Natural resource management and development discourses in the Caribbean: reflections on the Guyanese and Jamaican experience

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Abstract

International discourses on environment and development help to shape global shared understandings of environmental issues. This paper describes the environment and development history of Guyana and Jamaica through pre-colonial, colonial, independence and market liberalisation stages. Two opposing discourses are used to frame this history: a dominant global

environmental discourse characterised by technical and 'scientific' expertise and hierarchical governance; and a counter-discourse emphasising local control over natural resources. This analysis serves as a first step in surfacing and understanding the highly complex and multifaceted nature of environmental issues in these locations. However, we conclude with the recognition that further work should go beyond a bipolar analysis to one taking a critical, multidimensional approach, to promote more sustainable management of natural resources than has previously taken place.

Introduction

In most rural parts of the developing world, local communities rely almost exclusively on the quality, abundance and diversity of their local natural resources. Yet the way in which these resources have been managed has not always been in the hands of the people who depend on them. In fact, as a result of historical land and resource use expropriation, many people at a local level are subject to policies and practices set up by national governments and controlled by international institutions through the lenses of 'development' and/or 'conservation'. These have been strongly influenced by international debates on environment and development which help to shape global shared understandings of issues. These common perceptions and discourses 'construct meanings and relationships, helping to define common sense and legitimate knowledge'.[1]

Dominant global environmental discourses more often than not contribute to the standardisation of problems, leading to the production of 'blueprint' solutions which are consequently translated into policy without local adaptation.[2] This determines the flow and quantity of aid and funding,[3] and promotes the redistribution or entrenchment of power and decision-making. Wardell and Reenberg and Sletto,[4] for example, show how global discourses framed around

environmental degradation and risk associated with the use of fire as a land management tool have privileged specific institutions (over local indigenous knowledge) in West African countries and Venezuela respectively. Politics and power underlie the gathering, representation and use of knowledge[5] and are intimately bound within global and consequently national and institutional discourses.[6] Power relations within discourses play a significant role in determining whose interests or knowledge are advanced or whose are suppressed or oppressed.[7]

Discourses can be analysed by examining the ways in which their messages are communicated in the form of narratives or storylines.[8] Environmental discourses have been categorised in different ways. Dobson, for example, makes the distinction between conservationism, reform environmentalism and radical ecologism.[9] Dryzek goes much further and produces a classification based on the premises of global limits and their denial, environmental problem solving, sustainability and democratic green radicalism.[10]

Many environmental discourse analyses differentiate the environmental debate according to two distinct discourses.[11] The first of these points towards a dominant global environmental discourse characterised by technocentrism and managerialism, linked to general discourses of modernisation and, more recently, neoliberalism. This discourse promotes the centralisation of decision-making powers through mutually supporting scientific institutions, governments, multi-national industrial corporations (whether state controlled and/or private) and, recently, western conservation and development NGOs. Whichever political orientation, left or right, this global process of centralisation has consistently undermined local control over resource management, replacing it with a homogenised, ubiquitous and hierarchical administrative structure which increasingly de-skills and disempowers local communities. Secondly, a commonly associated counter-discourse emphasises an agenda of decentralisation through the

promotion of human rights, self determination and localised community-based and ecologically compatible approaches to environmental management. Examples include the emergence of the Indian Chipko movement in the 1970s; the Kenyan Green Belt Movement in the 1980s; the Mexican Zapatista movement in the mid-1990s; and the global Transition Towns Network in the 2000s.

Both discourses depend on the clear identification of victims, villains and heroes. In the global environmental discourse, the local communities are both victims and villains; they are responsible for desertification, deforestation and biodiversity loss resulting from their over-population and environmental mismanagement, but they are also the victims – stuck in a debilitating cycle of environmental degradation and poverty.[12] The heroes are the technical, scientific, policy making and enterprising institutions which bring advanced technical know-how and establish limits on exploitation through financial incentives and/or punitive restrictions. Solutions are devised by experts at the international level through global conventions and international bodies, such as the Intergovernmental Panel on Climate Change (IPCC), Global Convention on Desertification and the Convention on Biological Diversity. The counter-discourse, variously described as 'populist' or 'grassroots', turns the situation on its head and identifies the centralising heroes as the villains, enslaving and subjugating the weak to channel resources towards powerful groups, depicted variously (depending on the political persuasion) as either 'capitalist industrialists' or 'communist politbureau'. The new heroes in this discourse are the marginalised communities. Through a process of bottom-up and participatory engagement and, if deemed necessary, direct action/civil disobedience, these communities are able to wrestle back control of local resources and manage these sustainably and equitably. This discourse questions established scientific 'truths' and replaces these by the lived experiences of local communities. The villains of this discourse also become victims, as

the governing, expert and accumulating classes can no longer grow rich and powerful off the backs of disempowered communities and degraded environments.

Although various authors have revelled in producing a myriad of sub-classifications amongst these two distinct discourses, the approach taken in this paper adopts Murray Bookchin's basic view that the history of both social and natural evolution aligns itself according to two opposing forces: co-operative differentiation and hierarchical domination.[13] History therefore unfolds as a battle between local communities committed to self-determination and elites aspiring to dominate them. In this paper, we narrate an environmental history of Guyana and Jamaica according to the influences of the dominant global environmental discourse and the populist/grassroots counter-discourse. In our analysis, we will draw upon these two polar opposites to show how, through history, local people have been subject to environmental and development interventions governed by the dominant discourses of the time. Our purpose is to simplify a highly complex history in order to first expose the manifestation of the two discourses described above, which, in turn, will hopefully allow a more nuanced interpretation of current developments. Our conclusions call for an analysis that goes beyond these polarised discourses towards capturing the multi/trans-scalar, differentiated and complex non-linear nature of natural resource dilemmas.

The case studies have been chosen to represent the continental interior and island environments of the Caribbean. These have experienced different development pathways and local histories, though within the same framework of European colonisation through to independence and then to a progressively more globalised world. The interior of Guyana, comprised of a mosaic of dense tropical rain forest, savanna and wetland ecosystems, has been comparatively untouched by development until fairly recently due to its relative isolation. Jamaica, on the other hand, has

been chosen to represent the colonial and postcolonial pathway of the maritime Caribbean, characterised by radical deforestation and exploitative forms of agricultural and plantation land use. Coastal Guyana will also be considered with Jamaica where appropriate, as this area has a broadly similar colonial history to the Caribbean island territories. In selecting these English-speaking former colonies, we are conscious that we have excluded territories which have experienced significantly different development pathways, such as Cuba, with its post 1950s socialist regime and the associated Cold War embargoes, the French départements (Guadeloupe, Martinique and Cayenne), and Haiti, which led the way to island independence in 1804, but which suffered from the isolation that its early decades as an independent and perceived unstable state precipitated.

Pre-colonial history

The pre-colonial indigenous civilisations of Jamaica and Guyana (and the wider Caribbean as a whole), were characterised by relatively isolated communities focussing their subsistence on small-scale agriculture, hunting, gathering and occasional trade with and raids on adjoining communities. Communities had collective ownership of prescribed bio-regions underpinned by hierarchical decision-making structures focusing on determining the limits on natural resource extraction and trade/offensive actions with hostile/neighbouring communities. Otherwise, individuals had extensive freedoms with regard to when, where and to what extent they employed their labour and had direct control over their surrounding resources. Bookchin portrayed indigenous communities, such as these, as the closest society had ever got to with regards to populist/grassroots control.[14] Nevertheless, one should be careful not to romanticise these cultures excessively since some practices, for example violent raiding activities for women, certainly do not fit within the narrative of present-day egalitarian and democratic decision making and personal freedoms.

Jamaica's earliest inhabitants were almost certainly the Ciboneys, a coastal dwelling group with mostly hunter-gatherer practices. Arawaks, originally a seagoing people, settled in Jamaica at around AD 650 and rapidly adopted a system of cultivated fields and gardens, which they had absorbed through their contact with other groups in the region of the Guianas and Venezuela.[15] In contrast to Jamaica, the indigenous population of Guyana was diverse, with various groups vying over the savanna, forest and wetland landscapes. Trade was important among the indigenous groups, and networks of alliances allowed the exchange of skills, knowledge and various food/non-food products. Prior to the arrival of Europeans, the Caribs, relative newcomers who may have moved north from Amazonia and progressively displaced the Arawaks, dominated the trading economy on the coast. Particular indigenous groups, such as the Caribs and Makushi, were also feared for their warrior skills; they frequently raided neighbouring communities for women and resources.[16]

Most of these indigenous communities practised a basic form of shifting cultivation and grew a diversity of crops (most reproducing vegetatively from cuttings), including the staple cassava or manioc, which was used to produce a variety of edible products.[17] Although favouring land with good drainage and light soils, lower hill slopes were also occasionally used. Forest was cleared by ring-barking and felling, and the vegetation was burned on the ground surface once dry. Plants such as cassava and sweet potato were typically grown on soil mounds which, according to Watts, caused little soil erosion.[18] Local fruit trees were also grown, commonly in ‘kitchen gardens’ adjacent to homes. Overall, this adaptive and relatively low density land-use system almost certainly caused little land degradation. Nor at this time was there large-scale forest clearance, as, for example, the Arawaks favoured grassland or secondary vegetation sites rather than mature rainforest sites.[19]

This discourse of a relatively egalitarian and sustainable society is important because it provides the 'seed' narrative for all subsequent populist ideas of local abilities to manage natural resources in sustainable ways while maintaining socially just cultures, without interference from external forces.

Period of colonial first encounter and expansion

The first encounters between local indigenous groups and European explorers may have been mostly amicable and mutually beneficial, with the predominant focus on trade. Jamaica was first visited by Christopher Columbus on his second voyage in 1494 and, although this was soon followed by Spanish trading posts, Jamaica attracted few Spanish settlers, and the Spanish had all but abandoned the island by around 1519. Europeans arrived in Guyana slightly later in the 1500s, but also there they quickly took advantage of trading opportunities in natural resources with indigenous people. By the 1620s a number of commercial trading posts had also been set up by the Dutch.[20]

However, the establishment of trading posts soon developed into greater enterprises for the extraction of resources, such as timber, minerals, and, eventually, cash crops, for export to Europe. These activities spawned an insatiable demand for manual labour, initially supplied by allied indigenous communities raiding rival communities for slaves, but then increasingly supported by slavery from Africa. By this time, imported disease and the changing relationship from one of trade to one of subjugation began to decimate indigenous communities living in close proximity to European settlements. For example, in Jamaica the Arawaks were enslaved and brutalised by the Spanish, and animals introduced by the Spaniards (pigs, goats and cattle) destroyed unfenced Arawak fields and gardens, while epidemics such as smallpox inflicted

devastation on the remaining isolated settlements.[21] Indigenous communities were either wiped out altogether, with the exception of a few isolated groups in the mountainous interior (as in Jamaica) or retreated inland (as in Guyana).[22]

The initial curiosity and interest in indigenous practices (as reported by the first explorers who originated the idea of the 'noble savage') soon gave way to another discourse of indigenous peoples living an 'unproductive life' in the 'wilderness'. The rapid extermination of large indigenous communities near European settlements reinforced the idea of indigenous people occupying an empty land. The inability to commodify and mass produce traditional resources also contributed significantly to the increasing narration of previously indigenous land as 'wilderness' unoccupied by no-one except a few vagrant groups struggling to maintain a bare existence. This development went on to contribute towards the emerging global narratives of wild pristine environments untainted by human hands.[23]

Colonial plantations

The establishment of the colonial plantation economy developed at great pace on the accessible coastal regions of the Caribbean, driven firstly by slave labour from Africa and later by indentured immigrants from India. As the sugarcane plantations were established as a major industry in the Caribbean, firstly on Española from the 1530s,[24] the wholesale destruction of the coastal forests commenced through the progressive depletion of both flora and fauna. Thus the roots of Caribbean environmental degradation lie in the history of the extractive plantation economies and the colonial legacy. Concomitant with the establishment of the plantation industry, there was a parallel scramble in the late 1600s to define and consolidate territorial sovereignty with, for example, the exploration of the Guiana Shield watershed divide which determined frontier borders between British, Dutch, French and Portuguese colonial powers.[25]

The Spanish monopoly of territory in the Caribbean was progressively challenged by northern European states throughout the sixteenth century, and lands unoccupied by the Spanish were colonised by others from the 1620s onwards.[26] After a phase of changing hands in the seventeenth and eighteenth centuries, often mirroring conflicts in Europe,[27] the Caribbean islands also settled into permanent sovereignty which lasted for the remainder of the colonial period.

Territorial expansion in Guyana was justified on the pretext of protecting the rights of indigenous subjects.[28] First, alliances were made with indigenous groups, who were then 'honoured' with the status of British subjects. However, implicit within this bequest was that, on becoming a British subject, the colonists could claim rightful ownership of the territory. At the same time, as elsewhere in the empire, humanitarian arguments, namely protecting the 'poor Indians' and making them 'civilised', spearheaded by colonial charitable enterprises and religious missions, were used as a means to annex indigenous lands, which were subsequently administered as Crown lands.[29]

Initial laws on natural resource use conceded a special status to the 'Aboriginal Indians of the Colony' by recognising their 'traditional rights and privileges' to hunt, fish, gather and cultivate wherever they wished on Crown lands, without need for a special permit.[30] However, as colonial interests in resource extraction became more important, rights were revoked, and under Ordinance No. 12 of 1871, the Governor of British Guiana assumed authority to define 'the privileges to be enjoyed by the Aboriginal Indians, in relation to the Rivers, Creeks, Crown Lands and Forests of the Colony and may in like manner, cancel, alter and amend any of such regulations'. After 1887, all indigenous rights to use forests and land granted to loggers, miners, balata (wild rubber) collectors and ranchers were restricted.[31]

Thus, the Guyanese interior remained relatively undisturbed in terms of land use conversion. Most logging was confined to the coastal forests and limited to specific species the timber of which had high export value. These included the greenheart (*Ocotea rodiae*), a hardwood valued for marine use in the UK and US; *Mora,* exported widely for use as railway sleepers; and *Dalli*, exported to Suriname for making plywood. The industry was constrained by a modest market, limited technology and limited access to forest resources, and controlled by a small Forest Department still in its infancy.[32] Most mining, for gold, was small-scale and confined to the banks of rivers and streams. Ranching, although extensive, occurred using the natural savannas as pasture. Nevertheless, the impact on the indigenous people was severe. The gradual expropriation of land rights meant that indigenous people had restricted access to former traditional resource use areas. For their livelihoods, many became increasingly reliant on the interior industries of ranching, logging and mining. The exploitative nature of these relationships brought about further conflict, abuse and detrimental socio-economic conditions for indigenous people. This was further exacerbated by the lack of services and development assistance for the interior populations by the colonial government, which was mainly concerned with issues around the coastal economy.[33]

Once the flurry over frontier establishment and territorial absorption as Crown land subsided in the 1830s, the colonial powers focused on the business of plantations, and the Guyanese interior with its remaining indigenous populations was neglected in favour of more productive coastal regions. Thus, Guyana was effectively divided into two, its coastal region paralleling Jamaica's plantation-based economic history while its interior was left 'undeveloped' apart from relatively minor resource extractive activities and missionary endeavours. Thus, by the

1840s, the colonial state no longer required indigenous people except as labour for the peripheral industries in timber, balata, gold and cattle-raising in the interior.

Whereas the Guyanese hinterland was now relegated to a 'wild and unproductive backwater', both the Guyanese coastal zone and Jamaica as a whole underwent rapid transformation into industrial agriculture. The large area, difficult swampy conditions and relative isolation with respect to the main trading routes, meant that the pressures for development (and associated degradation) in coastal Guyana were limited. However, the restricted area and hilly terrain of Jamaica began to experience the pressures of environmental degradation. Although there are few written records of the process, Watts cites written and scientific evidence of the progressive deterioration of soil resources throughout the insular Caribbean, following the consolidation of sugar cane plantations and the expansion of these and the slaves' provision grounds on to progressively more marginal and hillslope sites prior to emancipation.[34]

By 1665, almost all of the Caribbean coastal forests had been converted to plantations with only isolated pockets of natural forest remaining in the smaller islands, such as Barbados and St. Kitts. In Jamaica, the 18th century also resulted in the clearance of large tracts of highlands for coffee plantations (gradually abandoned through the 19th century due to depression in the industry and hillside degradation).[35] Thus the extermination of the indigenous population was followed by the destruction of native fauna and flora. In just under three hundred years following European arrival, both the natural and cultural landscapes were unrecognisable. This manifested the apex of domination of both nature and society: people, flora and fauna were subjugated to producing resources for augmenting the centralising and hegemonic European masters. Any opposition to this had either been wiped out or relegated to the fringes.

The creation of new 'local others'

The release from slavery led to the appearance of a new 'local' underclass in the coastal Caribbean, in addition to the surviving pockets of indigenous communities within the interior of Guyana. The distinct difference in Jamaica's and coastal Guyana's physical geography, the former limited in extent and hilly, and the latter extensive and flat, meant that the emancipation of slavery led to different environmental outcomes. In Jamaica, the emancipation of slaves in 1838 unwittingly exacerbated environmental deterioration. The freed slaves, invariably denied access to the best land still held by plantation owners, were forced on to poorer soils and/or more steeply sloping hillside and lowland marshlands, in order to establish their subsistence. Although there are no reliable records, deforestation of Jamaica's hillsides would have increased at this time. This played into the global environmental discourse of local communities unable to manage their environment adequately.

An early commentator on the state of Jamaica's hillsides was Jamaica's Director of Roads, Robert Thornton, in 1877: 'There are probably few British colonies which afford more striking illustration of the effects of the wholesale destruction of the aboriginal forest than is exemplified by this colony.'[36] Taking on this theme, in 1881, the first official report on the problem of forest destruction blamed the problem on the 'reckless' cutting down of forests by small farmers practising shifting cultivation. Morris, Jamaica's Director of Public Gardens and Plantations at that time, blamed both the government and private landholders for this situation; the former for allowing something like 30,000 acres of forest to be cleared each year, and the latter for abandoning cleared land after only one or two cropping seasons.[37]

At around this time, Morris and others began to make links between deforestation and an apparently increasing incidence of droughts. The likely consequences of deforestation on the

Jamaican climate led to the delimiting of forest reserves at the end of the 19th century (although these were not formally enacted in law until 1927). By the 1920s, the issue of deforestation had been refocused as an agricultural problem, and had become one of replacing the perceived (by colonial administrators) inefficiencies and environmentally damaging effects of shifting agriculture with more permanent forms of cultivation. In the 1930s, soil conservation became a prominent feature of agricultural policy across the British tropical colonies. The prevention of soil erosion provided a justification for interfering in traditional patterns of land use and was an important aspect of a transition to a more interventionist colonial policy that took place at that time, particularly in East Africa,[38] but also in Jamaica and throughout the Caribbean. This was undoubtedly facilitated in the Caribbean by the activities of the recently established Imperial College of Tropical Agriculture in Trinidad, which provided graduates who joined the Colonial service as agricultural officers. In Jamaica, agricultural practices that were identified as particularly problematic included fire clearance, digging of plots at the end of the dry season, inappropriate locations for hillside drains and short-term tenancies.[39]

Central, therefore, to the emerging global discourse of environmental degradation was a view that the emancipated slaves were the principal agents of degradation and were largely ignorant of effective soil management techniques. Little notice was taken of their traditional technical knowledge. As Blaikie argues, the assumptions on which environmental policy was based in the colonial period underline the strengthening discourse: (i) the problem is identified as an environmental one; (ii) local ignorance is a key factor in environmental mismanagement; (iii) overpopulation contributes; and (iv) increasing the incentive to practice 'modern' methods is stimulated by incorporation of traditional farmers into the market economy.[40]

Postcolonial socialist period

When Guyana became independent in 1966, its economy was wholly dependent on exports, mainly sugar, rice, bauxite, some minerals and specialist timbers, owned in the main by British and American companies. Two years prior, in the elections of 1964, the British colonial authorities had used race politics skilfully to unseat the Indo-Guyanese Cheddi Jagan's democratically elected, but supposedly communist, People's Progressive Party government.[41] The Afro-Guyanese opposition People's National Congress (PNC) leader, Forbes Burnham, succeeded as Prime Minister through a coalition with the right-wing United Force (UF), which had the support of businesses, churches, and through them, the indigenous people. However, this partnership between the PNC and UF soon dissolved and Burnham proceeded to govern in full authoritarian style, declaring Guyana a 'Cooperative Republic' in 1970 and instilling a programme of 'socialist' reforms.[42]

There is relatively little ideological distinction between Jamaica's two principal political parties, the Jamaica Labour Party (JLP) and the People's National Party (PNP). Both of these arose from Jamaica's burgeoning post-war trade unions movements. By the time of Jamaica's independence in 1962, bauxite had become the most significant single item in Jamaica's trade profile. Michael Manley, soon to become leader of the PNP and Jamaica's Prime Minister between 1972 and 1980, eloquently details the central position of bauxite in Jamaica's ever-growing trade deficit and the colonial and US-driven exploitation of this natural resource.[43] This was a major factor in Manley's growing perception that third world governments in general and the Jamaican government in particular required a different structural approach to independence – a socialist path. As Prime Minister from 1972, Manley sought closer ties with the Communist bloc, including Cuba, and closer control of Jamaica's natural resources. By 1975, Jamaica had followed the Guyanese route by raising the price of bauxite, and had

purchased 51 percent of the Jamaican holdings of the multinationals (mainly US and Canadian) which controlled Jamaica's bauxite industry, had raised taxes on these companies and had sought to purchase large areas of land owned by the bauxite companies.[44] However, by 1980, Manley's 'socialist path' had led to economic chaos, including a decimation of the tourist industry (fuelled by negative North American media reports of rising crime), huge rates of migration of Jamaican professionals to North America, and internal social instability.[45] The collapse in world bauxite prices through the late 1970s, in the wake of the oil crises and introduction of neoliberalism as global economic discourse, exacerbated Jamaica's problems. Jamaica turned to the IMF for support in 1979 but failed to raise foreign exchange, according to Manley due to gross miscalculations by the IMF of the value of Jamaican economy.[46]

Throughout this period Manley, himself a land owner and farmer, attempted to promote Jamaica's domestic agricultural sector, which had continued to suffer from poor soils, low economic returns, restricted access by small farmers to good agricultural land, and the progressive migration of male farmers to cities and abroad. However, despite significant FAO input and USAID support, and significant capacity building within the Ministry of Agriculture including the creation of the Soil Conservation Division and the Natural Resources Conservation Division, domestic agriculture remained in a parlous condition.[47] Although Manley returned to power in 1989, he had significantly softened his political stance, and a more pragmatic, if still socialistic, programme was pursued until he resigned amid growing ill health in 1992.

The theorists of socialist ideology often portray the practice of their creed as a process of emancipation and empowerment of oppressed and subjugated sectors of society. Yet, as Burnham and Manley demonstrated, the removal of colonial 'oppression' only resulted in its

replacement by another form of centralised control, which, although reducing the levels of extreme inequalities amongst the population, did little to devolve decision-making control to local communities. If anything, power was centralised even further. This was exemplified in Guyana by the brutal repression of a local move for autonomous determination in the Rupununi region, with dire consequences for the local indigenous population who were subsequently further neglected in terms of services and development.[48]

Both Guyana and Jamaica experienced a shift in the discourse of environmental degradation and poverty during the 1970s, from one blaming local communities to one which accused foreign neocolonial extractive practices of exacerbating the local situation. The new emphasis was now on land husbandry and self sufficiency (but still directed through centralised control). This mirrored, in the global context, a growing influence of neo-Marxist approaches to development theory, and called for the recognition of environmental degradation as a social problem arising from inequality. As such, this required social as well as technical solutions including commitment to changes in social policy.[49] The new autarchic economic development policies favoured state intervention and the nationalisation of natural resources and their associated industries, and restricted foreign and private investment.

Help for these state initiatives was sought from international organisations and foreign expert knowledge. In Guyana, for example, between 1978 and 1987 the World Bank and IMF tried to promote public-sector productivity in the interior by investing over US$35 million in the newly-established state-owned company, Demerara Woods Ltd., but poor financial management and lack of capacity in forestry meant that the company soon ran into debt.[50] Likewise in Jamaica, several projects were funded in the 1980s and 1990s by organisations such as FAO, USAID and the EU to control soil erosion (one of the main causes of

environmental degradation within the country).[51] Although bench terracing was fostered by FAO experts as being the best method of soil conservation, it soon became obvious that this and other technologies were inappropriate in the local agricultural and economic conditions.[52] Political objectives were ostensibly being met, but without fundamental improvements in perceived (in the absence of any measurement) levels of soil erosion, and hence by extension, land degradation.

Mismanagement, corruption and political reluctance to support local autonomous enterprise led to seriously declining economies where basic foods, fuels and goods became unavailable and local hardship prevailed. In Guyana especially, but also Jamaica, more educated and well connected citizens emigrated, leaving those behind to face increasing poverty. Nevertheless, a period of relative isolation of both countries from direct foreign exploitation did result in some natural resources, such as forests and mineral resources in Guyana, being protected behind the closed doors of 'cooperative socialism'. On the whole, the failure of these socialist experiments not only acted to reinforce the global environmental discourse indicating that local communities were incapable of managing their own resources sustainably and lifting themselves out of poverty, but needed the intervention of external expertise.

Neoliberal structural adjustment

The collapse of socialist governance, first in Jamaica and then later in Guyana, and ultimately internationally, established once and for all the hegemonic technocentrism and managerialism of the global environmental and development discourse. The process established during the colonial period now comes back with a vengeance - external western intervention is seen as the solution. The principal mechanism is liberalisation of markets through the removal of trade barriers and a 'stimulus' of national industries through debt-based investment. Underlying these

major trends is a process of technology and knowledge transfer through the parachuting of western expertise to address problems arising from 'local ignorance'. It is no coincidence that this period is commonly termed 'neocolonial'.[53]

By the late 1980s, Guyana's and Jamaica's economies were in states of near collapse. When Guyana's socialist Prime Minister, Forbes Burnham, unexpectedly died in 1985, most natural resource industries including sugar, bauxite and timber had run up huge deficits, public infrastructure had fallen into disrepair and the standard of living had decreased dramatically. In Jamaica, the government was increasingly turning to the IMF and the World Bank for assistance, entering into no fewer than 18 agreements between 1981 and 1992.

From the late 1980s, there was a marked shift in emphasis – from one focusing on pursuing agricultural sector adjustment loans to one of liberalisation, deregulation and institutional reform.[54] In both Guyana and Jamaica, government progressively withdrew from direct intervention in agriculture under a wave of new structural adjustment programmes, and in the face of declining global raw materials prices and mounting external debts. This paved the way for a series of neoliberal economic reforms and in 1988 Guyana adopted an Economic Recovery Plan (ERP) as part of an IMF-supervised programme of structural adjustment.[55] Key to the ERP was attracting foreign investment in natural resource production, privatising former state holdings and divesting state lands.[56]

The impact of this process of globalisation has had a number of effects. Firstly, small producers were placed under severe hardship as trade liberalisation resulted in an influx of cheap products.[57] This led to the collapse of many small domestic agricultural and natural resource enterprises. For example, when tariffs on imported skimmed milk powder were reduced, the

Jamaican dairy industry collapsed, compounded by food aid policies (in 2003, the US government donated 4500 metric tonnes of skimmed milk powder to Jamaica to be used to expand the national School Feeding Programme). Other examples of decline in Jamaican agricultural production have been the fall in production, between 1995 and 2004, of local carrots by 35 percent, potatoes by 62 percent, and onions by 89 percent.[58]

Domestic enterprises were replaced in Guyana by large multi-national conglomerates which were principally interested in extracting the raw materials for processing elsewhere. This is highlighted in Guyana, where in 1986 the Guyana Natural Resources Agency was established with World Bank assistance to promote private-sector investment in logging and mining. Exports in sugar, rice, gold and timber increased following the adoption of the ERP, a period in which GDP rose an average of 6 per cent per year.[59] However, closer examination of the terms under which foreign companies were allowed to exploit natural resources such as timber, highlighted tax exemptions for foreign companies, long-term fixed royalty payments in Guyanese dollars and permission to employ at least 15 percent foreign workers, with effective regulatory government institutions absent, resulting in over-exploitation and what Colchester terms 'enclavistic' development.[60] This, together with cutbacks in government spending on health and education, public-sector redundancies and the decline in real earnings resulting from inflation and devaluation, did little to ameliorate the poor socio-economic status of the population.[61]

Although it is evident that environmental degradation is occurring on, for example, Jamaica's hillside farms, without accurate quantitative information of how much and where this degradation is occurring, there is a supposition by the authorities that the adoption of external conservation prescriptions is the answer. This is inevitably drawn from the narrative surrounding the problem

rather than from empirical investigation of soil erosion, which hardly exists.[62] The indigenous mechanisms whereby local communities cope with their situation have frequently been overlooked. Impoverishment of local communities has been further exacerbated by increasing incidences of more extreme climatic conditions,[63] particularly damaging early-season droughts and a greater occurrence of high magnitude rainfall/hurricane events during the main agricultural season. In a recent survey of Jamaican farmers growing food for the domestic and north coast tourist markets in semi-arid southern St Elizabeth, farmers were well aware of increasingly hazardous climatic conditions (a combination of longer and more frequent droughts and more unpredictable episodes of torrential rainfall).[64] In Guyana, coastal agriculture has been repeatedly affected by severe flooding caused by high rainfall coinciding with high tides and failures in sea defence infrastructure (most coastal agricultural land is below sea level).[65]

The process of external intervention has resulted in the progressive erosion of local resilience and adaptability which has not been adequately replaced by state intervention. For example, despite the existence of relief structures set up following Hurricane Gilbert (1988), the Jamaican government struggled to provide appropriate relief following two successive years (2004 and 2005) where early-season droughts were succeeded by a stormy rainy season.[66] This has resulted in a resurgence of the populist discourse where local solutions are sought for the combined threats of land degradation and external control. For example, some Jamaican farmers have developed a range of strategies to cope with drought hazards, including mulching (to reduce moisture loss), use of drip irrigation, a switch to more drought resistant crops, and diversification of income generation.[67] This discourse highlights that blueprint policy prescriptions do not take account of the instabilities, uncertainties and complexities of many parts of the developing world, and so as Adger *et al*. point out, 'since global discourses are

often based on shared myths and blueprints of the world, the political prescriptions flowing from them are often inappropriate for local realities'.[68]

Commodification of the environment

The evolving global environmental discourse has increasingly compensated for the failures of the neoliberal free-trade approach in addressing environmental degradation through an attempt at monetising environmental externalities. The first wave emerged in the 1990s, in response to the Earth Summit of 1992, where 'sustainable development' emerged as the dominant narrative. The imperative behind this was the permanent integration of existing local natural resource products for the global market (as opposed to their replacement by short-term large-scale monocultures, clear-felling and strip mining). For example, a major emphasis was placed on the bioprospecting enterprise,[69] where the protection of biodiversity would be paid for by the commercialisation of medical properties of traditional remedies. This was seen as a 'win-win-win' situation: western pharmaceutical corporations would make a profit; local communities would derive an income from this; and biodiversity would be protected as a result. Other examples included international ecotourism, extractive reserves for wild products (e.g. Brazil nuts), sustainable forestry and payments for ecosystem services (e.g. carbon banks). Jamaica's natural forests have long been decimated. However, Guyana still contains a significant portion of South America's relatively undisturbed rainforest. The growing importance of this resource has proved to be the stimulus for international initiatives, and we turn to this to complete the narrative.

In Guyana, the Iwokrama International Centre (371,000 hectares of primary rainforest) was established in 1996 with considerable funding from the United Nations Development Programme (UNDP) as well as the UK's Department for International Development (DFID).[70]

The aim of the enterprise was to develop a market for local natural resources, principally through sustainable logging, ecotourism and bioprospecting, e.g. traditional medicinal products, aquarium fish and butterflies. In 2006, Guyana's President Bharrat Jagdeo went a step further by offering to place almost the entirety of Guyana's rainforest (75 percent of the country's territory) under international supervision as part of the world's battle against climate change.[71] Describing the rainforest as a 'global asset in the fight against climate change',[72] he appealed to the British government and non-governmental organizations to assist Guyana in safeguarding it through bilateral investments in conservation and sustainable development. President Jagdeo's offer came just as Reduced Emissions from Deforestation and Forest Degradation (REDD) was put on the global agenda at the 2007 climate change talks in Bali - the big new market-based solution to save the planet from runaway climate change.[73] To finance REDD, the World Bank launched the Forest Carbon Partnership Facility (FCPF), aimed at reducing deforestation and forest degradation by compensating developing countries for greenhouse gas emission reductions.

One mechanism for implementing REDD is through payments for ecosystem services (PES).[74] In March 2008, the investment firm Canopy Capital and the related environmental alliance known as the Global Canopy Programme (GCP) signed a preliminary agreement with the Iwokrama International Centre to help finance the protected area for five years in return for 'ownership' of forest ecosystem services, including carbon retention, rainfall generation and climate regulation, and a claim in any future profits.[75] Canopy Capital is looking at marketing ecosystem services through an 'Ecosystem Service Certificate' attached to a 10-year tradable bond, the interest from which will pay for the maintenance of the Iwokrama forest.[76] PES is also being implemented in the second phase of the Guiana Shield Initiative (GSI) project, started in January 2007 and funded by the EU and UNDP.[77] In Guyana, the Iwokrama

International Centre has been chosen as a pilot site, and as well as setting up financial mechanisms for rewarding and compensating the conservation of ecosystem services, the initiative incorporates the original objectives of promoting income generation through market-oriented activities such as eco-tourism, and the sustainable harvesting of timber and non-timber forest products. In July 2008, Guyana was named as one of the initial countries to benefit from funding from the FCPF.[78] This funding is targeted at establishing emissions reference levels, adopting REDD strategies, and designing monitoring systems.

Incorporating environmental externalities into the market economy reflects a belief that the dynamic behaviour of the capitalist system changes from one of unlimited growth to one where environmental limits feed back to balance growth within sustainable limits. 'Capital thus develops a conservationist tendency, significantly different from its usual reckless, destructive form'.[79] However, significant questions still remain on how one can value environmental externalities such as biodiversity loss, the effects of greenhouse gas emissions and ecosystem services. More significantly, the capitalisation of nature would further exacerbate the consolidation of control within global centres of the market economy.

The considerable activity for 'sustainable development' in Guyana has also led to the development of a new global counter-discourse. The emergence of a grassroots movement for self-determination could be described as the coming together of a series of groups – first Amerindian, then African slaves, then indentured East Indians, and most recently, thanks to the globalisation of communication and movement of peoples, into a single global movement sharing a common history of oppression from colonial masters to national state autocratic monopolies to the global capitalist system.[80] This national and international, amorphous and multi-distributed group has raised a series of questions on the accuracy of figures produced in

order to gain funding, the transparency of national institutions, the continued exploitation of natural resources only for export, as well as the lack of consultation and participation of local indigenous communities and their land rights issues.[81] With reference to the establishment of Iwokrama in 1996, the Makushi leader, Sidney Allicock, admits that,

> …in the beginning…Iwokrama was not a good example of democratic decision-making. There was no authentic consultation with Guyanese as a whole, nor with indigenous peoples as a major group. Iwokrama began as a big political decision with a vision….that did not harness, at the outset, the views, fears, hopes or interests of the rights holders/stakeholders – the Makushi and other peoples whose lands and the sacred and spiritual values as well as their modern aspirations were at stake.[82]

Furthermore, although there have been consecutive bouts of multilateral and bilateral funding for indigenous communities living in and around proposed protected areas[83] – areas that could be used as future 'carbon banks' or 'PES banks' – there are increasing protests from local indigenous communities seeking to settle outstanding land rights issues. Serious questions have been raised on who is to gain from these new initiatives: international corporations/national elites or local communities?

Conclusion

So far, we have attempted to draw a common Caribbean history of environment and development by focusing on two distinct localities, Jamaica and interior Guyana, through the lens of a dominant centralising global discourse and its populist antithesis. Although the histories of both our case studies were subdivided into distinct and parallel phases of, for example, colonial expansion, independence and market liberalisation, this history can be characterised as a process of control over natural resources and local communities being appropriated by 'elite' groups. These include European colonial powers, national autocrats, neocolonial influences and international institutions such as private multinational corporations, multilateral funding bodies and non-governmental organisations. The populist reaction is

instead in diametric opposition to the centralising process: *ad hoc*, geographically differentiated, with an evolving and diverse membership.

The environmental history we have outlined illustrates that from precolonial times, knowledge and epistemic framings of the Caribbean environment have been co-constructed through dominant discursive regimes leading to particular political, economic, social and ecological outcomes. The power of whose knowledge counts in this story indicates that from colonial times to current paradigms of environmental commodification, Western scientific/technical knowledge has led politics, policy and practice. 'Unproductive' indigenous peoples, farmers as ignorant degraders of land, and other notions of local people have been used to appropriate land, marginalise populations and embed technologies not wholly appropriate for the local contexts. The environmental governance emanating from these discourses has also led to the 'enclosure' of natural resources, thus restricting landscapes and environment for some, while opening them up for others. This continues to the present day, with the current global initiative to mitigate against climate change by protecting natural resources, such as forests in Guyana, is a case in point.

However, Adger *et al*. warn of simplistic differentiation of discourses and associated actors, noting that the actual evolution of environmental/social events in particular localities does not neatly correspond to these categories.[84] Conversely, Pepper argues that a polarising approach can at least serve as a useful device for stimulating dialogue by simplifying highly complex and multifaceted issues to give us 'a toehold by which we can elevate ourselves eventually to a higher understanding of complex reality'.[85] In our own experience, we constantly encountered paradoxes and schizophrenic thoughts and behaviours amongst policy makers, activists, scientists and local communities.[86] Indeed, as Bulkan and Bulkan note, the individuals who

constitute ‘local communities’ respond differently, making it very difficult to categorise these groups exclusively as victims, villains or heroes.[87] Thus, one may disagree with the process of differentiating history according to the battle of two polar opposites. It could be argued that it is this division into distinct and intractable positions which prevents the constructive resolution of both human poverty and environmental degradation. Forsyth points to a more critical approach to analysing environmental issues which examines concepts such as scientific ‘explanations’ and ‘accuracy’ in-depth, incorporates institutional realism and poststructural analyses, and gives more attention to biophysical agency.[88]

The main purpose of this paper, therefore, is not to reinforce the perception of an elitist/populist divide by labelling particular individuals as victims, villains and heroes. The tensions of the polar opposites are manifest within each one of us and the challenge is to be able to expose these tensions explicitly and identify a balance. We argue that this can only be accomplished by more nuanced and multidimensional approaches, to promote more sustainable management of natural resources than has taken place hitherto in Guyana and Jamaica, and throughout the wider Caribbean.

One such approach is systems thinking and practice, which engages with complex situations by identifying 'systems', clarifying their purpose, and exploring how they transform the environment within which they are nested.[89] In particular, a 'critical systems' approach acknowledges that 'systems' do not exist 'out there', but are instead created by us as mental models so as to facilitate our engagement with what would otherwise be a world which overwhelms us with information.[90] Thus, a system's purpose is determined not only by the apparently factual (objective) information available, but also by the modeller's worldview which selectively integrates this information to present a system which is compatible with the

modeller's conscious, but more often than not, unconscious, agenda. This is especially the case with those individuals who claim to be 'objective'. Hence, discourse analysis is an attempt to create distinct narratives, each with a distinct purpose, for example to forward the interests of the narrative's 'heroes' and undermine those of the narrative's 'villains'. Yet, systems do not operate in a vacuum; they are enmeshed in a network of feedback processes between system components (subsystems), the supra-systems within which they are embedded, and other systems within the environment with which they exchange energy, matter and information. Hence, for example, the 'bottom-up' counter-discourse's coherence begins to fall apart when you consider how local groups, in their attempts to overcome pressures from national governments, 'jump scale' to form alliances with international NGOs.[91]

Thus, to disentangle such complex interrelationships between actors within different temporal, spatial and organisational scales requires a significantly more sophisticated approach. This paper has identified the gross pattern of, and historic influences on, natural resource management in two contrasting Caribbean situations. Each of the historical phases examined in the paper has acted as a palimpsest on the present-day situation, promoting complexity and underlining the inadequacy of ‘traditional’ and inevitably linear approaches to natural resource management. We would argue that the next step in interpreting the environmental history of Guyana and Jamaica requires a critical systems approach, and the application of critical systems methodology. Developing such an approach is beyond the scope of the present paper, which should therefore serve as a stepping stone for those wishing to develop a deeper understanding of the environmental history of Guyana and Jamaica.

Notes

1 J S Dryzek, *The politics of the earth. Environmental discourses (second edition)*, Oxford: Oxford University Press, 2005, pp 9.

2 E M Roe, 'Development narratives, or making the best of blueprint development', *World Development*, 19(4), 1991, pp 287-300; M A Hajer, *The politics of environmental discourse: ecological modernisation and the policy process*, Oxford: Clarendon, 1995; T J Bassett & K B Zuéli, 'Environmental discourses and the Ivorian savanna', *Annals of the Association of American Geographers*, 90, 2000, pp 67-95.

3 See for example J Keeley & I Scoones, 'Knowledge, power and politics: the environmental policy-making process in Ethiopia', *Journal of Modern African Studies*, 38(1), 2000, pp 89-120.

4 D A Wardell & A Reenberg, 'Framing field expansion strategies in the savanna biome – land use and land cover dynamics in and around Tiogo Forest Reserve, Burkino Faso', in *Savannas and dry forests: linking people with nature*, J Mistry & A Berardi (eds), Aldershot: Ashgate, 2006, pp 19-52; B Sletto, 'The knowledge that counts: institutional identities, policy science, and the conflict over fire management in the Gran Sabana, Venezuela', *World Development*, 39(10), 2008, pp 1938-1955.

5 M Foucault, 'Two lectures', in *Power/knowledge: selected interviews and other writings 1972-1977*, C Gordon (ed), New York: Pantheon Books, 1980, pp 78-108.

6 For the general approach of political ecology see, for example, R Bryant & S Bailey, *Third world political ecology*, London: Routledge, 1997; P Stott & S Sullivan (eds), *Political ecology: science, myth and power*, London: Arnold, 2000; T Forsyth, *Critical political ecology: the politics of environmental science*, London: Routledge, 2003.

7 See for example J Crush (ed), *Power of development*, New York: Routledge, 1995; A Escobar, *Encountering development*, Princeton: Princeton University Press, 1995.

8 M A Hajer, *The politics of environmental discourse: ecological modernisation and the policy process*, Oxford: Oxford University Press, 1995.

9 A Dobson, *Green political thought: an introduction*, London: Unwin Hyman, 1990.

10 Dryzek, *The politics of the earth. Environmental discourses (second edition)*

11 See for example W N Adger, T A Benjaminsen, K Brown & H Svarstad, 'Advancing a political ecology of global environmental discourses', *Development and Change*, 32, 2001, pp 681-715.

12 Adger *et al*., 'Advancing a political ecology of global environmental discourses'; T J Bassett & D Crummey (eds), *African savannas: global narratives and local knowledge of environmental change*, Oxford: James Currey, 2003; L C Gray & W G Moseley, 'A geographical perspective on poverty-environment interactions', *The Geographical Journal*, 171(1), 2005, pp 9-23.

13 M Bookchin, *The ecology of freedom*, Palo Alto, CA: Chesire Books, 1982.

14 Bookchin, The ecology of freedom

15 C V Black, *The History of Jamaica*, London: Collins Educational, 1983.

16 V T Daly, *A short history of the Guyanese people*, Oxford: Macmillan Caribbean, 1975.

17 Black, The History of Jamaica; J Forte, *About Guyanese Amerindians*, Guyana: J Forte, 1996.

18, 19 D Watts, *The West Indies: patterns of development, culture and environmental change since 1492*, Cambridge: Cambridge University Press, 1987.

20 Daly, A short history of the Guyanese people

21 A Crosby, *The Columbian Exchange*, Westport, Connecticut: Greenwood Press, 1972.

22 Watts, The West Indies: patterns of development, culture and environmental change since 1492; M Colchester, *Guyana fragile frontier: loggers, miners and forest peoples*, London: Latin American Bureau, 1997.

23 W Cronon, ‘A place for stories: nature, history, and narrative’, *The Journal of American History*, 78, 1992, pp 1347-1376; D Worster, *The wealth of nature: environmental history and the ecological imagination*, Oxford: Oxford University Press, 1993.

24 Crosby, The Columbian Exchange

25 Colchester, Guyana fragile frontier: loggers, miners and forest peoples

26 Watts, The West Indies: patterns of development, culture and environmental change since 1492

27 S J Randall,’The historical context’, in *Understanding the Contemporary Caribbean*, R S Hillman & T J D’Agostino (eds), Boulder, Colorado and Kingston, Jamaica: Lynne Rienner and Ian Randle, 2003, pp 51-83.

28 P Rivière, *Absent-minded imperialism. Britain and the expansion of empire in nineteenth-century Brazil*, London, New York: I.B. Tauris Publishers, 1995.

29 Rivière, Absent-minded imperialism. Britain and the expansion of empire in nineteenth-century Brazil

30 A Benjamin & L Pierre, ‘Review of legislation in relation to land, forestry and mining’ in *Situation analysis indigenous use of the forest with emphasis on Region 1*, J Forte (ed), Georgetown,Guyana: University of Guyana, 1995, Annex 1.

31 Benjamin & Pierre, Review of legislation in relation to land, forestry and mining

32 Colchester, Guyana fragile frontier: loggers, miners and forest peoples

33 Colchester, Guyana fragile frontier: loggers, miners and forest peoples

34 Watts, The West Indies: patterns of development, culture and environmental change since 1492

35 D Barker & D McGregor, 'Land degradation in the Yallahs Basin, Jamaica: historical notes and contemporary perspectives', *Geography*, 73, 1988, pp 116-124.

36 R Thornton, *Letter from Director of Roads*, Royal Botanic Gardens Kew: Miscellaneous Reports: Jamaica Forestry/ 15.4, 1877.

37 D Morris, *Forest Conservation in Jamaica*, Miscellaneous Reports: Jamaica Forestry/15.4, Royal Botanic Gardens Kew, London, 1881.

38 D Anderson, 'Depression, dust bowl, demography, and drought: the colonial state and soil conservation in East Africa during the 1930s', *African Affairs*, 83, 1984, pp 321-343.

39 H H Croucher & C Swabey, *Soil Erosion and Conservation in Jamaica*, Department of Science and Agriculture, Bulletin No. 17 (new series), Kingston, Jamaica: Government Printer, 1937.

40 P Blaikie, *The political economy of soil erosion in developing countries*, London: Longman, 1985.

41 P Mars, *Ideology and change: the transformation of the Caribbean left*, Detroit, MI & Kingston, Jamaica: Wayne State University Press & The Press, University of the West Indies, 1998.

42 Mars, Ideology and change: the transformation of the Caribbean left

43 M Manley, *Up the down escalator: development and the international economy, a Jamaican case study*, London: Andre Deutsch, 1987.

44 S J Randall & G S Mount, *The Caribbean Basin: an international history*. London: Routledge, 1998.

45 Randall & Mount, The Caribbean Basin: an international history

46 Manley, Up the down escalator: development and the international economy, a Jamaican case study

47 D T Edwards, *Small farmers and the protection of the watersheds: the experience of Jamaica since the 1950s*. University of the West Indies Centre for Environment and Development, Occasional Paper Series, No. 1, Kingston, Jamaica: Canoe Press, 1995.

48 Colchester, Guyana fragile frontier: loggers, miners and forest peoples

49 Blaikie, *The political economy of soil erosion in developing countries*; P Blaikie & H Brookfield, *Land degradation and society*, London: Methuen, 1987.

50 Colchester, Guyana fragile frontier: loggers, miners and forest peoples

51 Edwards, Small farmers and the protection of the watersheds: the experience of Jamaica since the 1950s

52 Barker & McGregor, Land degradation in the Yallahs Basin, Jamaica: historical notes and contemporary perspectives; D McGregor & D Barker, 'Land degradation and hillside farming in the Fall River Basin, Jamaica', *Applied Geography*, 11, 1991, pp 143–156; Edwards, Small farmers and the protection of the watersheds: the experience of Jamaica since the 1950s.

53 For a general statement on neo-colonialism, see R B Potter, T Binns, J A Elliott and D Smith, *Geographies of Development: An Introduction to Development Studies* (Third Edition), Harlow, UK: Pearson, Prentice Hall, 2008, p 76. For a brief discussion, with some examples, of neo-colonialism in the Caribbean, see R B Potter, D Barker, D Conway & T Klak, *The Contemporary Caribbean*, Harlow, UK: Pearson, Prentice Hall, 2004, pp 464-468.

54 R H Singh, 'The impact of structural adjustment policies on the performance of agriculture: the case of Jamaica', in *Structural Adjustment and the Agricultural Sector in Latin America and the Caribbean*, J Weeks (ed), London: Macmillan, 1995, pp 229-257.

55 H A Bartilow, *The debt dilemma: IMF negotiations in Jamaica, Grenada and Guyana*, London: Macmillan, 1997.

56 H Lemel, *Patterns of tenure insecurity in Guyana*, Madison, WI, Land Tenure Centre, Working Paper No. 43, University of Wisconsin-Madison, 2001.

57 T Weis, 'Restructuring and redundancy: the impact and illogic of neoliberal agricultural reforms in Jamaica', *Journal of Agrarian Change*, 4, 2004, pp 461-491.

58 C Beckford, D Barker & S Bailey, 'Adaptation, innovation and domestic food production in Jamaica: some examples of survival strategies of small-scale farmers', *Singapore Journal of Tropical Geography*, 28, 2007, pp 273-286.

59 National Development Strategy for Guyana 1996. Available online at: www.guyana.org/NDS (accessed 20th December 2008).

60 Colchester, Guyana fragile frontier: loggers, miners and forest peoples, p 103.

61 D Hogg, *The SAP in the forest: the environmental and social impacts of structural adjustment programmes in the Philippines, Ghana and Guyana*, London: Friends of the Earth, 1993.

62 D McGregor, 'Soil erosion, environmental change, and development in the Caribbean: a deepening crisis?', in *Environment and Development in the Caribbean: Geographical Perspectives*, D Barker and D McGregor (eds), Kingston, Jamaica: University of the West Indies Press, 1995, pp. 189–208.

63 D McGregor, D Campbell & D Barker, 'Environmental change and Caribbean food security: recent hazard impacts and domestic food production in Jamaica', in *Global Change and Caribbean Vulnerability: Environment, Economy and Society at risk?*, D McGregor, D Dodman & D Barker (eds), Kingston, Jamaica, University of the West Indies Press, (in press).

64 McGregor *et al*., Environmental change and Caribbean food security: recent hazard impacts and domestic food production in Jamaica

65 M Pelling, 'Coastal flood hazard in Guyana: environmental and economic causes', *Caribbean Geography,* 7(1), 1996, pp 3-22; M Pelling, 'Vulnerability, urbanization and environmental hazard in coastal Guyana', in *Resources, Planning and Environmental Management in a Changing Caribbean,* D Barker, & D McGregor (eds). Kingston, Jamaica: University of the West Indies Press, 2003, pp 133-152; P. Williams, & L Johnson-Bhola, 'An investigation into the causes and consequences of coastal flooding in Guyana, in *Global*

Change and Caribbean Vulnerability: Environment, Economy and Society at risk?, D McGregor, D Dodman & D Barker (eds), Kingston, Jamaica: University of the West Indies Press, (in press).

66 D McGregor, & A Tate, *Hazard and vulnerability in a small island state: impacts and lessons from recent Jamaican experience*, Centre for Developing Areas Research (CEDAR) Research Paper No. 44, 2007, 25pp.

67 R J Kent, 'History and necessity: the evolution of soil conservation technology in a Jamaican farming system', *Geographical Journal*, 168, 2002, pp 48-56; D Beckford, & D Barker, 'The role and value of local knowledge in Jamaican agriculture: adaptation and change in small-scale farming', *Geographical Journal* , 173(2), 2007, pp 118-128; D Beckford *et al*., Adaptation, innovation and domestic food production in Jamaica: some examples of survival strategies of small-scale farmers; McGregor *et al*., Environmental change and Caribbean food security: recent hazard impacts and domestic food production in Jamaica.

68 Adger *et al*., 'Advancing a political ecology of global environmental discourses', p683.

69 See Adger *et al*., 'Advancing a political ecology of global environmental discourses', pp 693-697.

70 See Iwokrama International Centre website at www.iwokrama.org (accessed 20th January 2009).

71 See various media reports including, BBC (available at http://news.bbc.co.uk/1/hi/sci/tech/7603695.stm, accessed 20th December 2008), and statements by the Guyanese Office of the President at http://op.gov.gy.

72 The Globe and Mail (Toronto), '*Guyana's modest proposal*', 19th January 2008, available online at http://www.theglobeandmail.com, accessed 20th December 2008.

73 See REDD Monitor's website at http://www.redd-monitor.org for more information; D O'Connor, 'Governing the global commons: Linking carbon sequestration and biodiversity conservation in tropical forests', *Global Environmental Change*, 18(3), 2008, pp 368-374.

74 See for example Special Issue on Payments for Environmental Services in Developing and Developed Countries, Ecological Economics, 65(4), 2008.

75 See relevant items on the Iwokrama International Centre website at www.iwokrama.org.

76 See Canopy Capital's website at http://canopycapital.co.uk for more information.

77 See Guiana Shield Initiative website at http://www.guianashield.org (accessed 20th December 2008).

78 Stabroek News (Georgetown), '*Guyana in forest carbon first*', 24th July 2008, available online at http://www.stabroeknews.com/news/guyana-in-forest-carbon-first, accessed 20th December 2008.

79 A Escobar, 'Constructing nature: elements for a poststructural political ecology', in *Liberation ecologies: environment, development, social movements*, R Peet & M Watts (eds), London: Routledge, p 47.

80 A Bulkan & J Bulkan, 'These forests have always been ours: official and Amerindian discourses on Guyana's forest estate' in *Indigenous resurgence in the contemporary Caribbean: Amerindian survival and revival*, M C Forte (ed), New York: Peter Lang, 2006, pp 135-154.

81 See for example J Bulkan, 'GFC's misleading data on forestry in Guyana', *Kaieteur News (Georgetown)*, 16th November 2008, available online at http://www.kaieteurnews.com/2008/11/16/gfc's-misleading-data-on-forestry-in-guyana, accessed 20th December 2008; J Bulkan, 'Bulkan responds to Vivian Li's GFC data on concession allocations', *Kaieteur News (Georgetown)*, 23rd November 2008, available online at http://www.kaieteurnews.com/2008/11/23/bulkan-responds-to-vivian-li's-gfc-data-on-

concession-allocations, accessed 20th December 2008; J Bulkan, 'Why is the GFC Commissioner defending Barama when WWF does not believe that company can regain the forestry stewardship certificate?', *Stabroek News (Georgetown)*, 20th January 2009, available online at http://www.stabroeknews.com/letters/why-is-the-gfc-commissioner-defending-barama-when-wwf-does-not-believe-that-company-can-regain-the-forestry-stewardship-certificate, accessed 26th January 2009; K Dooley, T Griffiths, H Leake & S Ozinga, *Cutting corners. World Bank's forest and carbon fund fails forests and peoples*, FERN / Forest Peoples Programme, 2008.

82 S Allicock, *Developing partnerships between the North Rupununi District Development Board (NRDDB) and the Iwokrama International Centre Programme for rain forest conservation and development*, Paper submitted at Indigenous Rights in the Commonwealth Caribbean and Americas Regional expert meeting, Georgetown, Guyana, 2003, p. 3 (available on-line at http://www.iwokrama.org/people/nrddb.htm).

83 See item 'Guyana , Germany ink euro 2.93M Protected Areas project', 18th February 2006, at the Guyana Government Information Agency (GINA) website at http://www.gina.gov.gy/archive/daily/b060218.html (accessed 20th December 2008).

84 Adger *et al*., 'Advancing a political ecology of global environmental discourses'

85 D Pepper, *E-socialism: from deep ecology to social justice*, London: Routledge, 1993, p. 7.

86 J Mistry, A Berardi & M Simpson, 'Critical reflections on practice: the changing roles of three physical geographers carrying out research in a developing country', *Area*, 2009 (in press).

87 Bulkan & Bulkan, 'These forests have always been ours: official and Amerindian discourses on Guyana's forest estate'

88 Forsyth, Critical political ecology: the politics of environmental science

89 C Blackmore & A Berardi with the T863 course team, *Introducing environmental decision making (Book 1 of Open University course T863 Environmental decision making : a systems approach)*, Milton Keynes, The Open University Press, 2006.

90 R Ison, C Blackmore & R Morris with the T863 course team, *Starting off systemically in environmental decision making* (Book 2 of Open University course *T863 Environmental decision making : a systems approach)*, Milton Keynes, The Open University Press, 2006; P Furniss, A Berardi, D Morris, K Collins, C Blackmore, M Reynolds & S Simon with the T863 course team, *Making environmental decisions and learning from them (Book 3 of Open University course T863 Environmental decision making : a systems approach)*, Milton Keynes, The Open University Press, 2006.

91 K Schmelzkopf, 'Scale and narrative in the struggle for environment and livelihoods in Vieques, Puerto Rico' in *Contentious geographies*, M Goodman, M Boykoff & K Evered (eds.), Aldershot: Ashgate, 2008, pp 131-145.