and the 1998 logging ban in China

In the summer of 1998, floods along the Yangtze River devastated large areas of central China and killed more than 3,600 people (Liang, 1998). However, the economic consequences of the flooding were severe. The cost in damage to property and fields, lost production, aid to flooded areas, and flood control expenses has been estimated at 248 billion rmb (US$30 billion) (Liang, 1998).

Analysts asserted that over-logging in areas around the major river systems led to excess runoff of soil into the rivers, raised river levels as the silt was deposited downstream, and thus greatly increased the severity of the flooding. This kind of analysis of the consequences of deforestation was well documented by research, such as in the Journal of the Beijing Forestry University (e.g. Wang, 1996).

Responding to the scale of the disaster and evidently angered that overlogging had worsened the flooding, Premier Zhu Rongji announced that logging of China's natural forests in the upper reaches of the Yellow River and the Yangtze River was henceforth banned. In October of 1998, the Minister of the State Forestry Administration, Wang Zhibao, said that by the year 2000, natural forests would no longer be logged in most of China's existing natural forests. The plan was to reduce the annual logging quota, of some 29 million cubic metres in 1997, by about 10 million cubic metres each year (Zhang et al., 2000).

At the same time, the logging industry would be required to rely only or mainly on harvesting economic forests rather than natural forests. The plan would also require a major state investment in reforestation, using workers who previously worked in the logging industry to plant trees in heavily logged areas, and would require nearly 20 billion rmb (US$2.3 billion) in loans or credits to deal with displacement of the logging industry and investment in replanting.

To emphasise the seriousness of the issue, the government pushed prosecutions of illegal logging and of corruption in the allocation of logging permits, and ensured that some of the prosecutions received sufficient publicity to be widely noticed. It seems that there is a continuing struggle between the central government's determination to enforce the logging ban and local logging interests which have become accustomed to evading such restrictions. As long as the central government prioritises this campaign, however, the provincial and county governments are forced to give the appearance of adhering to the policy, and of prosecuting offenders.

It appears, from recent assessments, that the government's ban on logging in 1998 has greatly reduced logging in the seventeen provinces to which the restrictions were eventually applied (Xu et al., 2000; Zhang et al., 2000; Murray, 2001). In combination with reforestation and afforestation programs, assisted in some cases by the World Bank, these measures have evidently stabilised China's forest cover (Rozelle, et al., 2000).

However, the success of the ban has inevitably led to a shortfall in wood for various industries such as construction and the production of paper, and this shortfall has induced Chinese firms to make up the shortfall from other countries in the region, particularly in Southeast Asia. For example, imports of timber and wood products reportedly increased sharply in the year after the ban (Rozelle, et al., 2000), which may have a major long-term impact on Southeast Asian forests (Rozelle et al., 2000; Pearce, 2000).

I now turn to the case of Thailand, where the state also attempted to regulate forestry during the past half-century, without halting the continuing decline in natural forests, and where a logging ban was also implemented after disastrous flooding, for nearly the same reasons.

State regulation and deforestation in Thailand

The Royal Forestry Department (RFD), established in 1896, has mainly been concerned during most of the first hundred years of its existence with allocating and regulating logging concessions, particularly for teak in the northern part of the country. In 1899, the state nationalised all natural forests, which were to be controlled by the RFD. After the 1932 revolution, foreign concessions were gradually replaced by Thai logging interests, but deforestation continued, and several million peasant tenant-farmers from the plains eventually moved into northern forested regions to clear land for agriculture (Bello, et al., 1998). With the growing stress on economic development in the 1960s and 1970s, the

government and external agencies such as the World Bank encouraged the production of cash crops in the mountainous regions, which led to further deforestation.

The Forestry Department also collaborated with successive governments' political aims in gaining control over resources and territory in the forests. For example, the regime built roads into some of these areas to improve access for the army in their campaign to deny such areas to Communist insurgents. This opened previously remote forested regions to exploitation by migrants and logging interests from the plains after the threat from Communist insurgents waned in the late 1970s.

Conservation was always a secondary concern. Indeed, Thailand's forest cover declined from about 70 percent of the country in the 1930s, to about 53 percent by the 1960s, to no more than 23 percent by the late 1990s (Blakesley and Elliott, 2000). The most recent estimate of the remaining forested area includes degraded forests and monoculture tree plantations of teak, eucalyptus, and rubber trees.

Attempts to regulate logging prior to the 1990s through concessions and limited harvest quotas were not very effective, and illegal logging was common. In the early 1960s, the government announced a goal of preserving a forest cover of 50 percent of the country (Hunsaker, 1996). This proved to be unrealistic, and was not backed by any serious attempts to implement such a goal. Forest Reserves established during the 1960s for the purpose of conservation turned out to be already inhabited by large numbers of forest-dwellers and subsistence farmers. Deforestation continued, with an estimated loss of 12.5 million hectares of forest between the 1960s and the mid-1980s.

With increasing attention to deforestation from internal and international agencies and NGOs, and with the prospect of serious consequences from deforestation in the next few decades, Thai government agencies produced a new National Forest Policy, announced in 1985, which proposed that 40 percent of the country should be forested. The plan was that 25 percent of this forested area would be for production forests, and 15 percent for 'conservation forests'. This was revised in 1991 to set aside 25 percent of the forested area as 'conservation forest' (Blakesley and Elliott, 2000).

It has been claimed that Thailand has one of the best systems for protection of forests in the region (McQuistan, 2000). Thailand is also developing the culture and practice of consultation with stakeholders over environmental issues (Rasmussen, 2000). Nevertheless, Thai forestry policy up to 1989 was only weakly proactive, in the sense that it has not had sufficient impact on illegal logging, or on deforestation, to halt continuing and possibly irreversible loss of natural forests and their ecosystems. As in China, this weak proactive policy was strengthened only after a disastrous flood.

Floods and the 1989 logging ban in Thailand

In November of 1988, flooding in the southern province of Nakorn Srithamarat killed some 350 people (Hunsaker, 1996), a death rate, proportional to total population, nearly double the death rate from the 1998 floods in China. The floods also caused an estimated U.S. $120 million in damages to property. This rate of damage was proportionally much less than the damage caused by the 1998 floods in China, mainly because the floods in Thailand did not affect regions as densely populated or as important for agriculture as the areas inundated by the Yangtze floods. Nevertheless, in both countries, the floods were perceived as disasters for the local population and for the local economy.

As in China, the 1988 floods and landslides in Thailand were attributed, in part, to deforestation, leading to much higher runoff of rainwater from hillsides. After a public outcry over the disaster, Prime Minister Chatichai Choonhavan's newly installed government issued a nation-wide ban on logging in January of 1989 (Prudhisan and Maneerat, 1997), stopped the issuing of new logging concessions, and moved to revoke existing permits (McDonald, 1990). Former logging concessions were designated as national parks or wildlife sanctuaries (Blakesley and Elliott, 2000). Thousands of workers were forced out of logging, or into illegal logging (Hunsaker, 1996).

As in China, one of the immediate consequences of the logging ban was to displace logging for the Thai market into neighbouring countries (England, 1996). Within a month of the ban, for example, Thai logging interests had signed agreements with the regime in Burma to begin cutting Burmese timber for export to Thailand (McDonald, 1990). The Burmese regime was keen to sell logging concessions to get hard currency, and similar deals, for similar reasons, led to increased exploitation of forests in Laos and Cambodia for the Thai market.

But the 1989 ban on logging in Thailand was only partially effective in controlling deforestation (Laird, 2000), and depletion of forests continued despite the ban. The Thai Government's own Office of Environmental Policy and Planning came to the same conclusion (OEPP, 2000). According to one estimate, the rate of net annual forest loss in the 1990s was about 1 percent each year (Rasmussen, 2000), mainly due to continued illegal logging and expansion of agriculture (Blakesley and Elliott, 2000). This amounts to more than 100,000 hectares of net deforestation every year. Since the logging ban, it has been estimated that overall forest cover has continued to decline, from about 28 percent of land area in the late 1980s to about 23 percent ten years later (McQuistan, 2000).

In Phetchabun province in north-central Thailand, for example, forest cover had declined from over 70 percent in 1960 to 19 percent by 1995, and further deforestation continued between 1995 and 2000, according to an official of the Forest Resource Assessment Division (Samabuddhi, 2001b).

Some of the continuing pressure on forested land has come from the drive to produce profitable export cash crops such as ginger, which has led to clearing of natural forests in highland areas by Lisu hilltribes and other groups, allegedly with capital from business interests in northern towns such as Chiang Rai (Bangkok Post, 1998b).

The highland-dwelling peoples can be quite different in their uses of land in forested areas. Some groups such as the Karen have practised a conservative type of subsistence swidden agriculture which allows them to remain in some forested areas for long periods, while other groups such as the Hmong and Yao have practised shifting swidden agriculture, in which land is cleared and exploited more intensively and which requires periodic migrations and new land-clearing (Bello, et al., 1998). Some of these highland groups also differ in their commitment to clearing forested land for cash crops for sale into lowland market networks. Thus, we must be cautious in generalising about the impact of the various highland-dwelling groups on the forests. Some Thai commentators blame the hilltribes for deforestation problems which are often more strongly linked to migrants from the plains and to illegal logging interests controlled by cliques in northern towns. However, there is no doubt that some of the hilltribes also contribute to deforestation.

By the late 1990s there were an estimated one million households subsisting in National Forest Reserves without legal rights (Rasmussen, 2000), and occupying as much as 20 percent of Thailand's state-owned forest reserves (Hunsaker, 1996). Although some forest-dwellers are Thai citizens, others are non-Thai migrants. Forest-dwellers without legal title to forested lands may resort to short-term maximisation of profit from nearby forests for their own survival, with little concern for the longer-term future of forests in which they have no legal stake, and from which they may be evicted at any time. Lacking Thai identity documents and land ownership deeds, they are less able to resist attempts to relocate them out of forested areas in order to conserve the forests, or to turn degraded forests into plantations operated by agribusiness interests (Bello et al., 1998). Hence, their lack of legal bases for their land claims increases their propensity to engage in non-legal forms of resistance, and in poaching.

The Thai army has on occasion collaborated with the Forestry Department in patrolling for poachers, particularly around National Parks, setting up checkpoints to try to intercept illegally taken logs and inspecting sawmills for illegal supplies of wood (Sukkasem, 2000). But soldiers, often in collaboration with Forestry Department officials, Land Department officials, and politicians, have also been actively involved in the profit from illegal logging (Hunsaker, 1996; Bello et al., 1998; Chongcharoen, 2001; Samabuddhi, 2001a).

Complicating the process of monitoring deforestation and implementing reforestation is the state-owned Forestry Industry Organisation (FIO), founded in 1947 to manage logging concessions under the overall authority of the Royal Forestry Department. The FIO also carried out logging to clear areas around

proposed reservoirs and dams, and sold illegally cut timber which had been confiscated from various parties (Rajesh, 2000). The FIO suffered a substantial loss of revenue as a result of the 1989 logging ban. The organisation responded by applying to use terminated logging concessions to expand its tree plantations of teak and eucalyptus and to supply its sawmills.

However, this has led to conflict in areas where local communities are determined to resist the conversion of common forest areas or degraded forests into tree plantations. In effect, the policy of reforestation using monoculture tree plantations often pits government agencies and agribusiness firms against local villagers, who may be displaced into other forested areas, or who have nowhere else to go because there is no remaining agricultural land. Conflict has been particularly serious in the poor northeastern part of the country, where an estimated 4.7 million hectares of forests were cleared between the 1960s and the mid-1980s (Hunsaker, 1996), and where current forest cover may be less than 14 percent (Bello, et al., 1998). The attempt to switch the mission of the Royal Forestry Department from production to plantation reforestation and conservation has actually increased the level of conflict with hilltribes and local communities of subsistence farmers in such areas (Hunsaker, 1996; Rasmussen, 2000). There is vigorous debate within Thailand between those who advocate the rights of peoples who inhabit the forests, and those who want to conserve forests even against measured exploitation by forest-dwellers (Rasmussen, 2000). NGOs and other advocates line up on both sides of the debate, but are particularly vigorous in defending the rights of forest-dwellers.

The Royal Forestry Department has been actively involved in the processes of 'ecological modernisation' within Thailand over the past few decades. These processes have included the Department's participation in discussions with environmentalist NGOs and intellectuals, participation of government officials in numerous regional forums in Southeast Asia on environmental issues, collaboration with the World Bank on projects to conserve forests, and the preparation of a progressive environmentalist Thailand National Report to the 1992 UN Conference on Environment and Development in Rio de Janeiro, with the active collaboration of Thailand's environmentalist NGOs (England, 1996).

The Forestry Department's commitments to both conservation and plantation forests, however, have led to increased conflict with forest dwellers and subsistence farmers, and to some political pressure to avoid such costly conflict by mollifying local communities which might otherwise engage in aggressive resistance. At the same time, Forestry Department officials are sometimes implicated in mutually beneficial relationships with commercial or even illegal logging interests.

Since implementation of the logging ban has been seriously flawed by continued illegal logging and the obtaining of logging rights by corruption, it is not surprising that floods resulting from runoff from deforested hillsides have continued. In May of 2001, for example, flash floods killed dozens of people in a region known for illegal logging (Samabuddhi, 2001a).

The most pessimistic assessments note that the Thai government is more devoted to economic development and political compromises than to effective protection of the forests.

On the positive side, the Thai government can claim a series of well-intentioned measures and policies to try to curtail deforestation, a logging ban which greatly reduced logging in some areas, a forestry bureaucracy which provides a good knowledge base and accurate assessments of the state of the forests, a number of reforestation programs, recent provisions for 'community forestry' to try to see whether communities can actually conserve forests, and some responsiveness to the vigorous lobbying of NGOs and the resistance of some local communities to state programs.

But the political and bureaucratic complexities of the Thai political system and the considerable and often corrupt responsiveness of various agents of the state to local and regional business elites have facilitated the continuing – albeit slower – decline of the forests, and undermined the implementation of national policies designed to conserve forests. The floods, ultimately, were not a sufficiently severe threat to state legitimacy, or to the interests of the political elite.

Conclusions

The natural forests of both China and Thailand were seriously depleted during the 20th century. In both societies, deforestation was identified by scientists and forestry officials as a problem which could damage the country's economic base if it continued unchecked. The forestry bureaucracies in the two societies tried to deal with deforestation through regulations on logging, establishment of forest reserves, reforestation programs, and plantation forests. International organisations such as the World Bank eventually provided resources for some of these endeavours in each country. But neither society succeeded in stopping the continuing loss of natural forests. Both societies maintained a 'weak proactive' forestry regime – a collection of policies that had some impact, but were not sufficient to stop the depletion of natural forest.

Some of the reasons why these policies were weak in both societies are similar: a higher priority on economic development than on environmental conservation by officials and political leaders at all levels; the resulting insufficient allocation of funds for state agencies which were supposed to monitor and control illegal logging in forest reserves; local corruption and collusion between some officials and logging interests; and desire of both governments to avoid unnecessary conflict with ethnic minorities in some forested regions for the sake of political stability.

In both societies, an ecological disaster widely attributed to deforestation prompted a much stronger state response. The floods, loss of life, and destruction of property in Thailand in 1988, and in China in 1998, led to a ban

on logging in both societies to try to prevent further disasters. This 'strong reactive' response has reduced the rate of deforestation in both societies well below the pre-disaster rate, and has also helped to focus the attention of the public, as well as of politicians and officials, on the problems which can result from continuing loss of forests. The logging bans have also pushed logging for the Chinese and Thai markets into poorer neighbouring states such as Laos, Burma, and Cambodia where control over logging is looser and where state officials are more easily tempted by windfall gains from cutting natural forests.

From these two cases, then, I offer the following ideas for further analysis:

(1) Deforestation in developing countries will normally induce only 'weak proactive' policies.

(2) Ecological crisis brought about by policy failures can precipitate 'strong reactive' responses which produce much more dramatic reductions in forest depletion than have been achieved with typical 'weak proactive' policies.

(3) Neither democracy nor critical mass media nor activist NGOs are necessary for such a response to occur. Indeed, a polity may be hobbled, as seems to have occurred in Thailand, by the vigorous lobbying, resistance, or mutually beneficial collusion of a welter of competing interests and parties.

As Heilbroner (1974) and Ophuls (1977) suggested several decades ago, it is possible that democracies are unable to produce the vigorous action and the severe restrictions on the pursuit of individual benefit which may be essential to avoid some kinds of longer-term environmental disasters. This suggestion has not been popular among environmentalist scholars and activists, who are generally committed to *both* environmentalism and democratic decision-making (Dobson, 2000). However, it is possible that sufficiently forceful state action will only occur in certain kinds of authoritarian states. Indeed, democratic states typically become more authoritarian during wartime, for the same reason. A corollary is that environment crises, in the future, may push some democratic societies toward more authoritarian modes of governance.

In the meantime, it seems that both authoritarian and democratic states among developing societies in the contemporary economic world-system are too committed to short-term economic goals to impose more than 'weakly proactive' environmentalist policies on their citizens, except when actual or impending environmental disaster threatens national economic well being, and thus also threatens the survival of a regime.

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