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SUSTAINABLE MAURITIUS? ENVIRONMENTAL CHANGE, ENERGY EFFICIENCY, AND SUSTAINABLE DEVELOPMENT IN A SMALL ISLAND STATE IN THE INDIAN OCEAN

LAURA JEFFERY

Abstract

The tropical Small Island Developing States (SIDS) typically contribute little to global climate change, yet they are among the countries most vulnerable to sea level rises, variations in temperature, fluctuations in rainfall, and extreme weather events. With high population density and limited natural resources, they are also susceptible to the challenges of sustainable natural resource management. The Republic of Mauritius is one of four SIDS in the Indian Ocean, and one of six SIDS that are also members of the African Union. In 2008 the Mauritian government launched a programme called *Maurice Ile Durable* (MID, or Sustainable Mauritius) with the intention of turning Mauritius into a world and SIDS model of sustainable development. This chapter deploys MID as a lens through which to examine debates about environment and development in Mauritius. MID's remit included environment, employment, education, and equity, but its main priority was energy efficiency. This chapter contrasts the narrow focus of Mauritian government actors firstly with the critiques of environmentalists – who called for greater emphasis on the preservation of biodiversity and mitigation of climate change – and secondly with the interpretations of marginalised urban citizens, many of whom came to see MID in particularly – and consequently the concept of sustainable development in general – in terms of energy efficiency and economic development rather than (also) environmental sustainability. It suggests that MID could have been more effective if environmental sustainability had been foregrounded, and more inclusive if economic development had been more equitably distributed.

1. Environment and development: from ecological anthropology to sustainable development, political ecology, and climate change

Social scientists in general – and human geographers and social anthropologists in particular – have long theorised the relationship between environment and development. Ecological anthropology in the 1960s posited that natural environments shaped culture by providing

both opportunities and constraints; a culture was assumed to adapt to its natural environment in pursuit of social stability and ecological equilibrium (Kottak 1999: 23-24; Baer & Singer 2014: 60). From this perspective, environmental sustainability and socio-economic development seemed to be at odds with one another (see Gray & Moseley 2005: 10). Within a few decades, in an era characterised by transnational migration, global interconnectedness, and an awareness of the long arc of anthropogenic environmental change, the ecological anthropology of the 1960s appeared overly culturally bounded, ecologically deterministic, and preoccupied with stability rather than change (Kottak 1999: 23-25; Baer & Singer 2014: 61)

In the 1980s, a social science model of sustainable development sought to reconcile environmental sustainability with socio-economic development. In 1987 the World Commission on Environment and Development (WCED) Brundtland Report correlated poverty with environmental degradation:

Many parts of the world are caught in a vicious downwards spiral: Poor people are forced to overuse environmental resources to survive from day to day, and their impoverishment of their environment further impoverishes them, making their survival ever more difficult and uncertain.¹

Scholars have suggested that the authors of the Brundtland Report were seeking simultaneously to address the concerns of environmentalists about environmental degradation in the developing world and the preoccupation of governments in developing countries with seeking socio-economic development (see Gray and Moseley 2005: 10). Subsequently, integrated conservation and development projects (ICDPs) targeted the activities of impoverished people on the grounds that it was these activities that posed the greatest threat to the environment.

Social scientists were quick to criticise the underlying assumption in the Brundtland Report that environmental degradation could simply be blamed primarily on poor environmental management by impoverished people (Blaikie & Brookfield 1987; Bryant 1992). Firstly, this assumption ignores the socio-economic structures that cause impoverishment (Escobar 1996: 51; Gray & Moseley 2005: 14). Secondly, much anthropogenic environmental change is caused by the

¹ WCED Brundtland Report. 20 March 1987. Accessed 16 December 2014. <http://www.un-documents.net/our-common-future.pdf>

activities associated with industrialisation and the consumption patterns of affluent people (Peet & Watts 1996: 7; Gray & Moseley 2005: 19). Since the 1980s, political ecology – which combines human ecology with political economy – has sought to address both the underlying causes of impoverishment and the impact of industrialisation and wealth on environmental degradation (Blaikie & Brookfield 1987: 17; Bryant 1992: 13; Peet & Watts 1996: 4-5; Robbins 2004: 14).

Across the social sciences, political ecology has become associated with arguments about the gulf between those who contribute most to climate change and those who are most vulnerable to its effects. The vast majority of climate scientists now attribute global climate change to rising emissions of the greenhouse gases (carbon dioxide, nitrous oxide, methane) particularly since 1750, correlating with the industrial revolution and subsequent dependency on fossil fuels, with increased intensity and global spread in the second half of the 20th century (Baer & Singer 2014: 11-14). Marginalised people within developing countries tend to have lower greenhouse gas emissions and yet it is they who suffer disproportionately from climate change due to their concentration in ecologically fragile parts of the world and their dependency on the environment for livelihoods (Crate & Nuttall 2009: 10; Baer & Singer 2014: 18-19, 72). Climate change thus magnifies existing inequalities, compounding existing impoverishment, vulnerability, and marginalisation (Crate & Nuttall 2009: 14-17; Baer & Singer 2014: 21-22, 72-73).

In a recent article on the uneven attention devoted around the world to the concept of climate change, Orlove et al (2014: 252) argue that since the 1980s both sustainable development and climate change have been prominent explanatory and policy frameworks, but in different geographic contexts. First, they argue that sustainable development is more commonly applied in relation to environmental changes attributed to local intensive use – such as desertification which reduces land productivity and mountainside deforestation which results in soil erosion and landslides – and so the proposed solution is to promote sustainable resource management and alternative livelihoods (Orlove et al 2014: 259). Second, they argue that climate change is more commonly applied in relation to environmental changes attributed to global causes such as greenhouse gas emissions – such as melting Arctic glaciers and associated sea level rises threatening low-lying islands – which are thus to be addressed globally (Orlove et al 2014: 259-260). They recognise, however, that both frameworks are applicable to all these regions

(Orlove et al 2014: 259). To start with, deserts and mountains also experience environmental changes associated with global climate change, such as changes in temperature and precipitation, and increased frequency of extreme weather events (Orlove et al 2014: 259). The Arctic and low-lying islands, meanwhile, also experience environmental changes associated with unsustainable resource use, such as depleted fish stocks as a result of overfishing, loss of biodiversity associated with invasive species, and declining water quality as a result of solid waste disposal (Orlove et al 2014: 259).

This chapter interrogates environmental change and society in Africa through the lens of the Republic of Mauritius, a relatively small and highly developed island state in the Indian Ocean, where environmental changes are discursively associated both with vulnerability to global climate change and with unsustainable management of local natural resources. My case study is the contradiction between the Mauritian government's sustainable development programme *Maurice Ile Durable* (MID, or Sustainable Mauritius) and actual energy policies designed to meet rising energy demands through further dependency on imported coal and the conversion of waste to energy, rather than to promote sustainability and self-sufficiency through reduced energy demand and the development of local renewable sources of energy.

2. *Vulnerability to environmental changes in Mauritius*

The 1992 UN Conference on Environment and Development recognised that 'small island developing states are a special case both for environment and development ... [and] are considered extremely vulnerable to global warming and sea level rise'.² The Small Island Developing States (SIDS) are scattered around the Caribbean, the Pacific, the Indian Ocean, the Atlantic Ocean, and the South China Sea. SIDS are diverse in terms of size, resource endowment, isolation, productive capacity, vulnerability to environmental and natural disasters, economic diversification, and development trajectories (see Kothari & Wilkinson 2013: 93). Nevertheless, the usefulness of the category of SIDS rests on several general characteristics. SIDS tend to have relatively small populations that are growing relatively quickly, and are

² UN International Year of Small Island Developing States 2014. Accessed 16 December 2014. www.un.org/en/events/islands2014/smallislands.shtml

often densely populated, meaning that limited agricultural land and marine resources are put under considerable strain. SIDS are often highly dependent on exchange with distant markets – in particular for the importation of food supplies and fossil fuels – making them vulnerable to high transportation costs and price variations. SIDS typically contribute little to global climate change, and yet low-lying islands are disproportionately vulnerable to climate changes such as sea level rises, variation in temperatures, fluctuations in rainfall, and the increasing frequency and severity of extreme weather events such as tropical storms. At the same time, however, as tropical islands they also have considerable natural resources offering opportunities for renewable energy supplies such as solar, hydro, wave, and wind.

Four of the SIDS – Mauritius, Seychelles, Comoros and Maldives – are in the Indian Ocean. Six of the SIDS – Mauritius, Seychelles, and Comoros in the Indian Ocean, plus Cape Verde, Guinea Bissau, and São Tomé and Príncipe in the Atlantic Ocean – are also members of the African Union. Malay and Arab or Swahili traders explored the south-west Indian Ocean over a thousand years ago, but many of the smaller islands in the region – including Mauritius, Seychelles, and Réunion – were unpopulated prior to European colonial expansion from the end of the fifteenth century onwards (Allen 1999: 9). Following Vasco da Gama's trip around the Cape of Good Hope in 1498, Portuguese navigators used Mauritius as a stopping place en route between the Cape and India, but did not establish a permanent settlement on the islands (Barnwell & Toussaint 1949: 3; Toussaint 1966: 110). From 1598 the Dutch East India Company (VOC) used Mauritius as a stopping place en route to and from East Asia, but abandoned the island in 1710 due to the challenges of maintaining the small settlement (Allen 1999: 9; Barnwell & Toussaint 1949: 34-37). The French, who had occupied nearby Réunion since 1642, then claimed Mauritius in 1715 and Seychelles in 1742, populating the islands with enslaved labourers, mostly from coastal East Africa and Madagascar (Allen 2004: 34, 37; Barnwell & Toussaint 1949: 41, 43; Toussaint 1966: 272). Britain acquired Mauritius and its dependencies – including Seychelles, Rodrigues, Agalega, St Brandon, Tromelin, and the Chagos Archipelago, but not Réunion – under the Treaty of Paris in 1814 (Allen 1999: 11; Barnwell & Toussaint 1949: 123, 125); Seychelles became a separate crown colony in 1903. Following the abolition of the British slave trade in 1807 and the emancipation of enslaved labourers in Mauritius in 1835, the British supplemented the population of Mauritius with indentured labourers

from India, who comprised two-thirds of the population by 1871 (Allen 1999: 17; Carter 1995: 271). Mauritius became independent in 1968, and the Republic of Mauritius now constitutes the main island of Mauritius plus the outer islands of Rodrigues and the coral islands Agalega and St Brandon; Mauritius also claims the Chagos Archipelago, which is currently administered as a UK Overseas Territory, and Tromelin, which is currently a French Overseas Territory co-managed with Mauritius.

The VOC introduced sugarcane to Mauritius in the mid-seventeenth century, finding the crop resilient and well suited to the rainy and windy climate (Barnwell & Toussaint 1949: 32-33). The French experimented with other crops – coffee, cotton, indigo, and spices – which turned out to be more susceptible than sugarcane to natural disasters such as cyclones (Allen 1999: 11-12; Barnwell & Toussaint 1949: 55). The British replaced native forests with sugarcane plantations, and Mauritius became a monocrop agricultural economy based on sugarcane (Allen 1999: 28; Carter 1995: 13-14). Mauritius was still almost entirely dependent on sugarcane at independence in 1968, but this made the economy extremely vulnerable to the weather, to fluctuations in global sugar and fuel prices, and to the gradual end of EU subsidies and preferential trade agreements (Kothari & Wilkinson 2013: 94-95; Lim Tung 2011: 261).

Since the 1970s, Mauritian governments have sought to reduce dependence on sugarcane both by diversifying agricultural production and by diversifying economic activity. Nevertheless, 90% of the arable land on the main island of Mauritius is still under sugarcane production, while the remaining 10% comprises tea, tobacco, and food products (Ramjeawon 2008: 1727). Mauritius has high but declining dependence on food imports, which comprised two-thirds of its food supplies in 2010 (Luximon & Nowbuth 2010: 5). The main pillars of the Mauritian economy are now cane, manufacturing, tourism, and financial services and ICT (Kothari & Wilkinson 2013: 99-102; Lim Tung 2011: 262; Mohee & Mudhoo 2012: 301). Agriculture and other economic activities on the smaller outer islands differs from mainland Mauritius in that Rodrigues relies on fisheries and livestock export plus tourism, and Agalega on its coconut plantations (Gemenne & Magnan 2011: 25, 52).

As a result of its relatively peaceful transition to independence, its well-functioning democracy, and the diversification of its economy, Mauritius is often referred to as one of Africa's postcolonial success stories in terms of political, human, and economic development. It is the

highest ranking country on the Ibrahim Index of African Governance, which assesses safety and rule of law, participation and human rights, sustainable economic activity, and human development.³ In 2013 Mauritius ranked 63rd on the UNDP's Human Development Index, which is higher than almost every country in mainland Africa (except Libya at 55th in 2013); the other African SIDS are also ranked lower (Seychelles is 71st, Cape Verde is 123rd, São Tomé and Príncipe is 142nd, Comoros is 159th, and Guinea Bissau is 177th).⁴ Given that the Republic of Mauritius is indexed as a country of High Human Development Indicators, it is perhaps less a Small Island Developing State (SIDS) than a middle-income Small Island State (SIS), although with a land area of over 2000km² and a population of 1.3million it is also considerably less 'small' than many other SIDS or SIS (Connell 2013: 2-3). And the main island of Mauritius, an oceanic island with relatively high elevation, is less at risk from sea-level rises than the archipelagic states comprised entirely of low-lying islands: Kiribati, Maldives, Marshall Islands, and Tuvalu (Connell 2013: 243; Robertson & Rubow 2014: 65; Rudiak-Gould 2013: 2); Mauritius was, for instance, relatively unaffected by the 2004 Indian Ocean tsunami (Gemenne & Magnan 2011: 21).

Nevertheless, like many Small Island (Developing) States, the islands of Mauritius are vulnerable to the effects of climate change and other environmental changes.⁵ Rainfall is declining at an average rate of 57mm per decade, resulting in water shortages that cannot meet increasing demands from the domestic, agricultural, industrial, and tourism sectors (Gemenne & Magnan 2011: 22-23). The average temperature is rising at a rate of 0.15°C per decade (and has risen by 0.74–1.2°C since the 1961-1990 long term mean); coral bleaching events in 1998 and 2009 resulted in loss of biodiversity, degradation of marine and land ecosystems, and negatively impacted upon fisheries and tourism (Gemenne & Magnan 2011: 25; Ramessur et al 2013: 2). Sea level at the capital Port Louis rose by a mean of 2.1mm per year by the

³ Ibrahim Index of African Governance. Accessed 16 December 2014. www.moibrahimfoundation.org/iag/

⁴ UNDP Human Development Index. Accessed 16 December 2014. data.undp.org/dataset/Table-1-Human-Development-Index-and-its-components/wxub-qc5k

⁵ Mauritius Meteorological Services. Accessed 16 december 2014. metservice.intnet.mu/climate-services/climate-change.php

first decade of the 21st century (compared to around 1.5mm per year over the second half of the 20th century); salination of freshwater and soil negatively impacts upon drinking water supplies and agriculture, and erosion of beaches contributes to the unmaking of Mauritius as an attractive tourist destination (see Gemenne & Magnan 2011: 22, 26-27). The occurrence and severity of tropical storms have intensified, and flash floods after storms in 2013 killed eleven people (Gamenne & Magnan 2011: 21-22; Ramessur et al 2013: 2).

At the same time, however, socio-economic development has also posed threats to the Mauritian environment: loss of biodiversity, resource depletion, deforestation, erosion, degradation of the ecosystem, contamination of coastal zones and freshwater supplies, air pollution, and solid and hazardous waste disposal (Foolmaun et al 2011: 967; Ramessur et al 2013: 1). Overfishing results in diminished fish stocks, and undersea tourism damages the coral reefs (Gamenne & Magnan 2011: 24, 27). Sugarcane plantations can promote soil erosion and landslides on hill slopes, and the fertilisers and pesticides used on sugarcane plantations and the chemicals used in the textiles industry run downhill and enter the water system and impact upon agriculture and marine wildlife (Gamenne & Magnan 2011: 23-24; Ismael 2008). Traditionally sugarcane fields are set on fire to burn off the dry leaves before harvesting the juicy canes, but this releases dioxins and wastes the cane trash, which can be left on fields to prevent regrowth of other species and thus reduce the need for herbicides; as a result of more efficient manual harvesting techniques and increasing mechanisation, the practice of burning fields is in decline (Ismael et al 2008).

Sugarcane is an exceptionally productive species: in addition to commercial sugar products, cane trash, and cane tops (used as an animal feed or exported as a raw material for paper), the extraction of cane sugar also produces by-products including molasses and a fibrous biomass called bagasse (Chummun 2013: 210; Mohee & Mudhoo 2012: 311). Bagasse was historically incinerated to power the sugarcane factory itself, but more efficient techniques have meant that the local sugarcane industry has increasingly produced energy beyond the needs of the sugarcane industry, which is sold to the national grid (Chummun 2013: 211; Ramjeawon 2008: 1727). Molasses can be distilled into ethanol, which can be blended with petrol or used as a cheaper and cleaner alternative to petrol; this practice is being developed but remains relatively underexploited in Mauritius (Chummun 2013: 211; Mohee &

Mudhoo 2012: 316-317). The sugar industry is increasingly referred to instead as the cane industry in recognition of the potential energy value of its by-products (Ramjeawon 2008: 1729).

3. *Maurice Ile Durable (Sustainable Mauritius)*

Mauritius has no coal, natural gas, or oil deposits, so energy needs are met through imported coal and petroleum products supplemented with local renewable resources: bagasse, hydro, solar thermal, photovoltaic, fuelwood, waste-to-energy, and wind (Chummun 2013: 210). The economy and energy requirements both grew at an average rate of 5% per year over the first decade of the 21st century; meanwhile, the contribution from local renewable energy stagnated (Elahee 2010: 803). Mauritius is thus extremely vulnerable to fluctuations in global energy prices. In response to the global energy crisis and record high oil prices in 2007, the then Mauritian Prime Minister, Navin Ramgoolam, launched the concept of *Maurice Ile Durable* (MID, or Sustainable Mauritius) in 2008. MID aimed to ‘make Mauritius a model of sustainable development’ (particularly in a SIDS context) ‘in which the needs of the present generation are met, without jeopardising the chances of future generations to meet theirs’ (Ministry of Environment and Sustainable Development 2011: 2, xii). This clearly draws on the Brundtland Report’s oft-quoted (1987) definition: ‘sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs’.⁶

The MID Fund was originally established under the aegis of what was then called the Ministry of Renewable Energy and Public Utilities (and became the Ministry of Energy and Public Utilities). Initially the main thrust of MID was to make Mauritius less dependent on imported fossil fuels – with an initial target of 65% autonomy by 2028 – by making increasing use of renewable energy and more efficient use of energy in general (Elahee 2011: 13). Many of the original projects financed by the MID Fund were entirely focused on energy efficiency: grants for the purchase of 25,000 solar water heaters, subsidies for the purchase of one million compact fluorescent lamps, the replacement of conventional

⁶ WCED Brundtland Report. 20 March 1987. Accessed 16 December 2014. <http://www.un-documents.net/our-common-future.pdf>

lighting with fluorescent lighting in public buildings, replacement of incandescent and halogen traffic lights with LED signal lights, and the installation of solar water heaters in public hospitals; MID also contributed to the ongoing renewal of the bus fleet towards reduced emission vehicles (Elahee 2011: 10; Jogoo 2014: 138). The proportion of Mauritian energy that came from local renewable sources actually fell annually from 17.5% in 2009 to 15% in 2013, when 92% of this came from bagasse, 4% from hydro, and the remaining 4% from wind, landfill gas, photovoltaic, and fuelwood; correspondingly, the proportion of Mauritian energy derived from imported fossil fuels rose annually from 82.5% in 2009 to 85% in 2013 (Statistics Mauritius 2013). The optimistic 2008 target of 65% energy autonomy by 2028 was revised downwards; in 2013, the target was 35% renewable energy by 2025.⁷ In 2016, however, 85% of Mauritian energy was still derived from imported fossil fuels (Statistics Mauritius 2016).

A national consultation process with members of the public and special interest groups in 2010 contributed to the expansion of the scope of MID. According to the resultant Green Paper (Ministry of Environment and Sustainable Development 2011), responses to the consultation suggested broader understandings of sustainable development as incorporating the environment (particularly conservation, pollution, and waste management), the economy (particularly energy and transport, but also self-sufficiency and green construction), society (particularly education, employment, health, and social cohesion), and governance. MID was expanded to incorporate the so-called '5Es' of MID, which were divided into six Working Groups which met in mid-2011: 1) Energy; 2) Environment – preservation of biodiversity and natural resources; 3) Environment – pollution, wastes and environment; 4) Employment; 5) Education; 6) Equity (see Ministry of Environment and Sustainable Development 2011: Annex 12). As part of this diversification, responsibility for MID was transferred from the Ministry of Energy and Public Utilities to the Prime Minister's Office (PMO) in collaboration with the newly renamed Ministry of Environment and Sustainable Development (MoESD, formerly known as the Ministry of Environment and National Development Unit). The five additional lead Ministries are Energy and Public Utilities; Agro-Industry

⁷ Osman Mahomed. "Maurice Ile Durable". United Nations 1 November 2013. Accessed 16 December 2014.
<http://sustainabledevelopment.un.org/content/documents/4074durable.pdf>

and Food Security; Labour, Industrial Relations and Employment; Education and Human Resources; and Social Integration and Economic Empowerment. All Ministries were expected to prioritise the realisation of MID. Drawing on the final reports from the six Working Groups, the UK consultants Mott MacDonald drafted the MID Policy, Strategy and Action Plan, a much-revised version of which was finally implemented in June 2013.

Thus MID's stated aim was to reduce dependency on imported fossil fuels through the development of renewable energy and more efficient use of energy in general, but instead Mauritius experienced rises both in demand for energy and in the proportion of energy derived from imported fossil fuels. The following subsections ask what is going on and look in more detail at two controversial energy efficiency projects which aimed not to reduce demand or to develop renewables but rather to meet increasing demand through the importation of fossil fuel and the conversion of waste to energy in ways which apparently contradict the aims of MID.

3.1. Energy efficiency: a proposed new coal-fired power station

Especially in the period since industrialisation, human societies have relied increasingly on the extraction of fossil fuels – coal and then petroleum and natural gas – for the production of cheap and abundant energy to fuel technological advancement and economic growth, but fossil fuels are highly polluting, demand continues to rise, and supplies are dwindling (Baer & Singer 2014: 11-14; Horta et al 2014: 115). Responses to the prospect of reaching peak oil extraction vary from pessimism about unemployment, high-cost energy, and energy shortages to optimism about opportunities to increase sustainability and self-sufficiency through the development of local renewable sources of energy (Baer & Singer 2014: 17; Hornborg 2013; Strauss et al 2013: 13).

The state-owned Central Electricity Board (CEB) is responsible for sourcing and supplying electricity in Mauritius. Mauritius has long relied on dual-fuel power stations that burn bagasse for six months of the year (during the sugarcane harvesting season) and imported coal for the other six months of the year when bagasse is not available; without coal, bagasse would be inefficient, but coal is environmentally more damaging than bagasse (Mohee & Mudhoo 2012: 312-315). In 2011, nearly 54% of the country's electricity supply came from Independent Power Producers

(IPPs) operating dual-fuel bagasse/coal cogeneration facilities, nearly 43% came from thermal power stations reliant on imported heavy fuel oil (which costs twice as much as coal to produce), just over 2% from hydroelectric plants, and the remaining 1% from bagasse and landfill gas (Central Electricity Board 2011: 27). In the context of increasing demand, perceptions of the unreliability and marginality of renewables, and the high cost of the perceived main alternative heavy fuel oil, CEB decided to commission a new single-fuel coal-fired power station.⁸

In 2006, the CEB issued a contract to Mauritius CT Power (MCTP, staffed by Indian and Malaysian engineering teams) to build and operate a coal-fired power station with two 50 megawatt turbo-generator units at Pointe aux Caves near Albion, which is a town on the west coast of Mauritius.⁹ In 2011 the Ministry of Environment and Sustainable Development rejected MCTP's application for an Environmental Impact Assessment (EIA) license, but MCTP appealed, and was granted its EIA license in 2013. MCTP would initially own and operate the power station; CEB would have a 26% shareholding and all electricity generated would go to CEB for the first twenty years, after which the facility would be transferred to the CEB with an expected further lifespan of twenty years.¹⁰ The power station would use bituminous coal sourced from South Africa's Richards Bay, which is the source of coal currently used by other IPPs in Mauritius.¹¹ The initial plan was for coal to arrive at the Port Louis docks for transportation by road 15km south to Pointe aux Caves, but critics questioned the road network's capacity to support the additional traffic load on already congested roads. Eventually the government decided that – since Pointe aux Caves is on the coast – MCTP should instead construct a jetty so that coal could arrive by sea.

MCTP proposed to create a thousand local jobs in construction and thereafter 200 local jobs at the power station.¹² Local fishermen based at Albion to the south and Pointe aux Sables to the north raised concerns

⁸ Swalay Kasenally. "Coal power: the politics of indecision". *Le Mauricien* 28 February 2012. Accessed 16 December 2014.

www.lexpress.mu/article/coal-power-politics-indecision

⁹ MCTP. Accessed 16 December 2014. <http://ctpowerltd.com/strategy/>

¹⁰ MCTP. Accessed 16 December 2014. <http://ctpowerltd.com/welcome/>

¹¹ MCTP. Accessed 16 December 2014. <http://ctpowerltd.com/engineering-team/>

¹² MCTP. Accessed 16 December 2014. <http://ctpowerltd.com/wp-content/uploads/2013/04/25-04-2013.pdf>

about effluent. The Mauritius Environment Platform led opposition to the power station on the grounds that it contradicted MID's purported commitments to reducing reliance on imported fossil fuels and to developing local renewable sources. Despite existing capacity in renewables such as bagasse and hydro for electricity, critics were widely concerned that a single-fuel coal-fired power station would divert investment away from alternative sources of electricity such as installing photovoltaic cells (which are an initially expensive investment but have long lives and low running and maintenance costs), retrofitting the existing dual-fuel power stations to use cleaner natural gas (from Mozambique and Tanzania) instead of coal, and the development of wind and wave energy (see Chummun 2013).¹³ In 2015, the Mauritian Government decided not to proceed with the plant after all; MCTP won its Supreme Court appeal in 2016, and the saga continues.

3.2 Waste management: a proposed new waste-to-energy plant

Increased waste production poses ever-greater challenges for safe waste disposal. Solid waste is increasingly incinerated and converted into electricity through a process known as waste-to-energy (WtE), which also addresses ever-increasing demands for energy (Chummun 2013: 214; Mohee & Mudhoo 2012: 299). Nevertheless, WtE has its critics, including Friends of the Earth and the Global Anti-Incinerator Alliance (GAIA). WtE facilities emit dioxins and other unintentional persistent organic pollutants plus the highly hazardous by-product ash.¹⁴ WtE relies on waste production, and thus appears to promote waste creation rather than reduction, and it can divert attention away from waste segregation for composting and recycling, and from the development of renewable energy (Clark 2007: 276-277; Alexander & Reno 2014: 340; cf. Chummun 2013: 214; Mohee & Mudhoo 2012: 303).

¹³ Pamela de St Antoine. "Engineer Felix Ah-Kee: Mauritius should look at alternatives to proposed coal plant". *Le Mauricien* 7 April 2013. Accessed 16 December 2014. www.lemauricien.com/article/engineer-felix-ah-kee-mauritius-should-look-alternatives-proposed-coal-plant

¹⁴ GAIA. "Keep Mauritius incinerator-free". Accessed 16 December 2014. www.no-burn.org/article.php?id=374. GAIA. "Mauritius says no to MSW incinerator". 22 June 2009. Accessed 16 December 2014. www.no-burn.org/article.php?id=734

During the 1980s and 1990s, solid waste in Mauritius was deposited in open air dumping sites, which emitted pollutants into the water table, the waterways, the land, and the air, especially when rubbish was burned.¹⁵ In 1997 the government opened a landfill site at Mare Chicose in the south-west. The landfill site posed a multitude of problems for the local community – leachates that polluted the nearby waterways, scavenging pests, increased traffic, odours, and skin and respiratory problems – and eventually the population agreed to relocate to the town of Rose Belle (Gemenne & Magnan 2011: 51). Mare Chicose initially had a capacity for 300 tonnes of waste per day for 18 years, but economic development has been accompanied by increased waste production, and by 2009 solid waste production was around four times this amount at 1,200 tonnes per day (or about 1kg per capita per day), and the site could not keep up (Foolmaun et al 2011: 967; Lim Tung 2011: 268-269, 281; Mohee & Mudhoo 2012: 302).

In 2006, the Mauritian government announced that it was considering a WtE facility that would incinerate 300,000 tonnes of mixed waste per year and sell the resultant 20 megawatts of energy to the CEB. The WtE facility would be constructed and managed by a local company Gamma Civic in collaboration with an American company Covanta Energy. La Chaumière lies between the west coast and the conglomeration of densely populated upland towns Beau-Bassin/Rose-Hill and Quatre-Bornes/Ebène. According to Gamma-Covanta's Environmental Impact Assessment, La Chaumière was selected – among other reasons – because the prevailing easterly winds would minimise the potential impacts on local air quality and because its proximity to the most densely populated part of the island would reduce transportation distances.¹⁶

Local residents campaigned against the WtE facility on the grounds that it could have similar local impacts as landfill sites, and filed an appeal before the Environment Appeal Tribunal against the

¹⁵ Institute for Environmental and Legal Studies. "Solid waste management in Mauritius". Last updated 15 October 2011. Accessed 16 December 2014. iels.intnet.mu/solidwaste_mau.htm

¹⁶ La Rédaction. "Not in my backyard". *L'express* 22 May 2007. Accessed 16 December 2014. www.lexpress.mu/article/not-my-backyard

government's approval of Gamma-Covanta's EIA Report.¹⁷ The political party Lalit questioned whether the WtE facility would be more polluting than the status quo of landfill plus the burning of bagasse and coal in cogeneration electricity plants.¹⁸ Lalit also noted, however, that Gamma-Covanta stood to make Rs.250 million from the project, and that the state would lose money if the WtE facility received less than the contracted 300,000 tonnes per year, which could undermine proposals to reduce waste production and sort waste for composting and recycling.¹⁹ Local environmentalists similarly argued that the government should instead use MID to concentrate its efforts: firstly on waste reduction; secondly on composting organic animal and food waste; thirdly on recycling paper, glass, plastics, and aluminium; and fourthly on the development of renewable energy.²⁰

Meanwhile, however, Solid Waste Recycling Ltd runs a composting plant on state land at La Chaumière which deploys a process and technology developed by an Indian company called Excel Industries. Solid Waste Recycling Ltd has a contract with the government to receive 180,000 tonnes of municipal solid waste per year for 20 years. Solid Waste Recycling Ltd then sells the treated compost as fertiliser, while Sotravic transports the residual waste (amounting to about half the total received) from the composting plant to Mare Chicose, where Sotravic reports converting landfill gas into about 3Mw per month of electricity provided to the national grid since 2011.²¹ According to the Institution of Engineers Mauritius, the amount of waste taken to landfill at Mare Chicose decreased by 16% between 2011 and 2012, resulting in a decrease in the landfill gas emissions and water pollution through

¹⁷ Nasseem Ackbarally. "Environment–Mauritius: hold your fire". Inter Press Service 15 July 2009. Accessed 16 December 2014.

¹⁸ Ram Seegobin and Lindsey Collen. "The La Chaumière Waste-to-Energy Project Criticized". *Lalit* 23 April 2009. Accessed 16 December 2014. www.lalitmauritius.org/viewnews.php?id=843

¹⁹ Ram Seegobin and Lindsey Collen. "The La Chaumière Waste-to-Energy Project Criticized". *Lalit* 23 April 2009. Accessed 16 December 2014. www.lalitmauritius.org/viewnews.php?id=843

²⁰ Institute for Environmental and Legal Studies. "Solid waste management in Mauritius". Last updated 15 October 2011. Accessed 16 December 2014. iels.intnet.mu/solidwaste_mau.htm

²¹ <https://www.sotravic.net/waste-and-energy/power-generation.html>

leachate infiltration into underground water.²² Additionally, the Institution of Engineers Mauritius reported that the rerouting of raw municipal solid waste from the capital Port Louis and from the densely populated hill towns to the nearby composting plant rather than the more distant landfill site had also reduced fuel consumption and CO₂ emissions.²³

4. Perceptions of MID and sustainable development

In light of the political and economic challenges facing the Mauritian government in its quest for energy efficiency within a context of sustainable development, this section examines how people understand, engage with, and critique MID. The material I discuss derives from two research projects: one with MID insiders and one looking at MID from the outside. The resultant material divides into three subsections: perceptions of MID from within, perceptions of MID amongst engaged professionals, and perceptions of MID and sustainable development amongst marginalised citizens.

4.1. Perceptions of MID from within

During the process of revision of the draft MID Policy, Strategy and Action Plan in 2012, Saeko Kajima conducted research with officials involved with the development and implementation of MID (Kajima 2012). She conducted interviews with members of various MID committees and Working Groups including representatives of four Ministries, two international development organisations, two private sector organisations, a conservation NGO, and the University of Mauritius (Kajima 2012: 27, 44, III). Kajima found that there was considerable confusion about the division of responsibility for MID, and all but one of her respondents agreed that inadequate coordination between Ministries was a barrier to the successful implementation of MID (Kajima 2012: 35, 47). Representatives of the other Ministries questioned the MoESD's leadership capacity and wondered why

²² Solid Waste Recycling Ltd Project Brief. Accessed 16 December 2014. www.iemauritius.com/upload/files/iem_swrl_brief.pdf

²³ Solid Waste Recycling Ltd Project Brief. Accessed 16 December 2014. www.iemauritius.com/upload/files/iem_swrl_brief.pdf

MoESD had been selected as the lead Ministry for a programme that is supposed to involve all Ministries; a proposed solution was for the PMO and the Prime Minister himself to take a more active lead on coordinating MID activities (Kajima 2012: 35, 47-48).

Kajima asked her interviewees ‘How would you explain *Maurice Ile Durable* to someone who was not aware of it?’ (Kajima 2012: IV), and was struck by the wide diversity of responses and by the fact that none of the respondents mentioned all 5Es despite their centrality to the Mauritian government’s vision of MID (Kajima 2012: 42). Of the 5Es, energy and the environment were most frequently mentioned, while education and equity were mentioned only once each, and employment was not mentioned at all (Kajima 2012: 43). There was general consensus amongst Kajima’s interviewees that MID had raised public awareness and engagement with sustainable development issues and had publicised the action taken by the Mauritian government in pursuit of social, economic, and environmental sustainability (Kajima 2012: 49). Despite this optimistic consensus, there were a few voices of dissent: one interviewee suggested a lack of public understanding of the concept of sustainable development, and another questioned the extent of dissemination amongst those who do not read newspapers or have access to the internet (Kajima 2012: 50); the Mauritian government admitted that there was inadequate public awareness of or engagement with its commitment to sustainable development.

4.2. *Perceptions of MID amongst engaged professionals*

As part of a wider project on debates about environmental knowledge, I spoke to people about sustainable development during two periods of ethnographic fieldwork in Mauritius in mid-2011 (when I also observed part of one of the MID Working Group meetings) and again in mid-2013. The people I asked specifically about MID included natural scientists, environmental consultants, leading members of three NGOs affiliated with the Mauritius Environment Platform, and political actors, many of whom had engaged professionally with MID as consultants or Working Group members. Many of the professionals I asked to tell me about MID immediately volunteered some variation on the theme of the then Leader of the Opposition Paul Bérenger’s claim that MID is an ‘empty shell’ (*coquille vide*).

They had three interrelated principal concerns. First, they were critical of the Mauritian government's self-interest in relation to MID's concentration on energy and the economy and its relative neglect of environmental sustainability. Second, they were concerned about the Mauritian government's vulnerability to foreign interference, complaining that MID was primarily a means for the French government and French companies to increase their influence and economic activities in Africa. The French government provided significant funding and technical support for MID through its development agency, Agence Française de Développement, which had privileged access to the Mauritian government, thus giving French companies a competitive advantage when it came to bidding for business opportunities such as the management contract for the Port Louis bypass. Third, my respondents told me that corruption was a concern because the Mauritian government was continuing to award large-scale energy contracts to supporters of the ruling Labour Party even when such contracts contravened the principles of MID. Arguments about the government's narrow focus on energy efficiency rather than environmental sustainability, its vulnerability to foreign interference, and political corruption were most often brought together and illustrated using the two controversial examples of the proposed coal-fired power station at Pointe aux Caves near Albion and the proposed waste-to-energy plant at La Chaumière, both of which are near where I and most of my research participants lived in west Mauritius.

4.3. Perceptions of MID and sustainable development amongst marginalised citizens

Most of my time in Mauritius has been spent living and working in the disadvantaged urban neighbourhoods on the outskirts of the capital Port Louis: Pointe aux Sables, Cassis, Roche Bois, and Baie du Tombeau. The people I know in these neighbourhoods are relatively marginalised, with relatively low educational background. Most do not read the daily newspapers or have access to the internet, gaining most of their news from television and the radio. MID was heavily promoted in the parastatal Mauritian Broadcasting Corporation (MBC), so I asked people living in these neighbourhoods to tell me what MID meant to them. Their responses took three forms. First, energy: MID aimed to encourage the use of renewable energy instead of fossil fuels. Second,

technology: MID promoted the production of durable objects and institutions. Third, politics and society: MID was a drive to advance the country by bringing improvements and reducing corruption and ethnic disharmony.

None of these respondents quoted the then Leader of the Opposition Paul Bérenger's comment that MID is an 'empty shell', but two individuals made similar criticisms to those cited above: one complained about corruption, while another complained about the incompatibility of cutting down trees to build roads while claiming to support the planting of trees. This one statement was the only response that indirectly associated MID with environmental issues: all other responses focused instead on energy, technology, politics, or society. Given that Environment is one of the so-called '5Es' of MID, I was curious about why so few people had made a direct association between MID and the environment. Public conceptions of MID as weighted towards energy solutions may be explained firstly by the fact that this was indeed MID's initial focus and secondly by the continued disproportionate allocation of the MID Fund and media attention towards renewable and efficient energy projects. Since the concept of sustainable development tends to include ecological sustainability alongside economic development (Croll & Parkin 1992: 6), I decided to probe my respondents' understandings of 'environment', 'sustainable development', and the relationship between the two.

For many of my respondents, the environment – *lanvironnman* in Kreol, from the French *l'environnement* – refers to the totality of one's environs, milieu, surroundings, or physical context, including the social, political, or cultural circumstances therein. For instance, when I asked Samantha to define the environment, she said 'the environment is everything that surrounds us; in fact everything forms part of the environment'. Similarly, for Adela, 'our environment is our place where we live; my surroundings [*anturaz*, from the French *entourage*] form part of the environment'. I started to probe, 'so the word environment is not reserved for ...', and Adela interrupted me before I could say the word, replying:

Nature? No, but nature forms part of it; the authorities use it in relation to nature and cleanliness. The Minister of the Environment is concerned with cleanliness, keeping places clean, green spaces, but for me the environment is not only that: our environment is where we live.

My ethnographic material suggests that these marginalised urban Mauritians are holistic and ‘contextualist’ when it comes to their understandings of nature and society (Hornberg 1996; see also Croll & Parkin 1992; Descola 1996: 99; Hastrup 2014: 1-2; Walley 2004; West, Igoe & Brockington 2006): they do not see nature as somehow separate from society; rather, they see nature and society as interconnected constituent parts of an anthropocentric lived environment.

I wondered if this holistic understanding of ‘environment’ would correspond to a similarly broad understanding of ‘sustainable development’ as incorporating the environment, the economy, society, and governance (as per the definitions given by members of the public and special interest groups who participated in the government’s national consultation process that led to the expansion of the scope of MID). In fact, however, most of these people told me that their first exposure to the concept of ‘sustainable development’ was through MID, and indeed their understanding of ‘sustainable development’ was shaped by the narrower focus of MID on energy efficiency.

Sustainable development is usually rendered *développement durable* in French and *devlopman dirab* in Mauritian Kreol. The word ‘development’ seems relatively unproblematic in translation between the English, French, and Mauritian Kreol: in all three languages it refers to growth, progress, advancement, and evolution. People in Mauritius who I asked to define ‘development’ mentioned job creation, infrastructure, and construction. ‘Sustainable’, on the other hand, appears more problematic. While ‘sustainable’ in English is indeed best translated into French as *durable*, the French word *durable* is perhaps better translated back into English as ‘durable’: the adjective meaning lasting, enduring, and constant. Ditto Mauritian Kreol, in which *dirab* means hard-wearing and durable. When I asked people what they understood by the concept of ‘sustainable development’, most gave explanations that reflected these additional connotations of durability – i.e. growth and progress through infrastructure and construction designed for the long term – but they did not spontaneously mention the environment.

I wondered how – if at all – people conceptualised the relationship between sustainable development and the environment. When I asked what sustainability means in relation to the environment, my interviewees responded by talking about the promotion of reuse, recycling, composting, and waste management. So even when asked directly about the environment, their responses recall the remit of MID

Working Group 3 (Environment – Pollution, Wastes, Environmental Health) rather than Working Group 2 (Environment – Preservation of Biodiversity and Natural Resources). In theory, the Mauritian government conceptualised MID broadly as a socio-political project encompassing the 5Es of energy, environment, employment, education, and equity. In practice, however, it would seem that the narrower focus of MID in practice has reinforced the notion that sustainable development is principally concerned with energy efficiency and waste management. From the perspective of my marginalised respondents, the Mauritian Government has yet to demonstrate convincingly that its concept of sustainable development includes (also) preservation of biodiversity and mitigation of climate change.

5. Conclusions

This chapter has deployed MID as a lens through which to examine debates about environment, sustainability, and development in Mauritius. MID was supposed to encompass environment, employment, education, and equity, and yet its primary focus was on energy efficiency. This chapter has contrasted the narrow focus of Mauritian government actors with two other broad categories of citizen: firstly, environmentalists who argue that MID ought to be able also to incorporate preservation of biodiversity and mitigation of climate change, and secondly, marginalised urban citizens, many of whom came to see MID in particular – and consequently the concept of sustainable development in general – in terms of socio-economic development rather than (also) environmental sustainability. I would suggest firstly that MID could have been more effective if environmental sustainability had been foregrounded, and secondly that MID would have been seen as more inclusive if economic development was more transparently and equitably distributed amongst the population as a whole rather than being seen as aimed at rewarding big businesses that support the ruling political parties.