

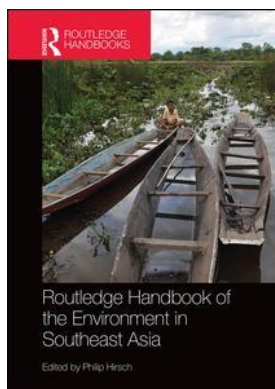
This article was downloaded by: 10.3.97.143

On: 23 Sep 2023

Access details: *subscription number*

Publisher: *Routledge*

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: 5 Howick Place, London SW1P 1WG, UK



## **Routledge Handbook of the Environment in Southeast Asia**

Philip Hirsch

### **Indonesia**

Publication details

<https://www.routledgehandbooks.com/doi/10.4324/9781315474892.ch22>

Jeff Neilson

**Published online on: 15 Sep 2016**

**How to cite :-** Jeff Neilson. 15 Sep 2016, *Indonesia from: Routledge Handbook of the Environment in Southeast Asia* Routledge

Accessed on: 23 Sep 2023

<https://www.routledgehandbooks.com/doi/10.4324/9781315474892.ch22>

**PLEASE SCROLL DOWN FOR DOCUMENT**

Full terms and conditions of use: <https://www.routledgehandbooks.com/legal-notices/terms>

This Document PDF may be used for research, teaching and private study purposes. Any substantial or systematic reproductions, re-distribution, re-selling, loan or sub-licensing, systematic supply or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The publisher shall not be liable for an loss, actions, claims, proceedings, demand or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

## 22

# INDONESIA

## A political–economic history of environment and resources

*Jeff Neilson*

### Introduction

From whatever point of view we survey this portion of the earth's surface – whether as regards its superficial extent, or the immense number of islands with which it is overspread, or the individual size of those islands; whether we examine their peculiarities of climate, or their geological structure, their rich and varied vegetation, their wonderful animal productions, or the strongly-contrasted races of mankind that inhabit them; or if, lastly, we look at them from a commercial and political point of view, noting the varied products which they furnish to supply the necessities and luxuries of mankind, trace the struggles of the chief nations of Europe for a share in their fertile soil, and watch the interesting moral and political problems now being worked out there; we shall be convinced that no part of the world can offer a greater number of interesting facts for our contemplation, or furnish us with more extensive and varied materials for speculation in almost every great department of human knowledge.

*Alfred R. Wallace, On the Physical Geography of the Malay Archipelago (1863, p. 217)*

One and a half centuries ago, Wallace spent eight years in what he called 'the Malay Archipelago', most of that time within what is now Indonesia, and achieved lasting acclaim for his seminal contributions to evolutionary theory and biogeography. His nineteenth-century claims about the immense biological, social and economic importance of the islands remain undiminished: Indonesia is still a major producer of commodities derived from strategic natural resources, and a storehouse of global biodiversity and terrestrial carbon (Table 22.1). The political and economic configurations, however, have been constantly reshaped over time to ensure that, in Wallace's words, the 'necessities and luxuries of mankind' can be adequately provisioned, with ongoing contests to determine who will benefit from a 'share in their fertile soil'.

Access to this resource wealth constituted the initial impetus for European colonial intervention in the islands during the sixteenth century, and has helped shape various colonial, post-colonial and (arguably) neo-colonial political configurations in the archipelago ever since. This chapter presents the relationship between the natural environment and society in Indonesia as being mutually constituted around issues of resource control and access. Moreover, resource access and environmental change in Indonesia have, for at least five centuries now, been

Table 22.1 Global ranking for Indonesian production of significant natural resources

World ranking	Commodity production	Source
1	Palm oil, coconuts, cinnamon, cloves, vanilla	FAOSTAT, <a href="http://faostat.fao.org/site/339/default.aspx">http://faostat.fao.org/site/339/default.aspx</a>
2	Fisheries (capture) Cocoa, rubber, pepper, cassava, nutmeg, areca nut Nickel, tin	FAO Yearbook of Fishery Statistics summary tables <a href="http://faostat.fao.org/site/339/default.aspx">http://faostat.fao.org/site/339/default.aspx</a> US Geological Survey (2010 data), <a href="http://minerals.usgs.gov/minerals/pubs/commodity/">http://minerals.usgs.gov/minerals/pubs/commodity/</a>
3	Fisheries (aquaculture)	FAO Yearbook of Fishery Statistics summary tables <a href="http://faostat.fao.org/site/339/default.aspx">http://faostat.fao.org/site/339/default.aspx</a>
4	Rice, coffee, sugar, tropical fruit Chillies, roots and tubers Total biodiversity	<a href="http://faostat.fao.org/site/339/default.aspx">http://faostat.fao.org/site/339/default.aspx</a> World Conservation Monitoring Centre of the United Nations Environment Programme (UNEP-WCMC), 2004
5	Coal Copper	<a href="http://www.eia.gov/countries/country-data.cfm?fips=ID&amp;trk=p1">www.eia.gov/countries/country-data.cfm?fips=ID&amp;trk=p1</a> US Geological Survey (2010 data), <a href="http://minerals.usgs.gov/minerals/pubs/commodity/">http://minerals.usgs.gov/minerals/pubs/commodity/</a>
6	Bananas, maize Forest carbon storage	<a href="http://faostat.fao.org/site/339/default.aspx">http://faostat.fao.org/site/339/default.aspx</a> Global Forest Resources Assessment 2010, <a href="http://www.fao.org/forestry/fra/fra2010/en/">www.fao.org/forestry/fra/fra2010/en/</a>
7	Gold	US Geological Survey (2010 data), <a href="http://minerals.usgs.gov/minerals/pubs/commodity/">http://minerals.usgs.gov/minerals/pubs/commodity/</a>
8	Tobacco Total forest area Tea, cashews	<a href="http://faostat.fao.org/site/339/default.aspx">http://faostat.fao.org/site/339/default.aspx</a> <a href="http://foris.fao.org/static/data/fra2010/III.pdf">http://foris.fao.org/static/data/fra2010/III.pdf</a> <a href="http://faostat.fao.org/site/339/default.aspx">http://faostat.fao.org/site/339/default.aspx</a>
9	Oranges	<a href="http://faostat.fao.org/site/339/default.aspx">http://faostat.fao.org/site/339/default.aspx</a>
10	Natural gas Soy beans	<a href="http://www.eia.gov/countries/country-data.cfm?fips=ID&amp;trk=p1">www.eia.gov/countries/country-data.cfm?fips=ID&amp;trk=p1</a> <a href="http://faostat.fao.org/site/339/default.aspx">http://faostat.fao.org/site/339/default.aspx</a>

produced by inherently global processes. Indonesia's resource wealth has been gradually incorporated into international commodity networks through politico-economic structures of colonialism, export-oriented neo-liberalism and state-centred developmentalism. Waves of global economic integration, mediated through national political systems, have dramatically re-shaped the relationship between Indonesian society and the natural environment, and this economic integration is further reconstituting contemporary modes of environmental governance.

This chapter focuses primarily on natural resources as an entry point to examine the environment in Indonesia. The rationale for this emphasis is based on the historical importance of natural resource access as the key determinant shaping environmental change in Indonesia, and also corresponds with predominant attitudes and popular discourse on the environment within contemporary Indonesia. This thematic focus is, quite clearly, anthropocentric. This perspective appeals to what appears to be a shift in how global society is increasingly approaching environmental problems more broadly. This involves a move from environment issues being understood as problems 'out there' (or abstractly for 'the planet') towards being a problem for us, a dilemma facing human civilization and well-being (Gilding, 2011). This is acutely reflected through the Millennium Ecosystem Assessment (MEA), initiated by the United Nations in 2001, with its objective of systematically assessing the consequences of ecosystem change for

*human well-being*. Finalized in 2005, the MEA popularized the idea of ‘ecosystem services’ and provided an appraisal of the condition of these services worldwide. Under this utilitarian MEA framework, natural resources are referred to as ‘provisioning services’, as distinct from non-extractive ‘regulating’ ecosystem services (for example, climate regulation and waste assimilation), ‘cultural’ services (for example, recreation and spiritual) and indirect ‘supporting’ services (for example, soil formation and photosynthesis). Importantly for the purposes of this chapter, the MEA presents a dynamic interaction between humans and other parts of ecosystems, where the changing human condition drives changes in ecosystems, which in turn affect opportunities for improved human well-being.

The MEA, however, largely ignores questions of power and politics, and how these shape environmental health. Elsewhere, the insights of political ecology (cf. Blaikie and Brookfield, 1987; Forsyth, 2003) have emphasized how environmental outcomes are a function of an ongoing, iterative relationship between local political processes, broader economic structures and local environments that, in the Indonesian context, have actively enrolled local environments into the global economy over time. As argued by Peluso and Watts (2001, p. 5), ‘specific environments (tropical forests or oil reserves) and environmental processes (deforestation, conservation, or resource amelioration) are constituted by, and in part constitute, the political economy of access to and control over resources’.

The theme of the environment in Indonesia is explored in this chapter by examining interactions between changing political systems in Indonesia and the ever-evolving value chains that link the Indonesian resource economy with global markets. The chapter is essentially structured chronologically, where key historical events are used as entry points to discuss and explore important processes of environmental change within Indonesia. Following this initial brief introduction, the next section examines the colonial processes through which Indonesia’s resource wealth became embedded within global trade networks, emphasizing how the diversity of political and economic systems throughout this period resulted in varying degrees of environmental change. The chapter then examines the period of state-based capitalism under President Suharto, when new national-level alliances dominated to exploit Indonesia’s resource wealth, and explores the specific influence of different economic policies on the Indonesian environment. The post-Suharto period (from 1998), generally known as *reformasi*, is then discussed to highlight the scalar nature of contemporary Indonesian political ecology, shaped as it is by the dual forces of political decentralization and global environmental governance. Some concluding remarks then follow.

### **The colonial incorporation of Indonesian environments in global trade networks**

It was the presence of nutmeg and cloves in Indonesia’s eastern islands (and the cultivation of imported pepper on Java) that prompted the European age of exploration and the subsequent colonization of Southeast Asia. Prior to that, Indian, Chinese and Arab traders had sought to profit from the extraction of Indonesia’s resources. However, the islands’ incorporation into European-controlled trade networks both expanded the number of commodities produced for global markets – quickly expanding beyond spices to coffee, sugar and tin – and fundamentally reshaped both political systems and processes of environmental change right across the archipelago. Native kingdoms, sultanates and fiefdoms were gradually absorbed, frequently through recourse to the use of extreme violence, within Portuguese and later Dutch-dominated trading systems (Peluso and Watts, 2001). Physical environments were transformed accordingly: the Bangka–Billiton islands into the bleak moonscapes of former tin mines, and rural Java into

extensive monocropped plantations. Since the early commoditization of various components of Indonesia's environment, and the associated integration of these commodities within global trade systems, understanding processes of environmental change has demanded enhanced sensitivity to the structures of international political economy in which these landscapes are incorporated.

The colonial-era political economy of Indonesia can, somewhat simplistically, be conveniently thought of as consisting of three primary, chronologically ordered, systems of surplus extraction: the VOC Dutch East Indies Company (1602–1798); the *culturstelsel* system of forced cultivation (1830–1870); and the corporate liberal period (1870–1942). Running through these structures, however, was what Geertz (1963, p. 48) controversially described as 'one long attempt to bring Indonesian crops into the modern world, but not her people'.

The primary mode of operation for the VOC was the establishment of trade monopolies, which were backed up by military coercion and administered through a scattered collection of trading posts built around military forts and local treaties. This system ensured that land, labour and produce could be controlled by the company, although often indirectly through an indigenous elite. By the eighteenth century, however, the VOC was shifting its attention beyond the spice trade and commenced its systematic transformation of Java into the world's leading producer of both sugar and coffee, necessitating constant territorial expansion and political intervention across the island to ensure adequate expropriation of the surplus. Java was also an important source of teak for ship-building and export, and Peluso (1992) describes the environmental consequences of this demand for forest landscapes on Java, with timber depletion and soil degradation. While the overall impact of the VOC on landscape change across Indonesia was isolated and fragmented, it established the political foundations for the larger-scale resource exploitation that followed. After previous years of returning impressive dividends to shareholders in Europe, the VOC was eventually declared bankrupt in 1798 (due, it is often claimed, to endemic corruption and maladministration), and the administration of former VOC lands was assumed by the Dutch East Indies colonial government.

The *culturstelsel* system of forced crop deliveries (based on the enforced conversion of farmer-owned land to government export crops) – or, alternatively, labour contributions on government projects – was one of the most quintessentially exploitative colonial regimes anywhere in the world: it was established on Java in 1830 after 30 years of policy uncertainty, including the British interregnum, following the VOC insolvency. This system had its greatest impact again on the island of Java, which Geertz (1963) claims to have been transformed into a 'mammoth state plantation' for the production primarily of coffee and sugar, and, to a lesser extent, indigo. While the programme was officially abandoned on Java in 1870, the exploitation of cultivators continued on some lands around Batavia through the persistence of numerous quasi-feudal 'private estates' – the *particuliere landerijen* (Furnivall, 1944). *Culturstelsel* was, first and foremost, a system of labour coercion (known in Indonesia simply as *tanam paksa*, or forced planting): it intensified agricultural production on existing lands through increased inputs of labour, but it did not result in a significant expansion into the so-called forest 'wastelands'. *Culturstelsel* was, however, implemented alongside a government-administered teak monopoly on Java that asserted state control over forest resources through an administrative, technocratic forestry service, providing an early example of state-based resource enclosure (Peluso, 1992).

Strongly influenced by late nineteenth-century European liberal philosophies, which advocated reduced state interventions in the economy, the 'liberal period' in the Dutch East Indies is generally considered to have commenced with the agrarian reforms laws of 1870. All land not held under private (European) ownership, including land inhabited by native Indonesians, legally

Table 22.2 Area of land leased out for commercial agriculture (in thousand hectares)\*

	Java	Outer islands
1874	7	
1885	185	160
1900	435	852
1930	1,457	2,324

\* Note, however, that the figures for 1874 and 1885 are for *erfpacht* government leases only, and so do not consider the much smaller area under various leases held from native states or the private estates.

Source: Furnivall, 1944 and Booth, 1998.

became state land and could potentially be leased out to commercial interests (Furnivall, 1944). Table 22.2 shows how capitalist investment flowed into commercial agriculture as a result (particularly sugar and tobacco) and led to significant agricultural expansion into the ‘wastelands’ for the cultivation of tree crops (such as coffee, rubber and tea), often at the expense of native forests. Private forestry management (teak) also increased to cover 655,000 hectares in Java by 1900 (Furnivall, 1944, p. 325). Apart from the long-established tin mines off eastern Sumatra, however, mining did not attract significant investment or expand substantially until the oil boom of the early twentieth century.

The period from 1900 until the global economic crisis of 1930 – during which time the Dutch colonial government increased public investment in social and physical infrastructure under the so-called ethical policy – signalled the beginning of large-scale, commercial exploitation of Indonesia’s natural resources and resulted in the first period of truly extensive environmental transformation. The diverse array of new resource-related investments by Dutch, English, American and Japanese firms was reflected in the rapid growth in exports during this period (Figure 22.1), almost all of which were natural resource-based. The number of commodities increased to encompass tea, rubber, tobacco and petroleum, and (following the effective colonial enclosure of the entire archipelago by 1908) spread beyond Java to the outer islands (Furnivall, 1944). The great Sumatran rainforests were opened up during this period, initially by commercial rubber estates along the east coast and tobacco in the north, and eventually extending south-west into Bengkulu and Lampung through smallholder coffee plantings. This process marked the beginning of the end for the Sumatran rhino, considered a ubiquitous pest by Alfred Wallace in the 1860s, but facing probable extinction in the twenty-first century – its habitat converted to a key global source of low-grade Robusta coffee.

A popular narrative of colonial exploitation of natural resource wealth, with the accompanying penetration of foreign capitalists, is still widely evoked within contemporary Indonesia by various political, economic and even religious interest groups. For example, in a statement promoting a new protectionist policy for domestic cocoa processors, the then Director-General of Plantations (Barani, 2010, p. 116) explained:

possibly almost all Indonesian cocoa beans can be processed domestically and can be exported in the forms of processed cocoa products, which has added value . . . Thus, we are not fettered in the same way as during the VOC colonial period, where Indonesia only produced raw material.

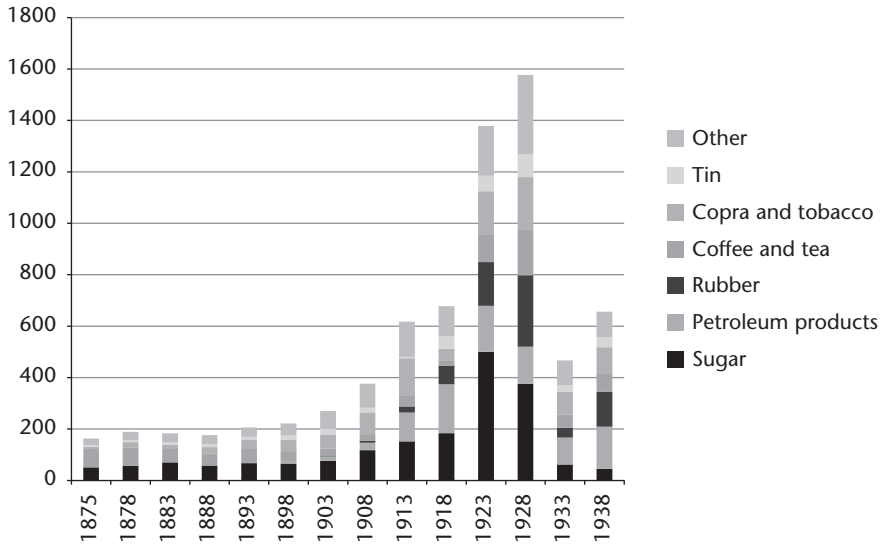


Figure 22.1 Growth in value of export commodities from the Netherlands-Indies (1875–1938, in million guilders, current value)

Data source: Kano, 2008.

Since the early days of Dutch colonialism in Indonesia, environmental change has been driven by the nature of the varied political and economic systems through which Indonesia's natural resources were controlled and exploited. It was, however, during the latter parts of the liberal period in the early twentieth century, when few impediments stood between international capital flows and the Indonesian environment, that the scale of landscape transformation was greatest.

### The environment under state capitalism

The period 1930–1965 was a turbulent one in Indonesian history: the Great Depression suppressed demand for export commodities; the Japanese occupation (despite its interest in securing strategic resources for the war effort) actually led to decreased levels of production; and the war for independence destroyed substantial economic infrastructure, especially on Java. The immediate post-colonial period in Indonesia was then characterized by President Sukarno's anti-imperialist political rhetoric and his aspirations for economic self-sufficiency: at its zenith, this involved the takeover and nationalization of many formerly foreign-owned assets (initially Dutch, and then British and American). Inward-looking, and essentially anti-economic, development policies contributed to the social chaos of the 1950s and 1960s as large-scale resource exploitation stalled – perhaps mercifully, from an environmental perspective. This period, however, culminated in the brutal Cold War-era regime change of 1965–1966, after which the New Order of President Suharto instituted wide-ranging economic reforms during negotiations with the World Bank and the International Monetary Fund over debt rescheduling and new development loans (Robison, 2009).

The desire to generate export earnings from Indonesia's natural resource potential was an important aspect of early New Order economic policy (Nitisastro, 2011) and was actively



facilitated by a series of new laws in 1967 covering foreign investment, forestry and mining, which collectively opened up the country's natural resources (once again) to the global market (Resosudarmo, 2005). Foreign capital was essential for the initial exploitation of these resources, leading to interpretations of Indonesian capitalist development at the time as being dependent on the global capitalist metropole (Mortimer, 1973). According to such accounts, the absence of a well-developed domestic bourgeoisie in Indonesia, which might otherwise act as a comprador class for foreign capital, led to the rise instead of the military and 'bureaucratic capitalists' to perform this function. The accumulation of capital by this social group was underpinned by its capacity to construct, and simultaneously participate in, favourable access to natural resources and to subsequently benefit from their exploitation. As described below, these lucrative resource access systems in Indonesia were initially underpinned by internationally supportive ideological positions towards economic activity associated with environmental degradation more broadly.

While the oil sector was notionally government-controlled, Pertamina (the state-owned oil company) relied heavily on international contractors for between 90 and 95 per cent of oil output throughout the New Order (Ascher, 1998). Oil had emerged from the war and post-war years as the most important contributor to export earnings, with production expanding from 54.2 million barrels in 1938 to 325.7 million barrels by 1971 (Kano, 2008). Oil production transformed entire landscapes in regions such as Lhokseumawe (Aceh), Riau and Balikpapan, and has been associated with environmental problems such as the spill caused by the grounding of a Japanese tanker, the *Showa Maru*, off Singapore in 1975. Foreign companies also emerged as key actors in the hard-rock minerals sector, led by North American companies such as Freeport McMoran and Inco, which signed contracts of work, in 1967 and 1968 respectively, to exploit gold, copper and nickel reserves in eastern Indonesia. These and other mines became key drivers of economic development in otherwise remote areas of Indonesia, but frequently drew criticism for their neglect of proper environmental management. A 1994 independent report (EnviroSearch International, 1994) to the Overseas Private Investment Corporation (OPIC) was damning in its criticism of Freeport's dumping of fine tailings into the Aghagon and Ajka River systems in West Papua, leading to the withdrawal of OPIC insurance for the mine. In another high-profile case of mining-related environmental damage, the Indonesian Ministry for the Environment filed a lawsuit in 2004 against the Newmont Mining Corporation for alleged heavy metal pollution in Buyat Bay, North Sulawesi (Newmont was subsequently acquitted). For environmentalists, the inability of the Indonesian government to successfully regulate international mining companies is due to the financial benefits obtained by those at the top of political bureaucracy, including the military personnel employed to 'maintain security' at the mines (Maimunah, 2006).

The extraction of profits from Indonesia's forests generally posed fewer technical and capital barriers to entry than did mining during the New Order, and so tended to be more amenable to the participation of domestic entrepreneurs, although initially in joint ventures with foreign companies. Political patronage and state protection afforded privileged access for Suharto cronies to large forestry concessions (Robison, 2009), which covered an extraordinary 61 million hectares (equivalent to more than the total land area of Thailand) of natural forest by 1993 before declining to a 2011 extent of 23 million hectares (MoF, 2012). The apparent 'success' of these policies was such that log removals increased from an estimated 1,983 cubic metres in 1966 to 28,000 cubic metres by 1976 (FAO, 1976), as Indonesia became the world's largest tropical timber exporter (Ascher, 1998). Rates of deforestation accelerated to some of the highest anywhere in the world. It was estimated by the World Bank (1990) that Indonesian forests were being cleared at a rate of one million hectares per year in 1988, while the FAO (2010)



estimated this at nearly two million hectares per year during the 1990s. Largely as a function of this forest loss, 69 Indonesian animal species (21 mammals, including the orangutan, the Sumatran tiger and the Sumatran and Javan rhinos) are now listed as critically endangered, facing an extremely high risk of extinction in the wild (IUCN, 2012).

During the 1970s, the government, reflected also in FAO publications (FAO, 1976), presented a discursive contrast between the ‘devastation’ caused by shifting cultivators and the ‘development’ of forestry resources through large-scale concessions, tending to dramatically overestimate the impact of the former, and thereby rationalizing the further enclosure of the forestry estate to the exclusion of local communities. Inspired in part by Hardin’s *Tragedy of the Commons*, along with poor regard for the capacity of community-based natural resource management, this led to a form of state-based environmentalism that embraced the central role of the state in environmental management, and which could be usefully used as a means to assert political control over both people and resources (Cribb, 2003). The government’s transmigration programme moved an estimated 2.5 million Javanese and Balinese to the outer islands during the Suharto regime, where they were frequently granted forest lands to clear for what was considered to be less damaging sedentary agricultural systems (Leitmann *et al.*, 2009).

A national environmental policy was first announced in 1973 (following the 1972 UN Conference on the Human Environment in Stockholm, to which Indonesia sent a delegation), and a minister (Professor Emil Salim) was appointed to the new environment portfolio in 1978. This was a state ministry of population and the environment, reflecting what was perceived to be the core environmental problem affecting Indonesia – the encroachment of backward farmers into forest areas. This resulted in the country’s first national park being declared in 1980. Within a decade, 19 parks had been established, covering 11.9 million hectares (Cribb, 2003), with very few further subsequent additions in following years. It was not until the 1990s, however, that Indonesia developed an environmental legislative and regulatory framework, including environmental impact assessment (AMDAL) procedures, an environmental impact control agency (BAPPEDAL), a hazardous waste control system and a spatial planning programme (Sentosa, 1996). The extent to which an environmental ethic was ever seriously embraced by the Indonesian state – especially in the face of strong demands and vested interests in essentially exploitative activities – remains contentious. Even the Minister, Emil Salim (2005, p xxiii), describes his role as ‘a kind of public relations spokesman’ for the regime.

The Indonesian government benefited immensely from the 1973 world oil crisis and the quadrupling of international oil prices. Awash with additional revenue, the government used these funds to embark on two significant development programmes: (i) an ambitious strategy of industrial deepening through import substitution industrialization; and (ii) a high level of rural support using green revolution technologies to increase rice production. Both of these endeavours had longstanding impacts on the Indonesian environment.

The initial protection of the domestic consumer goods sector, and subsequent industrial penetration into sectors such as steel, cement, fertilizer and paper production, resulted in the rapid expansion of Indonesia’s industrial sector (Figure 22.2). As with previous resource extraction, state-owned enterprises, and conglomerates with close associations with the regime, played an important role in this process (Robison, 2009). Industrial development was heavily concentrated on the island of Java, where expansion took place with little attention afforded to the environmental consequences, and where rivers became alarmingly polluted (World Bank, 1994). Resosudarmo and Irhamni (2008) draw an explicit relationship between state industrial policy and increased levels of industrial pollution in the 1970s. By the 1980s, the government itself had identified 20 highly polluted river systems across the country, including the Ciliwung in Jakarta, polluted by various heavy industries; the Asahan in North Sumatra, polluted by a

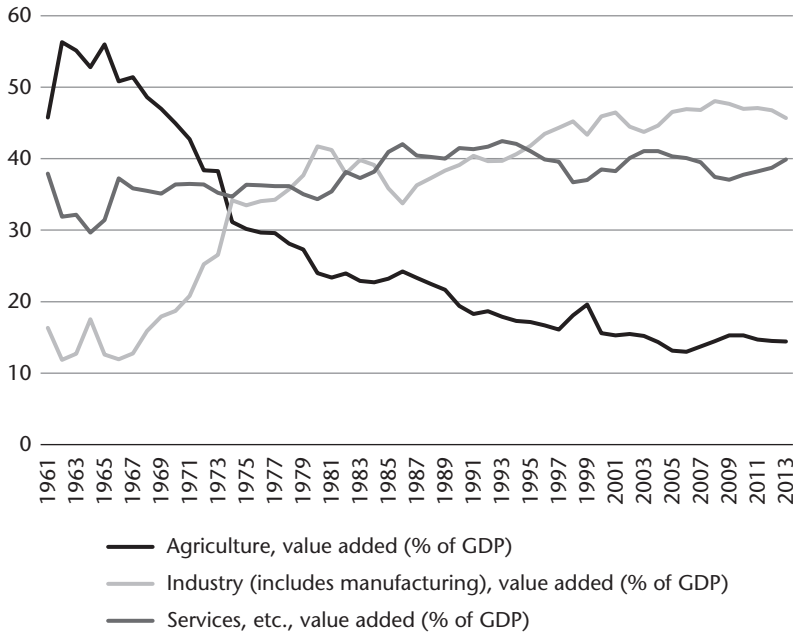


Figure 22.2 Changing composition of GDP in Indonesia (1961–2010)

Source: World Bank, 2015.

pulp and rayon factory, as well as an aluminium smelter; and the Barito in South Kalimantan, affected by pulp and plywood factories (Cribb, 1990). As a result of industrialization and associated urbanization, air pollution now routinely exceeds World Health Organization standards in massive urban centres such as Jakarta, Bandung and Surabaya, and this has emerged as a serious health issue. The government’s environmental pollution control agency (BAPPEDAL), and its embryonic environmental regulatory apparatus, were, however, largely ineffectual in reducing the extent of the country’s industrial pollution. This was compounded by the closely intertwined networks of state bureaucrats and capital interests that had evolved under the New Order. Dust emissions from PT Indocement factories on the outskirts of Jakarta (owned by a well-known business associate of President Suharto, Liem Sioe Liong), for example, had been visible for years starting in the 1970s, but were apparently ignored by the government (Cribb, 1990). State-owned enterprises with poor environmental performance, such as Krakatau Steel (*Tempo*, 2004), were similarly immune from public and legal scrutiny. Subsequent economic reforms in the 1980s, associated with a shift towards export-oriented industrialization, did not significantly reduce industrial pollution either. This is not surprising, considering that further growth in manufacturing occurred primarily through the relocation of pollution-intensive industries from East Asian countries, where environmental regulations were being tightened, to Indonesia, where regulation was still lax (Resosudarmo and Irhamni, 2008).

Agricultural development was also afforded specific policy attention during the early days of the New Order, with large-scale expansion of the earlier *Bimbingan Massal* (BIMAS, or Mass Guidance) programme towards self-sufficiency in food production (Roekasah and Penny, 1967). Oil revenues then provided the financial means for huge investments in *sawah* expansion, rehabilitation and expansion of irrigation infrastructure, farmer credit schemes, subsidized inputs, price

controls and a comprehensive extension delivery system (Simatupang and Timmer, 2008). BIMAS was successful in rapidly increasing rice production into the mid-1980s, when the Indonesian government proclaimed that the country was self-sufficient in rice. This was possible through the application of 'green revolution' technologies, such as new high-yielding varieties, and increasing dependence on chemical fertilizers and pesticides, whose costs were kept low by subsidies made possible by the country's petroleum surplus. The impacts of excessive pesticide use on human health, livestock losses, natural pest predator populations, crop pollination problems and wildlife have been well documented (Pimentel and Lehman, 1993). In Indonesia, the serious environmental and human health problems of excessive pesticide use were also recognized by the government (highlighted by resistant pests such as the brown rice hopper): a number of pesticides were officially banned in 1986 and a new programme of integrated pest management was introduced to replace BIMAS in 1989 (Resosudarmo, 2008). Despite an extensive list of banned pesticides, monitoring their circulation and enforcing their use remain minor priorities, and excessive use is a serious problem.

The severe environmental impacts of unrestrained resource exploitation and industrial development during the Suharto regime soon became well known to international conservation organizations and donor agencies, and also led to the emergence of an environment movement within Indonesia itself. Initially, this movement was established under the patronage of Emil Salim, at whose behest the Indonesian Forum for the Environment (WALHI) was founded in 1980 (Parlan and Maha Adi, 2010). According to Cribb (2003), environmentalism initially held a kind of privileged position in terms of its relationship to the state in Indonesia at a time when strict and oppressive controls were otherwise enforced over social organizations. Under Salim's protection, WALHI, and other environmental organizations, became a magnet for various groups that questioned and critiqued government performance and its version of developmentalism (Peluso *et al.*, 2008). By the 1990s, WALHI started to assume a more stridently oppositional stance towards the government, even initiating numerous legal challenges against it for AMDAL approval (for example, for companies such as PT Inti Indorayon Utama and PT Freeport Indonesia), for the misuse of forest rehabilitation funds, for forest fires in South Sumatra and for the failed one-million-hectare peat development project in Kalimantan (Parlan and Maha Adi, 2010). While state support was initially critical, Peluso *et al.* (2008) have emphasized how environmental agendas have also been shaped by the ability of grassroots movements to form alliances with other movements, with the state and with transnational actors, rather than being externally driven.

### **The Indonesian environment following *reformasi***

The Asian financial crisis of 1998 brought to an end the Suharto regime, and initiated the *reformasi* period of democratization. The implications for the environment of these political changes are difficult to categorize. Initially, the crisis resulted in increased deforestation as urban workers were laid off, export crops became financially more attractive under a drastically devalued rupiah and the state's ability to enforce forest protection was greatly diminished (Sunderlin *et al.*, 2001). The government and private sector were primarily focused on preventing business collapse, turning a blind eye to worsening industrial pollution and probably leading to specific cases of environmental damage. However, the full extent of industrial pollution across the country was temporarily reduced due to the general slowdown of industrial activity that occurred (Resosudarmo and Irhamni, 2008). For the most part, NGOs, civil society organizations and the media have been more interested in exposing issues of government corruption and the abuses of political power since obtaining these newfound freedoms in post-Suharto

Indonesia, rather than concentrating on environmental issues. The exception has been when life-taking ‘natural’ disasters – such as landslides, floods and mudflows – are widely believed to have been caused, or significantly exacerbated, by human-induced environmental degradation.

We can identify at least three emerging developments in post-Suharto Indonesia that are actively shaping processes of environmental change: (i) the decentralization of resource access and control under regional autonomy; (ii) Indonesia’s changing international trade relationships and a revival in natural resource exports; and (iii) the emergence of new global modes of extra-territorial environmental regulation that are intervening in environmental processes domestically.

Only 12 months following Suharto’s resignation, in 1999, the Habibie government introduced a set of regional autonomy laws which increased substantially the role and responsibilities of district governments (*kabupaten* and *kotamadya*). This was an attempt to placate regional dissent and resist the strong centrifugal forces that appeared to threaten Indonesian unity and that were especially pronounced in resource-rich provinces, such as Aceh, Riau, East Kalimantan and Papua. The period following these laws (which also saw a new Regional Autonomy Law passed in 2004) has been characterized by a high degree of legal uncertainty, which notoriously included contradictions between the 1999 regional autonomy laws and a new forestry law, also passed in 1999 (Arnold, 2008). Decentralization has spawned a paradox of (albeit uneven) recognition of local land rights and community-based forestry on the one hand, and a flurry of locally issued logging licences and a boom in timber extraction on the other (Obidzinski, 2005). Legal ambiguity has provided even greater space for the ascendancy of political influences on environmental governance regimes, where formal laws are but one of a number of factors shaping resource use and access within Indonesia (Bakker and Moniaga, 2010). Despite the intuitive expectations of improved environmental management as decentralized regulators become more proximate to affected communities, the evidence to date suggests a more complicated outcome for the environment. Overall, the imperative for local revenue generation and the opportunities offered to newly empowered bureaucrats and politicians in the districts appear to be resulting in continued, if not accelerated, resource depletion in many districts (Fox *et al.*, 2005; McCarthy and Warren, 2009).

Related to the economic rise of China, Indonesia’s international trade relations have undergone a significant structural shift since the Asian financial crisis: in 1996, 84 per cent of exports went to high-income economies (HIEs) and only 10 per cent to developing economies in East Asia and the Pacific (DEEAP, which includes China); by 2010, 63 per cent still went to HIEs, while 23 per cent was now destined for DEEAP countries (World Bank, 2015). Importantly, Indonesian exports to China are concentrated almost exclusively in unprocessed natural resources (Table 22.3). This appears to reflect a broader shift in Indonesia’s comparative advantage away from manufacturing (which has been declining since 2000 as a percentage of total exports) and back towards natural resources. This, in turn, is presenting a number of new challenges to the sustainable management of Indonesia’s resource wealth, which could be rapidly depleted amid growing Chinese demand.

The relative decline of manufacturing has, more recently, prompted a political response towards protective industrial policy (Manning and Purnagunawan, 2011), which has sometimes been framed in terms of the responsible and sustainable use of natural resources. Publicly voiced concerns regarding economic imperialism and resource depletion have resulted in a revival of resource-based industrialization policies, or what might be called resource nationalism (as expressed mostly clearly in Government of Indonesia, 2011). Various policy initiatives, including export tariffs and export bans on selected raw materials, have now been introduced for a number of commodities – including mineral ores, palm oil, cocoa, rattan and timber – to encourage

Table 22.3 Value of Indonesian exports to China  
(US\$ millions)

<i>Export</i>	<i>2010</i>	<i>2011</i>
Mineral fuels	6,023	8,923
Coal	4,071	6,012
Petroleum	706	570
Animal fats and vegetable oils	2,446	3,102
Palm oil	1,867	2,110
Rubber	1,416	2,007
Ores, slag and ash	1,387	2,828
Aluminium	466	767
Nickel	348	1,162
Copper	331	473
Wood pulp	659	804
All other exports	3,760	5,277
<b>Total exports</b>	<b>15,692</b>	<b>22,941</b>

*Data source:* UNCOMTRADE, 2013.

domestic value-adding. Despite the possible negative implications for foreign investment, the current Indonesian government appears to be willing to risk this by restricting access to its resource wealth and speculating on its future position as a strategic supply source within a resource-constrained world.

Coal and palm oil have emerged as core exports to China (Table 22.3), and indeed as central to Indonesia's total export income. Coalmining takes place primarily in Kalimantan and Sumatra, and is undertaken both by large-scale commercial operations and by smaller (but still substantial) illegal and quasi-legal operators (Erman, 2005). The sector has expanded significantly since *reformasi*: in South Kalimantan province alone, the number of operators increased from 157 in 1997 to 842 by 2004 (Fatah, 2008), and this uncontrolled expansion has been associated with considerable environmental damage (Erman, 2005). The decentralization of resource management under regional autonomy has allowed local authorities to establish both legal and semi-legal contracts with small-scale mining companies operating within their district, with little oversight from centralized environmental regulatory bodies.

The global demand for Indonesian palm oil (about half of which is now exported to China and India), and its environmental consequences, has come under increasing international scrutiny over the last decade (for example, Wakker *et al.*, 2004). The area of harvested oil palm has increased from 1.6 million hectares in 1997 to 6 million hectares in 2011 (FAOSTAT, 2013), and it is acknowledged that this expansion has occurred at the expense of natural forest areas (Fitzherbert *et al.*, 2008; Koh and Wilcove, 2008). More specifically, palm oil expansion in Indonesia is occurring into the last remaining natural habitat of the endangered orangutan on both Sumatra and Borneo (Nellemann, 2007; Singleton *et al.*, 2008; Swarna Nantha and Tisdell, 2009).

This recognized link between changing global consumption patterns and local environmental change has prompted a new approach by several leading conservation organizations, led by the World Wildlife Fund (WWF), and is slowly modifying environmental governance within Indonesia. Value chain certification schemes for 'sustainability', representing for some a controversial partnership between environmental groups and big capital, were initially introduced in the 1990s for commodities such as coffee as an attempt to prevent habitat loss in Central

America (Neilson and Pritchard, 2007). The number of commodities covered under various certification schemes has now expanded considerably, and the approach has been adopted by many of the world's largest corporations as part of routine supply-chain management practices. These schemes rely on influencing consumer choice towards environmentally sustainable products that are identified with a certification mark, which ensures that the product complies with third-party-specified environmental criteria. WWF (2012) has been at the forefront of promoting this approach globally and, in Indonesia, it initiated the Roundtable on Sustainable Palm Oil to further promote certification of palm oil. Similar schemes operating across palm oil, timber, fisheries, farmed shrimp, coffee and cocoa have now been introduced across Indonesia, often with powerful corporate support, and are adding an influential layer to the way resources are used locally (Neilson *et al.*, 2010).

Global environmental governance is also manifesting through the international responses to climate change mitigation and, in particular, through initiatives to reduce emissions from deforestation and degradation (widely known as REDD). According to the *Global Forest Resources Assessment* (FAO, 2010), Indonesia is the world's sixth-largest storehouse of forest carbon, although it is now the highest annual emitter of this carbon in the world (eclipsing Brazil for the first time during the period 2005–2010). Although negotiations to include REDD within a post-Kyoto agreement under the UN Framework Convention on Climate Change have effectively stalled, other bilateral initiatives have proceeded. The most far-reaching of these to date has been the Indonesia–Norway REDD+ Partnership, signed in May 2010 as a letter of intent by the Indonesian Minister of Foreign Affairs and the Norwegian Minister of Environment. This agreement, worth US\$1 billion to Indonesia, finally resulted in a Presidential Decree being issued in May 2011 that enacted a two-year moratorium on new concessions being issued on all primary forest and peatlands within forestry lands across Indonesia. Many green groups were disappointed with the scope of the decree, with its exceptions for 'vital development projects' including oil and gas and food security, extensions to existing concessions and proposals already with 'in-principle' approval. However, the ability of a foreign entity to openly influence policymaking processes within the sovereign nation of Indonesia is an important moment in the development of global environmental governance, and is indicative of broader trends in this direction.

## Conclusion

The chapter has emphasized the mutually constitutive nature of environments and political systems, where environmental conditions have influenced political structures (such as through natural resource wealth igniting separatist demands or through threats to charismatic wildlife shaping environmental accountability along certain value chains) and political–economic configurations have in turn shaped pressures on the environment (for example, by subjecting economic activity with environmental implications to local, national and international influences at different periods). A more comprehensive examination of societal attitudes towards the environment in Indonesia than is possible in this brief chapter would have further included a detailed discussion of the socio-cultural-religious underpinnings of human–nature interactions. This would include the diverse systems of customary *adat* law and resource tenure, and the spiritual dimension of social systems such as those celebrated in Bali by *Tri Harta Karana* philosophies and the *subak* water institutions, where religious, social, political and environmental functions are intertwined.

This review of the environment in Indonesia has emphasized the decisive role played by political systems (such as *culturstelsel* and regional autonomy) and economic structures (such as



corporate liberalism and import substituting industrialization) in shaping patterns of environmental change across Indonesia during key historical periods. While the specific nature of interactions between these broader structures with individual actors and groups embedded within regional landscapes results in a dizzying array of environmental outcomes, the two periods of extreme economic liberalism within Indonesia (1900–1930 and 1967–1973) certainly stand out as being environmentally transformative on a grand scale. This historical perspective towards global networks of environmental influence in Indonesia provides an appropriate frame for understanding contemporary processes of environmental change. In particular, it highlights recent trends in environmental governance across Indonesia shaped by simultaneous decentralization, global resource demands and the emergence of new modes of global environmental regulation.

## References

- Arnold, L. (2008) 'Deforestation in decentralised Indonesia: What's law got to do with it?', *Law, Environment and Development Journal*, vol 4, no 2, pp. 77–101.
- Ascher, W. (1998) 'From oil to timber: The political economy of off-budget development financing in Indonesia', *Indonesia*, vol 65, pp. 37–61.
- Bakker, L. and Moniaga, S. (2010) 'The space between: Land claims and the law in Indonesia', *Asian Journal of Social Science*, vol 38, no 2, pp. 187–203.
- Barani, A. M. (2010) *Bukan Sebuah Mimpi: Menjadi produsen kakao terbesar di Dunia*, Ideals Agro Abrar, Jakarta.
- Blaikie, P. and Brookfield, H. (1987) *Land Degradation and Society*, Methuen, New York.
- Booth, A. (1998) *The Indonesian Economy in the Nineteenth and Twentieth Centuries: A History of Missed Opportunities*, Macmillan, Houndmills, Basingstoke.
- Cribb, R. (1990) 'The politics of pollution control in Indonesia', *Asian Survey*, vol 30, no 12, pp. 1123–1135.
- Cribb, R. (2003) 'Environmentalism in Indonesian politics', in A. Bedner and N. Niessen (eds) *Towards Integrated Environmental Law in Indonesia*, CNWS Publications, Leiden, pp. 37–48.
- EnviroSearch International (1994) *Final Report: Environmental Review of P.T. Freeport Indonesia Copper and Precious Metals Mine, Irian Jaya, Indonesia*, presented to OPIC, <http://web.archive.org/web/20060113104955/http://www.austinchronicle.com/issues/dispatch/2005-09-23/FreeportEnvReview.pdf>, accessed 8 February 2013.
- Erman, E. (2005) 'Illegal coalmining in West Sumatra: Access and actors in the post-Soeharto era', in B. P. Resosudarmo (ed.) *The Politics and Economics of Indonesia's Natural Resources*, Institute of Southeast Asian Studies, Singapore, pp. 206–215.
- FAOSTAT (2013) Food and Agriculture Organization of the United Nations Statistics, <http://faostat.fao.org/site/339/default.aspx>, accessed 23 January 2013.
- Fatah, L. (2008) 'The impacts of coal mining on the economy and environment of South Kalimantan province, Indonesia', *ASEAN Economic Bulletin*, vol 25, no 1, pp. 85–98.
- Fitzherbert, E. B., Struebig, M. J., Morel, A., Danielsen, F., Brühl, C. A., Donald, P. F. and Phalan, B. (2008) 'How will oil palm expansion affect biodiversity?', *Trends in Ecology & Evolution*, vol 23, no 10, pp. 538–545.
- Food and Agriculture Organization of the United Nations (FAO) (1976) *Forest Resources in the Asia and Far-East Region*, FAO, Rome.
- Food and Agriculture Organization of the United Nations (FAO) (2010) *Global Forest Resources Assessment 2010*, FAO, Rome.
- Forsyth, T. (2003) *Critical Political Ecology: The Politics of Environmental Science*, Routledge, London.
- Fox, J., Adhuri, D. S. and Resosudarmo, I. A. P. (2005) 'Unfinished edifice or Pandora's box? Decentralisation and resource management in Indonesia', in B. P. Resosudarmo (ed.) *The Politics and Economics of Indonesia's Natural Resources*, ISEAS Publishing, Singapore, pp. 92–108.
- Furnivall, J. S. (1944) *Netherlands India: A Study of Plural Economy*, Macmillan, New York.
- Geertz, C. (1963) *Agricultural Involvement: The Process of Ecological Change in Indonesia*, vol 11, University of California Press, Berkeley.
- Gilding, P. (2011) *The Great Disruption: How the Climate Crisis Will Transform the Global Economy*, Bloomsbury, London.



- Government of Indonesia (2011) *Masterplan percepatan dan perluasan pembangunan ekonomi Indonesia, 2011–2025*, Kementerian Koordinator Bidang Perekonomian, Jakarta.
- International Union for Conservation of Nature (IUCN) (2012) *The IUCN Red List of Threatened Species. Version 2012.2*, www.iucnredlist.org, accessed 6 February 2013.
- Kano, H. (2008) *Indonesian Exports, Peasant Agriculture and the World Economy, 1850–2000: Economic Structures in a Southeast Asian State*, NUS Press, Singapore.
- Koh, L. P. and Wilcove, D. S. (2008) 'Is oil palm agriculture really destroying tropical biodiversity?', *Conservation Letters*, vol 1, no 2, pp. 60–64.
- Leitmann, J., Brown, T., Roesad, K., Bojo, J. and DeRidder, K. (2009) *Investing in a More Sustainable Indonesia: Country Environmental Analysis*, CEA Series, East Asia and Pacific Region, World Bank, Washington, DC.
- McCarthy, J. and Warren, C. (2009) 'Communities, environments and local governance in reform era Indonesia', in C. Warren and J. McCarthy (eds) *Community, Environment and Local Governance in Indonesia*, Routledge, Abingdon, pp. 1–27.
- Maimunah (2006) *Freeport: Bagaimana Pertambangan Emas dan tembaga Raksasa Menjajah Indonesia*, WALHI/JATAM, Jakarta.
- Manning, C. and Purnagunawan, R. M. (2011) 'Survey of recent developments', *Bulletin of Indonesian Economic Studies*, vol 47, no 3, pp. 303–332.
- Millennium Ecosystem Assessment (MEA) (2005) *Ecosystems and Human Well-being: Synthesis*, MEA, Island Press/World Resources Institute, Washington, DC.
- Ministry of Forestry (MoF) (2012) *Statistik kehutanan Indonesia 2011 (Forestry Statistics of Indonesia 2011)*, Ministry of Forestry of the Republic of Indonesia, Jakarta, www.dephut.go.id/files/BUku%20Statistik%20Juli%202012\_terbaru.pdf, accessed 4 February 2013.
- Mortimer, R. (1973) 'Indonesia: Growth or development?', in R. Mortimer (ed.) *Showcase State: The Illusion of Indonesia's Accelerated Modernisation*, Angus & Robertson, Sydney, pp. 51–67.
- Neilson, J. and Pritchard, B. (2007) 'Green coffee: The contradictions of global sustainability initiatives from an Indian perspective', *Development Policy Review*, vol 25, no 3, pp. 311–331.
- Neilson, J., Arifin, B., Gracy, C. P., Kham, T. N., Pritchard, B. and Soutar, L. (2010) 'Challenges of global environmental governance by non-state actors in the coffee industry: Insights from India, Indonesia and Vietnam', in S. Lockie and D. Carpenter (eds) *Agriculture, Biodiversity and Markets: Livelihoods and Agroecology in Comparative Perspective*, Earthscan, London, pp. 175–200.
- Nellemann, C. (ed.) (2007) *The Last Stand of the Orangutan – State of Emergency: Illegal Logging, Fire and Palm Oil in Indonesia's National Parks*, UNEP, Nairobi.
- Nitisastro, W. (2011) *A Collection of Writings and Speeches of Widjojo Nitisastro*, ISEAS Publications, Singapore.
- Obidzinski, K. (2005) 'Illegal logging in Indonesia: Myth and reality', in B. P. Resosudarmo (ed.) *The Politics and Economics of Indonesia's Natural Resources*, ISEAS Publishing, Singapore, pp. 193–205.
- Parlan, H. and Maha Adi, I. G. G. (2010) *Sekilas tentang WALHI dari masa ke masa*, WALHI, <http://walhi.or.id/id/home/sejarah-kami.html>, accessed 10 February 2013.
- Peluso, N. L. (1992) *Rich Forests, Poor People: Resource Control and Resistance in Java*, University of California Press, Berkeley.
- Peluso, N. L. and Watts, M. (2001) *Violent Environments*, Cornell University Press, Ithaca, New York.
- Peluso, N. L., Affif, S. and Rachman, N. F. (2008) 'Claiming the grounds for reform: Agrarian and environmental movements in Indonesia', *Journal of Agrarian Change*, vol 8, nos 2–3, pp. 377–407.
- Pimentel, D. and Lehman, H. (eds) (1993) *The Pesticide Question: Environment, Economics, and Ethics*, Springer, Berlin.
- Resosudarmo, B. P. (2005) 'Introduction', in B. P. Resosudarmo (ed.) *The Politics and Economics of Indonesia's Natural Resources*, ISEAS Publishing, Singapore, pp. 1–12.
- Resosudarmo, B. P. (2008) 'The economy-wide impact of integrated pest management in Indonesia', *ASEAN Economic Bulletin*, vol 25, no 3, pp. 316–333.
- Resosudarmo, R. P. and Irhamni, M. (2008) 'Indonesia's industrial policy reforms and their environmental impacts', *Journal of the Asia Pacific Economy*, vol 13, no 4, pp. 426–450.
- Robison, R. (2009) *Indonesia: The Rise of Capital*, Equinox Publishing, Singapore, orig. pub. 1986.
- Roekasah, E. A. and Penny, D. H. (1967) 'Bimas: A new approach to agricultural extension in Indonesia', *Bulletin of Indonesian Economic Studies*, vol 3, no 7, pp. 60–69.
- Salim, E. (2005) 'Preface: Looking back to move forward', in B. P. Resosudarmo (ed.) *The Politics and Economics of Indonesia's Natural Resources*, ISEAS Publishing, Singapore, pp. xxi–xxv.

- Sentosa, M. A. (1996) 'Industrial pollution control in Indonesia', in B. Boer, R. Fowler and N. Cunningham (eds) *Environmental Outlook No. 2: Law and Policy*, Federation Press, Sydney.
- Simatupang, P. and Timmer, C. (2008) 'Indonesian rice production: Policies and realities', *Bulletin of Indonesian Economic Studies*, vol 44, no 1, pp. 65–80.
- Singleton, I., Wich, S. A. and Griffiths, M. (2008) *Pongo abelii*, in IUCN (2012) *The IUCN Red List of Threatened Species. Version 2012.2*, www.iucnredlist.org, accessed 15 February 2013.
- Sunderlin, W. D., Angelsen, A., Resosudarmo, D. P., Dermawan, A. and Rianto, E. (2001) 'Economic crisis, small farmer well-being, and forest cover change in Indonesia', *World Development*, vol 29, no 5, pp. 767–782.
- Swarna Nantha, H. and Tisdell, C. (2009) 'The orangutan–oil palm conflict: Economic constraints and opportunities for conservation', *Biodiversity and Conservation*, vol 18, no 2, pp. 487–502.
- Tempo (2004) 'Warga Keluhkan Limbah PT Krakatau Steel', *TEMPO Interaktif*, 29 July, www.tempo.co/read/news/2004/07/29/05545684/Warga-Keluhkan-Limbah-PT-Krakatau-Steel, accessed 2 February 2016.
- UNCOMTRADE (2013) United Nations Commodity Trade Statistics Database, <http://comtrade.un.org/>, accessed 2 February 2016.
- Wakker, E., Watch, S. and Rozario, J. D. (2004) *Greasy Palms: The Social and Ecological Impacts of Large-scale Oil Palm Plantation Development in Southeast Asia*, Friends of the Earth, London.
- Wallace, A. R. (1863) 'On the physical geography of the Malay Archipelago', *Journal of the Royal Geographical Society of London*, vol 33, pp. 217–234.
- World Bank (1990) *Indonesia: Forests, Land, and Water – Issues of Sustainable Development*, World Bank, Washington, DC.
- World Bank (1994) *Indonesia: Environment and Development*, World Bank, Washington, DC.
- World Bank (2015) *World Development Indicators*, <http://data.worldbank.org/data-catalog/world-development-indicators>, accessed 25 January 2016.
- World Wide Fund for Nature (WWF) (2012) *Better Production for a Living Planet*, WWF Market Transformation Initiative, WWF, Geneva, [www.wwf.org.au/?4901/Better-production-for-a-living-planet](http://www.wwf.org.au/?4901/Better-production-for-a-living-planet), accessed 15 February 2013.