

The Journal of Environment & Development

<http://jed.sagepub.com/>

Natural Resource Exploitation in Cambodia: An Examination of Use, Appropriation, and Exclusion

Thanakvaro Thyl De Lopez

The Journal of Environment Development 2002 11: 355

DOI: 10.1177/1070496502238662

The online version of this article can be found at:

<http://jed.sagepub.com/content/11/4/355>

Published by:



<http://www.sagepublications.com>

Additional services and information for *The Journal of Environment & Development* can be found at:

Email Alerts: <http://jed.sagepub.com/cgi/alerts>

Subscriptions: <http://jed.sagepub.com/subscriptions>

Reprints: <http://www.sagepub.com/journalsReprints.nav>

Permissions: <http://www.sagepub.com/journalsPermissions.nav>

Citations: <http://jed.sagepub.com/content/11/4/355.refs.html>

Natural Resource Exploitation in Cambodia: An Examination of Use, Appropriation, and Exclusion

THANAKVARO THYL DE LOPEZ

In the beginning of the 1990s, after a traumatic modern history of conflicts and genocides, the Kingdom of Cambodia, with the support of the international community, entered an era of relative peace. Cambodia is endowed with valuable natural resources and biodiversity. Over the past decade, however, economic development has relied primarily on the unsustainable exploitation of these resources. Current trends in the use of resources in forestry, fishery, and agricultural land are unsustainable. The central position of the article is that resource appropriation by the political, economic, and military elites has gradually excluded the majority of the population from the country's forests, fisheries, and arable areas. A common pattern of unsustainable extraction and inequitable access characterizes the exploitation of these resources. The article discusses policy implications for the government of Cambodia and the international donor community. Environmental reforms will face strong resistance from the elites, as institutional and social change may prove politically and economically onerous.

As historians Mabbett and Chandler (1995) have argued, the wilderness of nature has always figured prominently in the awareness of the Khmer, the people of Cambodia. Forests covered most of their country until the very recent past. Cambodia has historically been a sparsely populated country consisting of small settlements surrounded by impregnable forests. The land, the rivers, the forests, and the sea have generously provided for the Khmer, contributing to the rise of the civilization of Angkor. From the 8th to the 14th century, the Khmer empire, centered around the famed temples of Angkor, extended its cultural and political domination over all of present-day Cambodia and most of present-day Thailand, Laos, and Vietnam (Giteau, 1996; Groslier, 1966).

In sharp contrast, the modern history of Cambodia has been beset by a dramatic succession of conflicts and genocides. From 1975 to 1979, the murderous regime of the Khmer Rouge, an infamous Cambodian Maoist movement, presided over the mass extermination of 1.7 million Cambodians, or approximately 30% of the country's population (Kiernan,

1996). Three decades of violent conflicts have deeply scarred Cambodia's population and destroyed most of its infrastructures. The modern tragedy of Cambodian history has attracted extensive scholarly inquiry (Becker, 1986; Bizot, 2000; Chandler 1983, 1991, 1996, 1999, 2002; Kiernan 1993, 1996; Osborne 1979, 1994; Vickery, 1986). Since the 1991 Paris Peace Agreements signed under the aegis of the United Nations, the country has trodden with uncertainty on the path of reconstruction, development, and democracy. With the support of the international community, Cambodians are struggling to restore the rule of law and rebuild governing institutions that would put an end to a culture of impunity and corruption. Khmer Rouge crimes against humanity remain unchallenged by the existing judiciary system. Their legacy of ruthless violence and senseless destruction haunts Cambodia's politics and society.

At the beginning of the 21st century, the Kingdom of Cambodia essentially remains an agrarian society. Because of its traumatic history, Cambodia lags far behind its Asia Pacific neighbors on all basic social indicators, including infant mortality, educational enrollment, and access to safe drinking water. With a GDP of U.S. \$260 per capita, it belongs to the group of 20 poorest countries in the world (World Bank, 2001). Yet Cambodia has many natural resources on which it can rely as a basis for economic development. Cambodia's biodiversity a mere decade ago was not much different from when it was described in the 13th century by an emissary of the Chinese court. Tcheou Ta-kuan (1312/1902) provides an early and picturesque account of the country's natural wealth: "Many rare woods are to be found in the highlands. Unwooded regions are those where elephants and rhinoceros gather and breed. Exotic birds and strange animals abound" (p. 19). The challenge for modern-day Cambodia is to exploit these resources in a sustainable and equitable manner.

The present work examines recent trends in agricultural land, forests, and fisheries use. Each of these natural resources alone warrants a separate in-depth sector analysis. The more modest objective of the article is to present a synthetic review and to expose the unprecedented intensity of resource extraction across Cambodia's ecosystems. The policy implications of environmental degradation are discussed, drawing on an interdisciplinary perspective, including aspects of property rights regimes, the use of conditional aid, and the potential for social instability. As this requires difficult institutional and social reforms, I hope to contribute to public debate and inquiry with regard to the sustainable and equitable use of Cambodia's natural environment.

Exploiting Cambodia's Natural Resources

AGRICULTURAL LAND

With a total land area of 176,520 square kilometers and a population of 11 million inhabitants, Cambodia is a sparsely populated country. The Khmer have historically occupied a corridor of fertile soil running along Tonle Sap Lake and the Mekong River (Delvert, 1961). Most of the population is concentrated in an area representing less than one third of the country. In this ecological niche, Cambodian farmers have access to water for intensive paddy cultivation and are thus less dependent on the caprices of the monsoon rains.

Although some 6.5 million hectares are reported to be arable, less than 3 million hectares are considered reasonably productive (Cambodia Development Resource Institute, 2001; Ministry of Environment, 1994). Landmines have rendered large parts of the country inaccessible and have considerably hindered agricultural productivity. According to the preliminary results of a nationwide study of landmines and unexploded ordinance, 45% of a total of 11,102 villages surveyed were identified as contaminated (Cambodian Mine Action Center, 2002). The area under rice cultivation in 1997 had been reduced by almost 30% from its level of 1967 (Oxfam Great Britain, 1999). Some 90% of the population is rural and relies on farming as its main source of income. However, rural communities have traditionally also been able to supplement farming activities with a safety net consisting of forest and fish products.

Between 1950 and 1970, the proportion of landless farmers increased from 4% to 20% (Kiernan, 1996). Although these never formed a sufficient majority for a peasant-led uprising, they were numerous enough for the Khmer Rouge to build a popular support base (Frieson, 1997; Kiernan, 1996). After the Khmer Rouge victory in 1975, land ownership was abolished and Cambodia became an indentured agrarian state organized into massive gang labors (Kiernan, 1996). It was not until the Land Law of 1992 that private land ownership was formally reestablished.

Access to arable land has reemerged since the end of the war in 1991 as a highly contentious issue. The administrative infrastructure for land management and the old cadastral records were destroyed by the Khmer Rouge. Even in the rare cases in which property rights could be demonstrated by documents predating the war, the government decided to allocate land on the basis of present occupation and cultivation. The Ministry of Land Management, Urbanization and Construction has received some 4.5 million applications for possession rights to cultivate land, most of which remain unprocessed. An estimated 10% of rural families who own land have full legal titles, whereas the overwhelming majority do not possess any official ownership documents

(United Nations World Food Program, 1999; World Bank, 2000). The registration of land ownership is a lengthy and arduous procedure that requires the signatures of a variety of commune, district, provincial, and national authorities. The system presents rent-seeking opportunities for corrupt officials and discriminates against those who cannot pay unofficial fees or who do not have political connections.

The inefficient pace of titling and the absence of map-based records have led to growing disputes over available agricultural land. The poor remain, in effect, unable to secure land rights and thus constitute easy prey for land grabbers. Among the landless, an estimated 13% report that their land was taken from them without compensation (Oxfam Great Britain, 2000). For several years, dispossessed farmers have set up a permanent camp outside the National Assembly to protest illegal land grabbing. Oxfam reported that 75% of people accused in land cases are either officials or the military (Oxfam Great Britain, 1999). The absence of secured property rights has made Cambodian farmers vulnerable to land dispossession by the armed forces and the country's political and economic elites. A survey of 30,000 rural households in 15 different provinces shows that landlessness has increased from 3% to 13% of the population between 1985 and 2000 (Oxfam Great Britain, 2000). Other sample surveys report a rising trend in landlessness, which could represent as high as 20% of the rural population, and an increase in the number of conflicts over land as it is becoming more concentrated in the hands of the elite (World Bank, 2002).

FISHERIES

The fisheries sector accounts for approximately half of the GDP (World Bank, 2000). The Food and Agriculture Organization (FAO) of the United Nations has estimated that on average, 75% of the daily protein intake of Cambodians comes from fish (FAO, 1997). The combined catch from marine and freshwater fisheries totaled approximately 95,000 tons in 1994 (Department of Fisheries, 1998). According to the Department of Fisheries of the Ministry of Agriculture, marine fisheries then represented 32% of the annual fish catch, inland fisheries 61%, and aquaculture 6%. These proportions are not expected to have varied significantly over the past few years. There is, however, greater uncertainty regarding the current total annual fish catch, which was estimated to fall in the range of 255,000 to 400,000 tons in 2001 (Department of Fisheries, 2001).

Marine Fisheries

Although Cambodia has 435 kilometers of shoreline and a corresponding exclusive economic zone (EEZ) extending more than 55,600 square kilometers, its marine fishing fleet remains limited. The devasta-

tion of the war precluded any development of a modern fishing industry and related infrastructure in Cambodia. Fewer than 200 vessels with horsepower greater than 30 were registered in 1995 (Ministry of Environment, 1998). Most of the trawlers plying the Cambodian EEZ illegally operate from Thailand and Vietnam, reportedly with some level of collusion with Cambodian authorities (International Center for Living Resources Management, 1999; Ministry of Environment, 1998). Overcapitalization of the Thai fishing fleet led to the collapse of the fisheries of the western Gulf of Siam in the 1980s, forcing Thai fishers into the Cambodian EEZ.

Shrimp, crab, squid, tuna, and other highly valuable species yield greater profits in foreign markets. Consequently, most of the marine catch is exported to Thailand, whereas only low-value surpluses are sold on local markets. Several studies of local communities show that capital investment required for deep-sea fishing is significantly higher than for coastal fishing (Bann, 1997a; De Lopez, 2001c). A traditional rowboat typically costs less than U.S. \$100, compared with several thousand dollars for a small motorized trawler. The absence of rural credit facilities prevents subsistence fishermen from participating in the more lucrative marine activities. Local coastal communities are largely restricted to the harvesting of low-value shell and fish species that abound in the shallow waters of creeks, bays, and estuaries.

There is little reliable current information on the status and trends of marine fish stocks in Cambodia. The Scientific Research Institute for Oceanography and Fisheries of the USSR conducted a research expedition between 1983 and 1986, in cooperation with Cambodian scientists (Ahmed, Tana, & Thuok, 1996; Csavas, Doulman, Petr, Prado, & Debas, 1994). More than 400 fish and crustacean species were reported, including commercial species such as mackerel, anchovy, sardine, tuna, flat fish, snapper, and grouper. A maximum sustainable yield of 20,000 tons of fish per year was suggested by the report. In contrast, marine catch by foreign and Cambodian vessels already exceeds 30,000 tons per year (Department of Fisheries, 1998; Ministry of Environment, 1998). The actual figure is in all probability much higher than as shown by official registries. Available statistics do not include the catch of foreign boats and Cambodian boats that land their fish directly in foreign harbors. An undetermined share of the catch is not declared to authorities for tax evasion purposes or simply not recorded because the Cambodian Department of Fisheries does not employ a sufficient number of field staff. There have been reports that overexploitation by trawlers has already led to the depletion of shrimp stocks in Cambodia (International Center for Living Aquatic Resources Management, 1999).

Cambodia is on the way to following the well-studied pattern of conversion of shoreline forests and mangroves to mariculture (Dierberg & Kiattisimkul, 1996; Flaherty & Karnjanakesorn, 1995; Gujja & Finger-

Stich, 1996). The relatively undisturbed coastal areas have attracted foreign and Cambodian entrepreneurs seeking rapid profits in shrimp farming, fishing, logging, and tourism development. This trend started after the fall of the Khmer Rouge regime and accelerated with the political stabilization of the country in the beginning of the 1990s. By 1994, intensive shrimp farming and charcoal production had degraded an estimated 3% of Cambodia's 85,100 hectares of mangroves (Asian Development Bank, 1996). With the support of local authorities and the Armed Forces, the exploitation of coastal ecosystems is threatening the livelihoods of near-shore subsistence fishers (Bann 1997a; De Lopez, 2001a, 2001c). Mangrove forests provide a variety of environmental benefits, including storm protection for human activities and spawning grounds for marine organisms. The destruction of critical habitats and ecosystems will have a negative impact on the fish catch of local communities.

Freshwater Fisheries

Tonle Sap, the Great Lake of Cambodia, is the largest freshwater body in Asia. During the monsoon when its surface reaches 250 kilometers long and 100 kilometers wide, the lake covers about 6% of the country, equivalent to 10,000 square kilometers. At the beginning of the wet season, the melting of Himalayan snows and the monsoon rains send a surge of water into the Mekong, which causes the Tonle Sap River to reverse its flow toward Tonle Sap Lake. This peculiar hydrology transforms the area into a reservoir that naturally regulates floods from the Mekong.

The so-called inundated forest forms a 20- to 40-kilometer-wide floodplain around the lake. This secondary scrubland vegetation is mainly confined to the fluctuating shorelines of the lake. The ecosystem of Tonle Sap is essentially supported by the decomposition of organic matter from the flooded forests. The ebb and flow of the waterline between wet and dry seasons provides critical nutrients to aquatic life, including more than 850 species of fish. Carp, catfish, murrel, and eel are the principal families (Pantulu, 1986). During the wet season, fish migrate from as far north as lower China and as far south as the Mekong Delta in Vietnam to spawn in the areas flooded by the lake. Consequently, the success of fish reproduction in a given year is critically dependent on the free and natural flow of the flood and the extent of the inundated forest.

The exploitation of the Tonle Sap fishery relies on a system comprising some 60 fishing lots. The lot system whereby the Royal Treasury received taxes from fishers for use rights of fishing grounds was first formalized under the French Protectorate in Cambodia in 1908 (Degen & Thuok, 1997). The lot system was abolished by the Khmer Rouge, then reestablished and operated as socialist solidarity groups from 1979. From 1979 to 1992, these governmental fishing cooperatives exploited

the fishing lots in Tonle Sap Lake. In 1992, to increase state revenues, the government of Cambodia introduced the prevailing system of fishing lots. Lots are auctioned every 2 to 3 years by the state to private entrepreneurs. The smaller lots have a surface of 20 square kilometers each, whereas the 20 largest lots are typically 20 kilometers long and 10 kilometers wide, for an equivalent surface area of 200 square kilometers. Smaller lots are auctioned for U.S. \$2,000, larger ones for up to U.S. \$200,000 (Lieng, Yim, & van Zalinge, 1995).

Lots allow cornucopian catches with minimal fishing effort. *Takei Lot*, the Khmer equivalent of "fishing lot tycoons," have exclusive rights over the exploitation of their lot and usually enforce them with private militias. The lessee surrounds flooded areas of the shoreline with wooden fences, waits for water to recede, and then garners fish off the wet ground. Most of the production is exported to the lucrative Thai market. The overwhelming majority of fishers, who generally practice subsistence or artisanal fishing, cannot afford to bid for even the smaller lots. Because fishing lots cover 80% to 90% of the lake's shoreline, subsistence fishers have de facto been excluded from the more bountiful areas of the lake and must lead an increasingly precarious existence.

Some 60% of total inland fish production originates in the lake and its surrounding floodplain. The region may supply as much as 80% of the total amount of fish consumed in Cambodia (FAO, 1997). An estimated 1 million people living on floating villages and around the lake directly depend on fishing activities. Although no comprehensive fish stock assessment exists, there is evidence that at present rates of exploitation, Tonle Sap fisheries may eventually collapse. The 1997 fish catch represented less than 60% of the 1960s catch (Fily & d'Aubenton, 1965; FAO, 1997). Catches of mature specimens of several commercial fish species from Tonle Sap Lake have declined, including the giant Mekong catfish (*Pangasius gigas*), the giant barb (*Catlocarpio siamensis*), and the Isok barb (*Probarbus jullieni*) (Ahmed, Hap, Ly, & Tiongco, 1998; van Zalinge, Thuok, & Tana, 1997). A survey of freshwater fisheries by the Mekong River Commission shows that 95% of households have recorded declines in their catch (Ahmed et al., 1998).

The logging of the inundated forest may seriously modify the hydrology of the lake and destroy fish habitat. The problem is further compounded by deforestation in the broader watershed of Tonle Sap, which has resulted in increasing runoffs from higher elevation areas. The resulting sedimentation may have an overall negative impact on fishery productivity. Using 1989 LANDSAT imagery, Thung (1994) has determined that the inundated forest had been reduced from 1 million in the 1960s to 614,000 hectares in 1992. FAO (1997) estimated the extent of the forest to 480,000 hectares in 1997. Analysts tend to agree that logging for firewood and charcoal production and conversion to agricultural uses,

in particular, rice and mungbean cultivation, is destroying the inundated forest rapidly (Ministry of Environment, 1998).

The ongoing construction of a system of seven large dams on the upper Mekong in the Chinese province of Yunnan constitutes an additional exogenous threat to the integrity of Tonle Sap Lake. The planned completion of this hydropower cascade over the next 20 years would dramatically modify the hydrological flow and sediment levels of the Mekong (Chapman & He, 1996). This will in turn have a negative impact on aquatic ecology and will alter the flood cycle of Tonle Sap plain. A study of large dams by the Mekong River Commission concludes that blockage of migration of fish might be the most serious threat and could lead to massive losses in fish production (Ahmed et al., 1996; Mekong River Commission, 1997). Official reactions to the construction of these dams have been generally muted, with China insisting that there will not be any environmental impact on downstream countries. The water politics of the Mekong River, as Milton Osborne (2000) has argued, are marked by the sharp imbalance in power between Southeast Asian countries and China's "impossibly large presence." There is little hope for these countries to influence China's course of action if it decides to proceed with the construction of the dams.

The Cambodian government derives substantial cash flow from lot rental fees and harvesting permits for marine and freshwater fisheries. Revenues from Tonle Sap lot auctions (U.S. \$1.9 million) represent more than 65% of total fees collected from fisheries (Ministry of Environment, 1998). In contrast, the budget of Department of Fisheries has been chronically inadequate, averaging less than U.S. \$200,000 a year. This has led to pervasive graft and poor institutional capacity. The existing Fishery Law, if implemented, would provide a sound basis for resource conservation. The Fishery Law strictly regulates fishing gear and equipment, fishing seasons, and fish sanctuaries. Tonle Sap Lake and its floodplain have the legal status of a protected landscape and ichthyologic reserve. Industrial fisheries may not operate during the wet season, when fish species migrate to the floodplains to spawn. Cambodian and foreign commercial entrepreneurs, supported by the armed forces and powerful political allies, have been able to take advantage of weak legal enforcement. The Department of Fisheries and Ministry of Environment staff stationed at Tonle Sap have confirmed to the author that they are generally helpless against businessmen with strong political ties. Conversion of the inundated forest to mung bean cultivation by local strongmen is proceeding unhindered. Although the Fisheries Law details types of fishing gear and restricts their usage during breeding seasons and in fish sanctuaries, Department of Fisheries staff lack the budget, equipment, and political support to enforce existing laws. Consequently, fish sanctuaries are not strictly protected, and the use of explosives, fine mesh, and other illegal equipment, as well as the capture of fries and fingerlings by

fishing tycoons, remains uncontrolled (Ministry of Environment, 1998). The marine and inland fisheries of Cambodia have thus been turned into an exclusive preserve for the profit of national elites.

FORESTS

The forest estate of Cambodia has traditionally been divided between conservation forests for nature protection and tourism and production forests for timber exploitation. Starting in 1913, the French colonial administration is credited with the earlier steps of establishing forest reserves (Le Billon, 1994). After Cambodia gained independence in 1954, forests were further surveyed and set aside for wildlife conservation and sustained timber production. By 1970, some 6 million hectares of forests were actively managed by the Department of Forestry. Few Cambodian foresters survived the civil war and the Khmer Rouge regime. The rule of the Khmer Rouge, which focused on rice production, left much of the forest estate undisturbed. After the fall of the Khmer Rouge in 1979, the various political factions exploited the forests more intensively in an effort to bolster their military capacity (Talbot, 1998). This marked the beginning of large-scale deforestation unprecedented in Cambodia's history and persisting to the present day. In 1994, the newly elected Royal Government of Cambodia instituted a system of private concessions that granted logging rights to private companies. Cambodia was facing international pressure to control deforestation and to exploit its forest resources in a sustainable manner. Concessions were granted to curtail illegal logging activities and to increase timber royalties for the government. Within 3 years, 7 million hectares of forests had been transferred to 33 different concessions managed by Cambodian, Chinese, Indonesian, Japanese, Malaysian, Russian, Taiwanese, and Thai companies (World Bank, 1996).

The forest cover rate of Cambodia was estimated using 1989 satellite imagery at 9.1 million hectares or 62% of the total land area (Thung, 1994). Although no countrywide assessment has been performed since, field checks conducted by the Asian Development Bank paint a seriously degraded situation. At present rates of exploitation, Cambodia's forest resources will have been totally exploited within the next 6 years (Asian Development Bank, 2000b). Although the annual allowable cut for sustained production has been estimated at around 500,000 cubic meters per year, actual production may exceed 4.5 million cubic meters per year (International Development Association, 1997).

The Department of Forestry and Wildlife, the lead agency in forest management, suffers from chronic institutional weakness and is unable to enforce regulations on sustainable yield. Although the Ministry of Environment has jurisdiction over some 3.3 million hectares of protected areas, insufficient budget hinders its management capacity. Conse-

quently, most of Cambodia's parks and wildlife reserves remain paper parks threatened by deforestation (De Lopez, 2001a).

The process through which concessions are awarded is muddled and consists of direct negotiations between senior government officials and private companies. Ministers, military commanders, provincial governors, and members of parliament have issued cutting permits to logging companies. Royalties from concessionaires must in theory be paid to the state's treasury. In practice, corruption has pervaded the system of concessions and has drawn criticism from the international community. In a separate work, I have exposed at greater length the implicit coalition to exploit Cambodia's forests that exists between the government, the armed forces, and timber concessionaires (De Lopez, 2001b). When a high-ranking official grants a cutting permit to a company, he expects to receive unofficial payment for his intervention. Part of this payment is distributed to the official's protégés, and part of it is transferred to higher echelons for the official's own political survival. The armed forces either directly harvest timber resources themselves or do so in collusion with concessionaires. In turn, military commanders are expected to transfer part of their revenues to central governmental authorities. The current government derives its power from this implicit "give and take rule," whereby revenues from logging must be shared with the armed forces and provincial authorities. In exchange for their support, military commanders gain the right to mine the natural resources of the provinces they control.

The international demand of timber exerts strong pressure on Cambodia's forest resources. Most of Cambodia's production is exported to Thailand, Laos, and Vietnam for direct consumption or transshipment to other countries. In an effort to promote local wood-processing industry, the government has decreed three successive bans on the export of unprocessed logs since 1996. All bans have been broadly violated (Global Witness, 1998, 1999, 2001a, 2001b). The scale of illegal exports is such that most of eastern Thailand may depend to a large extent on Cambodia's forests. Similarly, Vietnam's garden furniture industry uses Cambodian logs to manufacture products that are sold on European markets (Global Witness, 1999, 2001a).

Although farming and fishing are the main sources of income for rural communities, significant supplementary products such as firewood, timber for construction, food, and medicine are collected in forests. Several studies have shown that medicine and food represent an important source of income for rural populations (Bann, 1997b; De Lopez, 2001c; Meng, Kim, & Pech, 1999). Timber companies have prevented local villagers not only from cutting trees but also from collecting firewood, medicine, food, resin, and other nontimber forest products. Concession rights have been strictly enforced with armed employees and hired military personnel. Because most of the country has been

transferred to timber concessions and private interests, local people have been increasingly excluded from Cambodia's forests.

The process of deforestation in Cambodia is part of a broader trend of large-scale degradation perpetrated by multinational logging firms in the Asia Pacific region. Cambodia opened to international markets at the beginning of the 1990s and constitutes the final episode of an international succession of timber booms and busts in which, among others, Japanese, Indonesian, and Malaysian firms have played prominent roles (Dauvergne, 1997, 2001; Ross, 2001). The Mekong region is the final stage of a trail that has taken multinational loggers across the Asia Pacific, as they hop from one country to another exhausting timber resources. Many of the firms operating in Cambodia have more than 30 years of successful forest rent appropriation across the Asia Pacific. The industry is skilled in extracting timber resources rapidly, in building political and military support, and in resisting meaningful attempts at environmental reforms. Patterns in Cambodia of corruption of government officials, client-patron relationships, military involvement, exclusion of local communities, and disregard for environmental standards are reminiscent of the forestry sectors of Indonesia, the Philippines, and the Solomon Islands.

Policy Implications

There are disturbing similarities among the dynamics that determine how the forestry, fishery, and land resources of Cambodia are exploited. In all three cases, the pattern of discrimination against the poor is similar. Corrupt government officials, in collusion with the armed forces and powerful private interests, have arrogated the proceeds of the kingdom's natural wealth, to the detriment of a growing proportion of those excluded. Forest concessions and fishing lots have been allocated on nepotistic grounds to operators, who favor short-term benefits without any concern for sustainability principles. The inexorable destruction of the environment threatens the basis of traditional rural livelihoods. The elites have grabbed arable land not for productive purposes but more often for speculation and immediate capital gains.

Although the purpose of this article is to contribute to the theoretical understanding of contemporary Cambodia, the development of management plans for each of the three primary environmental resources discussed is beyond its scope. The present section refrains from giving advice to the "authorities," the government of Cambodia, or international donors. Neither should it be construed as a definitive answer to a set of complex social, political, and environmental issues. More modestly, the objective is to promote public debate and scrutiny that may

bring about some level of social and institutional change for achieving sustainable development.

PROPERTY RIGHTS

The theory of the property rights regime predicts that in cases of open access, in which anyone can enter a resource pool and appropriate resource units, overexploitation of the resource will result (Anderson, 1977; Dasgupta & Heal, 1979). Open access represents a lack of any kind of property right or ownership and is completely nonexclusive: No one can be prevented from exploiting the resource.

The prescribed policy has traditionally been for government to impose a different set of institutions on open access resources, notably, the creation of private property as a more efficient form of ownership. With the exception of marine resources, much of Cambodia's forests, fisheries, and agricultural land are already under private property ownership. The elites have well-defined forest concessions, fishing lots, and land holdings. Their rights are both exclusive and enforceable: Owners hold the power to the exclusive use of natural resources and can also prevent others, notably the rural poor, from using these resources. On a nationwide scale, the establishment of private property has not brought about economic efficiency or sustainable management of natural resources. The case for private property regimes rests on the assumptions that the owner chooses to manage well and to produce things valuable to society, that the interests of the owner are in accord with those of nonowners, and that private property is an inducement to industry rather than a substitute to industry (Bromley, 1991). These assumptions have been broadly violated in Cambodia. Fishing and logging concessionaires operate without any regard for environmental and social externalities, and vast tracks of arable areas are held for nonproductive uses while local people struggle on marginal land. An authority system able to uphold the rights and duties of owners is an essential component of any property rights regime. The Cambodian government has been unwilling to enforce environmental regulations on private owners, while the economic elites have taken advantage of the lax regulatory context.

To date, common property ownership and traditional rights structures have received little policy-making attention in Cambodia. Under common property, a group of individuals, such as people from the same village, hold ownership rights to the resource. The behavior of all members of the group is governed by accepted rules over the use of the resource and the distribution of the proceeds. Despite the rhetoric on participatory and community-based resources management, there are few examples of fisheries, forests, or agricultural land under the management of local people. The real "tragedy of the commons" may be the

process whereby indigenous property rights structures have been undermined and delegitimized (Bromley, 1991). This process has taken place in Cambodia, where the common resource pool has been eroded by the creation of private ownership favoring timber concessionaires, fishing lot tycoons, and agrarian landlords. To argue that common property regimes are optimal for all natural resources is as simplistic as to promote private property as a tool for achieving sustainable development in Cambodia. The successful conversion to a common property regime depends on a number of physical and sociocultural variables. Design principles for successful self-governed common-pool resource institutions, as well as conditions that enhance the likelihood of local users avoiding overexploitation, have been presented in the literature (Baland & Platteau, 1996; Gibson, McKean, & Ostrom, 2000; Ostrom, 1990; Stevenson, 1991). These include recognition of rights by governmental authorities, users' prior organizational experience, and the existence of a common understanding of each resource's attributes. Opportunities for granting local communities ownership of forest, fish, and land resources need to be further investigated in Cambodia. Under a common property regime, local people may be able to regain access to essential natural resources while contributing to preserving the country's environment.

Recognizing that the absence of secured property rights and the restricted access to common property resources are main contributors of poverty, international donors have agreed to finance a land management and administration project in Cambodia (World Bank, 2002). The objectives of the project are to strengthen land tenure security, resolve land disputes, manage land in an efficient and sustainable manner, and promote equitable land distribution. The project, starting in 2002, will be implemented over 15 years. Project components include the development of land registration and land dispute resolution mechanisms. An estimated 6 to 7 million titles are expected to be issued over the lifetime of the project. The case for land titling is based on the assumption of a positive correlation between formalized private property rights and economic development. The argument is that lack of land security is "hindering economic growth in Cambodia by reducing incentives to invest" (World Bank, 2002). For instance, low farm productivity and low rice yields may be due primarily to low investment in water control technologies. However, there is a danger that land titling may formalize the existing distribution of land, which already favors the elites. Although the project specifically targets rural communities through the intermediation of local grassroots organizations, wealthy landowners may be able to influence the process to their advantage. In a comparative study of similar land titling projects in Thailand and Indonesia, Herman Slaats (1999) argued that to conclude that registration of land might have protected the small landholder is incorrect. The law was selectively applied

and interpreted in favor of the empowered establishment, providing no safeguard to the poor. Land titling in Cambodia may simply record that large parts of the country are controlled by members of the armed forces and other branches of government. Hence, as has been emphasized by Daniel Bromley (1991), "a good deal of theft may end up as private property" (p. 114).

CONDITIONAL AID

The international community has been the main driving force behind Cambodia's return to relative peace and stability. The United Nations Transitional Authority in Cambodia administered the most complex and ambitious attempt to rebuild the country's economy and institutions and successfully oversaw national elections in 1993. Over the past decade, the international community has continued to assist the slow recovery of Cambodia through the agencies of the United Nations, multilateral lending agencies, overseas development agencies, and a variety of nongovernmental organizations. Reforms of the land law and forests concessions have emerged as issues of serious concern for donors. Nonhumanitarian assistance may become more conditional on the government's capacity to implement governance measures articulated by international donors. The four elements of good governance, defined as the manner in which power is exercised in the management of the country's economic and social resources for development, are accountability, transparency, predictability, and participation (Asian Development Bank, 2000a). Under a full-reform scenario, the Asian Development Bank expects Cambodia to be able to attract official grants and loans of up to U.S. \$1,046 million per year by 2020, versus only U.S. \$71 million per year under a no-reform scenario.

In the Asian Pacific region, Cambodia, Indonesia, the Philippines, and the Solomon Islands provide cases of mitigated success of making the disbursement of aid monies conditional on forestry reform (Dauvergne, 2001; Ross, 2001). Global Witness, a British conservation organization, has been an early advocate of the disbursement of aid contingent on the Cambodian government reaching targets for reform of the forest sector, including cancellation of concessions of companies that have logged illegally or that cannot meet sustainable forestry standards (Global Witness, 1996). In 1996, the International Monetary Fund froze a U.S. \$20 million loan to Cambodia because of the failure of the government to capture a sizable share of the forest rent despite the rapid deforestation of the country. The government then ordered a military crackdown on illegal logging operations, which culminated in 1999 in the widely publicized destruction of sawmills and confiscation of logs and equipment. Peter Dauvergne (2001) attributed the success of conditional aid in Cambodia to the heavy reliance of the state on foreign aid and to

unfavorable market conditions. The Asian financial crisis from 1997 to 1999 lowered demand from Japan and South Korea and contributed to a decrease in timber production in many exporting countries. The power of timber companies declined with the fall of corporate profits, while international donors gained more influence because external funds were essential to economic recovery.

Demand for tropical timber has rebounded due to stricter logging policies in China since 1998 and economic improvement in Japan and South Korea. The resumption of International Monetary Fund credit facilities to Cambodia in 1999, with a loan worth U.S. \$80 million, may therefore have been premature. Evidence is emerging that the timber industry and Department of Forestry officials have simply become more adept at concealing their operations (Global Witness, 2002). Global Witness (2002) has contested claims by the government that only small-scale forest crimes have taken place in Cambodia since 1999. Although the Forest Crime Monitoring Unit submitted 23 documented cases of violations by concessionaires, this has resulted in no apprehension of suspects nor legal action taken. This pattern, which could be described as "cat and mouse" between international donors, national governments, and the timber industry, has been reported for Indonesia and the Solomon Islands, where the state similarly responded to pressure for environmental reforms "with better rhetoric, tighter policies, and minimal genuine actions against timber firms" (Dauvergne, 2001, p. 64). Michael Ross (1996) has suggested that conditionality may work best in cases in which the logging industry is politically weak because it is at the beginning of a timber boom or approaching a timber bust. Reforms in the Cambodian forestry sector may soon become possible as the period of lucrative harvests from overseas sales comes to an end and corporations gradually lose interest in the country. The use of conditionality may allow international donors to push for otherwise politically costly measures. However, as in the case of the Philippines, for instance, these reforms may come too late to save Cambodia's forests.

There may be comparatively more opportunities for the effective use of conditionality in the fishery and land sectors. The involvement of multinational corporations in fisheries is uncertain, but the scale of profits is likely to be substantially more modest than in the forest sector. The fisheries of Lake Tonle Sap remain atomized and are operated by local strongmen. Although these similarly rely on political support through client-patron relationships, their sway on the state is less significant than that of logging concessionaires. Paradoxically, a reform of the Cambodian fishery sector has attracted less international attention. This may be explained by uncertainties regarding the state of fish stocks and the more insidious nature of the depletion of fishery resources. In contrast, international donors will closely scrutinize the proposed reform of the land sector (Asian Development Bank, 2000a; World Bank, 2002). Perfor-

mance indicators for the land management and administration project include the issuance of some 1 million titles from 2002 to 2007 and measures of reduction in the number of conflicts over land. The project, however, presents a number of inherent risks, as recognized by the international community. The support of the government and its commitment to ensuring that dispute-resolution mechanisms function efficiently and fairly remain uncertain. The extent of land ownership by the military and political elites is estimated to be high, which will constitute an obstacle to the stated objective of promoting equitable land distribution. The project will therefore not title land in cases in which agreements cannot be reached and "scale back if commitment to reform flags" (World Bank, 2002).

SOCIAL STABILITY

Without fundamental institutional reforms, a continuation of present trends in natural resources exploitation may lead to the concomitant collapse of several primary ecosystems in Cambodia. With the exception of mountainous regions, the country has lost most of its frontier forests. The depletion of marine and freshwater fisheries would deprive up to 5 million subsistence fishermen of their livelihood. Large landholders may be tempted to venture into rubber, palm oil, cash crops, or drug plantations or to turn their estates into landfills for toxic wastes from industrialized Asian countries (Human Rights Watch, 1999).

Successive governments have failed to inject a sizable share of the revenues of forestry and fishery into productive investments and public infrastructure. Large segments of the population do not have access to the most basic social services. After more than 20 years of conflict, the cleavages within Cambodian society have barely healed. The concentration of wealth from natural resources in the hands of the military junta, prominent business figures, and political leaders connected to the ruling party may exacerbate divisions between the ruling elite and the general population. Cases abound in which dispute over land, fishery, and forestry resources have pitted the armed forces against local communities, timber concessionaires against indigenous people, or government staff against fishing tycoons.

A growing body of the environment and security literature has reported empirical evidence that environmental scarcities are contributing to violent conflicts in many parts of the developing world (Barber, 1998; Homer-Dixon, 1994, 1999). Environmental scarcity of renewable resources may arise from depletion or degradation of the resource, from increased demand, and from unequal distribution. The existence of causal links between environmental degradation and social conflicts is a matter of controversy. Analysis of causation is difficult as a host of physical and social variables may be the sources of conflicts (Deudney, 1991).

In a model suggested by Thomas Homer-Dixon (1999), resource capture by powerful groups and associated ecological marginalization contribute to constrained agricultural and economic productivity, migration of affected people, segmentation of society, and disruption of institutions. These social effects may in turn generate violent conflicts such as insurgencies and group-identity conflicts.

Whether this causal pattern can materialize in Cambodia warrants further investigation. There is, however, evidence of localized disputes arising directly from environmental degradation. Desperate local people may once more take up arms and resort to violence to survive. The poor and excluded provided the backbone of the Khmer Rouge rise. The World Bank (2000) estimated the poverty line at 36% of the national population and at more than 40% in rural areas. More ominous is the fact that inequality of distribution of income is higher than in most other Asian countries at a similar level of economic development. Cambodia's population remains almost entirely rural and thus is highly dependent on access to natural resources for its subsistence. These are opportunistic times for exploiting popular discontent, which emerging local or regional strongmen may choose to take advantage of. The central government retains control over the central plains because of their accessibility and proximity to the capital city. Border provinces, such as those administered by the former Khmer Rouge, however, remain under tenuous or symbolic state administration.

As well, the government may be tempted to resort to force against popular discontent. As one senior military commander optimistically confided to the author, "This country is sparsely populated, a few tanks can easily quell any rebellion" (anonymous, personal communication, May 2000, Phnom Penh). The regime may be able to contain localized conflicts over natural resources between rural communities and state-endorsed extractive activities. Popular discontentment may not have the dire consequences of the Khmer Rouge rule, but it is likely to maintain Cambodia in a chronic stage of political instability and associated underdevelopment.

REFORM QUANDARY

Reforms in the environmental sector would imperil the current distribution of wealth skewed toward the elite. Although in the long term, reforms would benefit Cambodia's society and economy, in the short run they challenge the prevailing political economy of natural resource exploitation. Long-term benefits do not provide sufficient incentives for the current elites to move toward sustainable development.

As environmental degradation accelerates and ecosystems collapse, increasing popular resentment, combined with international pressure, may eventually compel the government to adopt wide-ranging and

meaningful reforms. The shock of ecosystem failures on human activities and social stability must be felt on a massive scale to induce the government to act. Essentially, before policy makers take note of environmental degradation, large sections of the populace must be directly affected and impoverished and must express their dissatisfaction. Unfortunately, ecosystem resilience would have already been seriously compromised at this stage. Their response to late changes in management is unlikely to have meaningful consequences for human activities. The implementation of sustainable yield principles would not result in any immediate tangible benefits once the national stocks of fish and timber have all but been depleted.

The dilemma confronting Cambodia's leaders and the international community is that environmental reform may result in increased political instability. The government has its hands tied and may not be able to open the regime to the detriment of its own political survival. The leadership juggles between trying to attract much-needed foreign direct investment and international aid disbursement and satisfying the clientele of strongmen and national elites for its political support. As environmental degradation accelerates and natural capital is depleted, its strategic options are narrowing. Reform programs articulated by the World Bank and the Asian Development Bank, along the lines of good governance, transparency, participation, and accountability, might seriously jeopardize the very foundations of the regime and the foundations of governmental support from dominant vested interests. The opposition of powerful military, political, and business figures to any change in the distribution of the natural wealth of the country might prove an insurmountable hurdle. The political cost associated with the successful implementation of wide-ranging reforms may accelerate the regime's demise and undermine its control over society. It is not clear whether Cambodia has the political capacity to undertake pragmatic governance reforms without political fallouts and fundamental threats to regime survival.

CONCERN FOR THE POOR

In a separate work, the author has argued for, and presented in greater detail, the use of a stakeholder management framework in controlling deforestation in Cambodia (De Lopez, 2001b). Stakeholder management, which finds its original roots in the management literature, consists of understanding the behavior, actions, and interests of stakeholders and devising strategies to effectively deal with them (Freeman, 1984). Stakeholder management recognizes the conflicting nature of the demands placed on the natural resources of Cambodia by different interests groups and organizations. The present pattern of natural resources exploitation cannot be straightforwardly attributed to ignorance and

lack of technical capacity but is to a large extent motivated by the interests of the more powerful stakeholder groups, that is, the Cambodian political, military, and economic elites. Present trends in deforestation, fishing, and appropriation of land benefit these elites.

The objective of stakeholder management, performed from the perspective of the international donor community, is to bring about institutional changes that would allow for the sustainable and equitable exploitation of Cambodia's natural capital. However, donors cannot meet the rightful needs of the Cambodian population while simultaneously satisfying the demands of the country's elite. Much of this article has underlined the trade-off inherent in the distribution of the country's natural resources among stakeholders. Cambodia's environmental pie can hardly be expanded; donors may, however, attempt to promote a more just distribution of this pie.

The existing coalition of interests among the country's political, military, and economic elites represents a major obstacle to any dramatic changes in the appropriation of the natural rent. In these conditions, a possible course of action is to gradually curtail the activities of the elites while granting local people greater use of natural resources. Although the Tonle Sap fishing lots and the national system of forest concessions must ultimately be reformed, opposition from the elites has impeded donors' efforts to promote sustainable yield principles over the past decade. Donor intervention ought to focus on access to arable land, while funding of protected areas can provide a supplement of forest and aquatic products to rural populations. As timber companies move from areas where resource extraction is no longer profitable, there may exist an opportunity for the rehabilitation of degraded ecosystems and the promotion of community-based stewardship.

The agricultural fields of Cambodia that are contaminated by unexploded ordinance and mines constitute an untapped source of arable land. Demining should not proceed before land titles can be issued to local people, lest cleared land be appropriated by the elites. This requires a tremendous strengthening of the existing land-ownership registration system, including the constitution of reliable cadastral records. Land registration must be streamlined and ought to be performed directly by the Ministry of Land Management under international supervision. The poor would thus be able to circumvent the patronage of local strongmen and other elites for land titling. The involvement of United Nations agencies and nongovernmental organizations, for example, Oxfam, will remain necessary to ensure transparency of the process.

Protected areas, which cover 18.2% of Cambodia, are essential to the preservation of the country's tropical evergreen forests and aquatic ecosystems. Most parks currently suffer from poor institutional support and a lack of financial and human resources (De Lopez, 2001a). A report by Global Witness (2002) has documented large-scale logging opera-

tions in seven national parks and wildlife sanctuaries, while illegal logging is reported in almost all existing protected areas. If efficiently managed, Cambodia's parks could provide the rural population with a host of environmental services and products derived from coastal ecosystems, tropical forests, and lakes. All Cambodian protected areas allow for subsistence activities in defined community development zones. Local people may fish and gather forest products as long as their activities use traditional gear and remain noncommercial. International assistance for conservation would enable the Ministry of Environment to enforce more strictly park protection measures against commercial entrepreneurs while maintaining access to parks for local people.

Despite the concern of many people in government, international agencies, and nongovernmental organizations, the degradation of Cambodia's environment has proceeded unabated. There is little hope of sustainable management of the country's forests and fisheries on a large scale. Frontier forests in much of the Asia Pacific have already succumbed to similar patterns of corruption of political elites and aggressive resource extraction by multinational firms (Dauvergne, 2001; Ross, 2001). As supplies of timber and fish become exhausted, entrepreneurs will move to other areas, leaving a trail of degraded ecosystems to an impoverished population. There is evidence that if overlogged tropical forests are set aside, they may regenerate to recover their protective functions (Whitmore, 1975). However, these forests usually must remain unsuitable for commercial use for periods extending more than 70 years. Experience of rehabilitation of forests in Asia shows that enrichment planting and reforestation are technically complex and costly operations (Banerjee, 1995). Depending on the intensity of logging operations and their impact on timber stand and soil, a secondary forest may naturally regenerate to provide local people with firewood, small poles, fruits, resin, and other nontimber forest products. In such cases, management by local residents under participatory forestry may contribute to rehabilitation. However, the low productivity of these ecosystems would constitute a major obstacle to successful management under the common property regime.

Conclusions

As argued by Amartya Sen (1999), development is a process of expanding the real freedoms that people enjoy. The exploitation of Cambodia's resources, under the general guise of economic progress, has led to the creation of environmental unfreedom for rural people and has undermined their basic ability to lead the lives they choose. A disconcerting pattern of exclusion of the poor and appropriation of natural

assets by the elites emerges from a broad analysis of Cambodia's fisheries, forests, and agricultural land. Trends in fishing and logging do not bode well for the future of the country's environment and people.

Cambodia's political and social stability and the development of its people are dependent on its ability to exploit its natural heritage in a sustainable and equitable way. The gradual shrinking of Cambodia's pie of natural resources leaves the regime less to exploit for its clientele and simultaneously undermines the livelihoods of rural populations. Growing environmental degradation may eventually threaten the cohesion of the coalition of military, business, and political interests.

Environmental reforms will come at a political and economic cost for the elites, which makes them unpalatable for the present leadership. The present dynamics of the exploitation and distribution of the natural resources of the kingdom do not favor a peaceful transition toward sustainable development. Environmental reformers ought to expect strong resistance from stakeholders with vested interests in the current pattern of appropriation and exclusion. A complex nexus of institutional arrangements, including market forces, property rights, and resource management regimes, shapes stakeholder behavior and interactions. This does not allow for simple policy recommendations and straightforward choices. The clearing of arable areas contaminated by landmines, the strengthening of protected areas, and the transfer of ecosystems stewardship to local people need to be further explored and publicly discussed as these measures may provide some degree of relief to rural poverty.

Acknowledgments

The author wishes to thank many official and nonofficial observers for sharing their views on the state of Cambodia's natural environment and their perspectives on the kingdom's future. The analysis benefited greatly from these discussions. Comments from anonymous reviewers and the editorial board of the *Journal of Environment and Development* also contributed to shaping the article. However, the author remains solely responsible for the opinions expressed.

References

- Ahmed, M., Hap, N., Ly, V., & Tiongco, M. (1998). *Socioeconomic assessment of freshwater capture fisheries of Cambodia*. Phnom Penh, Cambodia: Mekong River Commission.
- Ahmed, M., Tana, T. S., & Thuok, N. (1996). Sustaining the gifts of the Mekong: The future of freshwater capture fisheries in Cambodia. *Watershed: People's Forum on Ecology*, 1(3), 33-38.

- Anderson, L. G. (1977). *The economics of fisheries management*. Baltimore: John Hopkins University Press.
- Asian Development Bank. (1996). *Wetlands surveys in Cambodia to identify sites of international importance*. Manila, the Philippines: Author.
- Asian Development Bank. (2000a). *Cambodia: Enhancing governance for sustainable development*. Manila, the Philippines: Author.
- Asian Development Bank. (2000b). *Cambodia forest concession review*. Phnom Penh, Cambodia: Author.
- Baland, J. M., & Platteau, J. P. (1996). *Halting degradation of natural resources: Is there a role for rural communities?* Oxford, UK: Clarendon.
- Banerjee, A. K. (1995). *Rehabilitation of degraded forests in Asia*. Washington, DC: World Bank.
- Bann, C. (1997a). *An economic analysis of alternative mangrove management strategies in Koh Kong Province, Cambodia*. Singapore: Economy and Environment Program for Southeast Asia.
- Bann, C. (1997b). *An economic analysis of tropical forest land use options, Ratanikiri Province, Cambodia*. Singapore: Economy and Environment Program for Southeast Asia.
- Barber, C. V. (1998). Forest resource, scarcity, social conflict in Indonesia. *Environment*, 40(4), 4-9.
- Becker, E. (1986). *When the war was over: The voices of Cambodia's revolution and its people*. New York: Simon & Schuster.
- Bizot, F. (2000). *Le Portail*. Paris: Table Ronde.
- Bromley, D. W. (1991). *Environment and economy—Property rights and public policy*. Oxford, UK: Blackwell.
- Cambodia Development Resource Institute. (2001). *Land tenure in Cambodia*. Phnom Penh, Cambodia: Author.
- Cambodian Mine Action Centre. (2002). *National level one survey—Preliminary Results*. Phnom Penh, Cambodia: Author.
- Chandler, D. P. (1983). *A history of Cambodia*. Epping, UK: Bowker.
- Chandler, D. P. (1991). *The tragedy of Cambodian history: Politics, war, and revolution since 1945*. New Haven, CT: Yale University Press.
- Chandler, D. P. (Ed.). (1996). *Facing the Cambodian past: Selected essays, 1971-1994*. St. Leonards, Canada: Allen & Unwin.
- Chandler, D. P. (1999). *Brother number one: A political biography of Pol Pot*. Boulder, CO: Westview.
- Chandler, D. P. (2002). *Voices from S-21: Terror and history in Pol Pot's secret prison*. Berkeley: University of California Press.
- Chapman, E. C., & He, D. (1996). *Downstream implications of China's dams on the Lancang Jiang (Upper Mekong) and their potential significance for greater regional cooperation, basin-wide*. Retrieved January 16, 2002, from <http://www.anu.edu.au/asianstudies/mekong/dams.html>
- Csavas, I., Doulman, D., Petr, T., Prado, J., & Debas, L. (1994). *Cambodia—Rehabilitation and development needs for the fishery sector*. Rome: Food and Agriculture Organization.
- Dasgupta, P. S., & Heal, G. M. (1979). *Economic theory and exhaustible resources*. Cambridge, UK: Cambridge University Press.
- Dauvergne, P. (1997). *Shadows in the forest: Japan and the politics of timber in Southeast Asia*. Cambridge, MA: MIT Press.
- Dauvergne, P. (2001). *Loggers and degradation in the Asia Pacific*. Cambridge, UK: Cambridge University Press.
- Degen, P., & Thuok, N. (1997). *Inland fishery management in Cambodia: Is the fishing lot system the basis for improved management or should it be abolished?* Phnom Penh, Cambodia: Mekong River Commission.
- De Lopez, T. T. (2001a). Brave new parks: Lessons from internationally funded protected areas in Cambodia. *Natural Areas Journal*, 21, 377-384.

- De Lopez, T. T. (2001b). Deforestation in Cambodia: A stakeholder management approach. *International Journal of Sustainable Development and World Ecology*, 8, 380-394.
- De Lopez, T. T. (2001c). *Policy options for Cambodia's Ream National Park: Stakeholder and economic analysis*. Singapore: Economy and Environment Program for Southeast Asia and Ottawa: International Development Research Centre.
- Delvert, J. (1961). *Le paysan cambodgien* [The Cambodian peasant]. Paris: Mouton.
- Department of Fisheries. (1998). *Report on the fisheries sector*. Phnom Penh, Cambodia: Author.
- Department of Fisheries. (2001). *National fish catch statistics*. Phnom Penh, Cambodia: Author.
- Deudney, D. (1991, April). Environment and security: Muddled thinking. *Bulletin of Atomic Scientists*, pp. 23-28.
- Dierberg, F., & Kiattisimkul, W. (1996). Issues, impact, and implications of shrimp aquaculture in Thailand. *Environmental Management*, 20, 649-666.
- Fily, M., & d'Aubenton, F. (1965). *Cambodia: Report on fisheries technology in the Great Lake and the Tonle Sap, 1962-63*. Paris: Museum National d'Histoire Naturelle.
- Flaherty, M., & Karnjanakesorn, C. (1995). Marine shrimp aquaculture and natural resource degradation in Thailand. *Environmental Management*, 19(1), 27-37.
- Food and Agriculture Organization. (1997). *Towards a sustainable management plan of the natural resources of the Tonle Sap Lake*. Phnom Penh, Cambodia: Author.
- Freeman, R. E. (1984). *Strategic management: A stakeholder approach*. Boston: Pitman.
- Frieson, K. (1997). Revolution and rural response in Cambodia, 1970-1975. In B. Kiernan (Ed.), *Genocide and democracy in Cambodia* (pp. 33-50). New Haven, CT: Yale University South East Asia Studies.
- Gibson, C. C., McKean, M. A., & Ostrom E. (2000). *People and forests: Communities, institutions, and governance*. Cambridge, MA: MIT Press.
- Giteau, M. (1996). *Histoire d'Angkor* [History of Angkor]. Paris: Editions Kailash.
- Global Witness. (1996). *RGC forest policy & practice—The case for positive conditionality*. London: Author.
- Global Witness. (1998). *Going places . . . Cambodia's future on the move*. London: Author.
- Global Witness. (1999). *Made in Vietnam—Cut in Cambodia*. London: Author.
- Global Witness. (2001a). *Chainsaws speak louder than words*. London: Author.
- Global Witness. (2001b). *The credibility gap and the need to bridge it*. London: Author.
- Global Witness. (2002). *Deforestation without limits: How the Cambodian government failed to tackle the untouchables*. London: Author.
- Groslier, B. P. (1966). *Angkor: Art and civilization*. London: Thames and Hudson.
- Gujja, B., & Finger-Stich, A. (1996). What price prawn? Shrimp aquaculture's impact in Asia. *Environment*, 38(7), 12-39.
- Homer-Dixon, T. F. (1994). Environmental scarcities and violent conflict. *International Security*, 19(1), 5-40.
- Homer-Dixon, T. F. (1999). *Environment, scarcity and violence*. Princeton, NJ: Princeton University Press.
- Human Rights Watch. (1999). *Toxic justice: Human rights, justice and toxic waste in Cambodia*. New York: Author.
- International Center for Living Aquatic Resources Management. (1999). *Management of fisheries, coastal resources and coastal environment in Cambodia: Institutional, legal and policy perspectives*. Manila, the Philippines: Author.
- International Development Association. (1997). *Findings and recommendations of the log monitoring and logging control project*. Phnom Penh, Cambodia: Author.
- Kiernan, B. (Ed.). (1993). *Genocide and democracy in Cambodia: The Khmer Rouge, the United Nations, and the international community*. New Haven, CT: Yale University Southeast Asian Studies.
- Kiernan, B. (1996). *The Pol Pot regime: Race, power and genocide in Cambodia under the Khmer Rouge, 1975-79*. New Haven, CT: Yale University Press.

- Le Billon, P. (1994). *Protected areas in the Kingdom of Cambodia*. Phnom Penh, Cambodia: International Development Resource Center.
- Lieng, S., Yim, C., & van Zalinge, N. P. (1995). Freshwater fisheries of Cambodia: The bagnet (dai) fishery in the Tonle Sap River. *Asian Fisheries Science*, 8, 255-262.
- Mabbett, I., & Chandler, D. (1995). *The Khmers*. Oxford, UK: Blackwell.
- Mekong River Commission. (1997). *Large dam fisheries of the lower Mekong countries*. Phnom Penh, Cambodia: Author.
- Meng, M., Kim S., & Pech, B. (1999). *A scoping report on the ethnobotany of Bokor and Ream National Parks*. Phnom Penh, Cambodia: Ministry of Environment.
- Ministry of Environment. (1994). *First state of the environment report 1994*. Phnom Penh, Cambodia: Author.
- Ministry of Environment. (1998). *National environmental action plan 1998-2002*. Phnom Penh, Cambodia: Author.
- Osborne, M. (1979). *Before Kampuchea: Prelude to tragedy*. London: Allen & Unwin.
- Osborne, M. (1994). *Sihanouk: Prince of light, prince of darkness*. Honolulu: University of Hawaii Press.
- Osborne, M. (2000). *The Mekong*. New York: Atlantic Monthly Press.
- Ostrom, E. (1990). *Governing the commons: The evolution of institutions for collective action*. Cambridge, UK: Cambridge University Press.
- Oxfam Great Britain. (1999). *Land rights and access in Cambodia*. Phnom Penh, Cambodia: Author.
- Oxfam Great Britain. (2000). *Landlessness and Development Information Tool (LADIT) interim report*. Phnom Penh, Cambodia: Author.
- Pantulu, V. R. (1986). Fish of the lower Mekong Basin. In B. R. Davies & K. F. Walker (Eds.), *The ecology of river systems* (pp. 721-741). Dordrecht, the Netherlands: Dr W. Junk.
- Ross, M. L. (1996). Conditionality and logging reform in the tropics. In R. O. Keohane & M. A. Levy (Eds.), *Institutions for environmental aid* (pp. 167-197). Cambridge, MA: MIT Press.
- Ross, M. L. (2001). *Timber booms and institutional breakdown in Southeast Asia*. Cambridge, UK: Cambridge University Press.
- Sen, A. (1999). *Development as freedom*. Oxford, UK: Oxford University Press.
- Slaats, H. (1999). Land titling and customary rights: Comparing land registration projects in Thailand and Indonesia. In T. van Meijl & F. von Benda-Beckmann (Eds.), *Land and natural resources in Southeast Asian and Oceania* (pp. 88-109). London: Megan Paul International.
- Stevenson, G. G. (1991). *Common property economics—A general theory and land use applications*. Cambridge, UK: Cambridge University Press.
- Talbot, K. (1998). *Logging in Cambodia: Politics and plunder*. New York: Asia Society.
- Tcheou, T.-K. (1902). *Mémoires sur les coutumes du Cambodge* [The customs of Cambodia] (P. Pelliot, Trans.). Paris: Librairie d'Amérique et d'Orient. (Original work published 1312)
- Thung, H. L. (1994). *Forest cover of Cambodia using Landsat TM satellite imagery*. Phnom Penh, Cambodia: Mekong Secretariat.
- United Nations World Food Program. (1999). *Protracted emergency target survey*. Phnom Penh, Cambodia: Author.
- van Zalinge, N. P., Thuok, N., & Tana, T. S. (1997). *Where there is water, there is fish? Fisheries issues in the Lower Mekong Basin from a Cambodian perspective*. Phnom Penh, Cambodia: Mekong River Commission.
- Vickery, M. (1986). *Kampuchea: Politics, economics and society*. London: Pinter.
- Whitmore, T. C. (1975). *Tropical rainforest of the Far East*. Oxford, UK: Clarendon.
- World Bank. (1996). *Forest policy assessment—Cambodia*. Washington, DC: Author.

- World Bank. (2000). *Country assistance strategy for the Kingdom of Cambodia*. Washington, DC: Author.
- World Bank. (2001). *World development 2000/2001*. Oxford, UK: Oxford University Press.
- World Bank. (2002). *Land management and administration project*. Washington, DC: Author.

Thanakvaro Thyl De Lopez is a researcher in the Department of Geography at the University of Cambridge. His interests focus on the stakeholders and the economics of environmental conservation in developing countries. He is an adviser of the Parks Society of Cambodia, a nongovernmental conservancy and rural development organization.