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A fair green economy? Studies of agriculture, energy and waste initiatives in Malaysia

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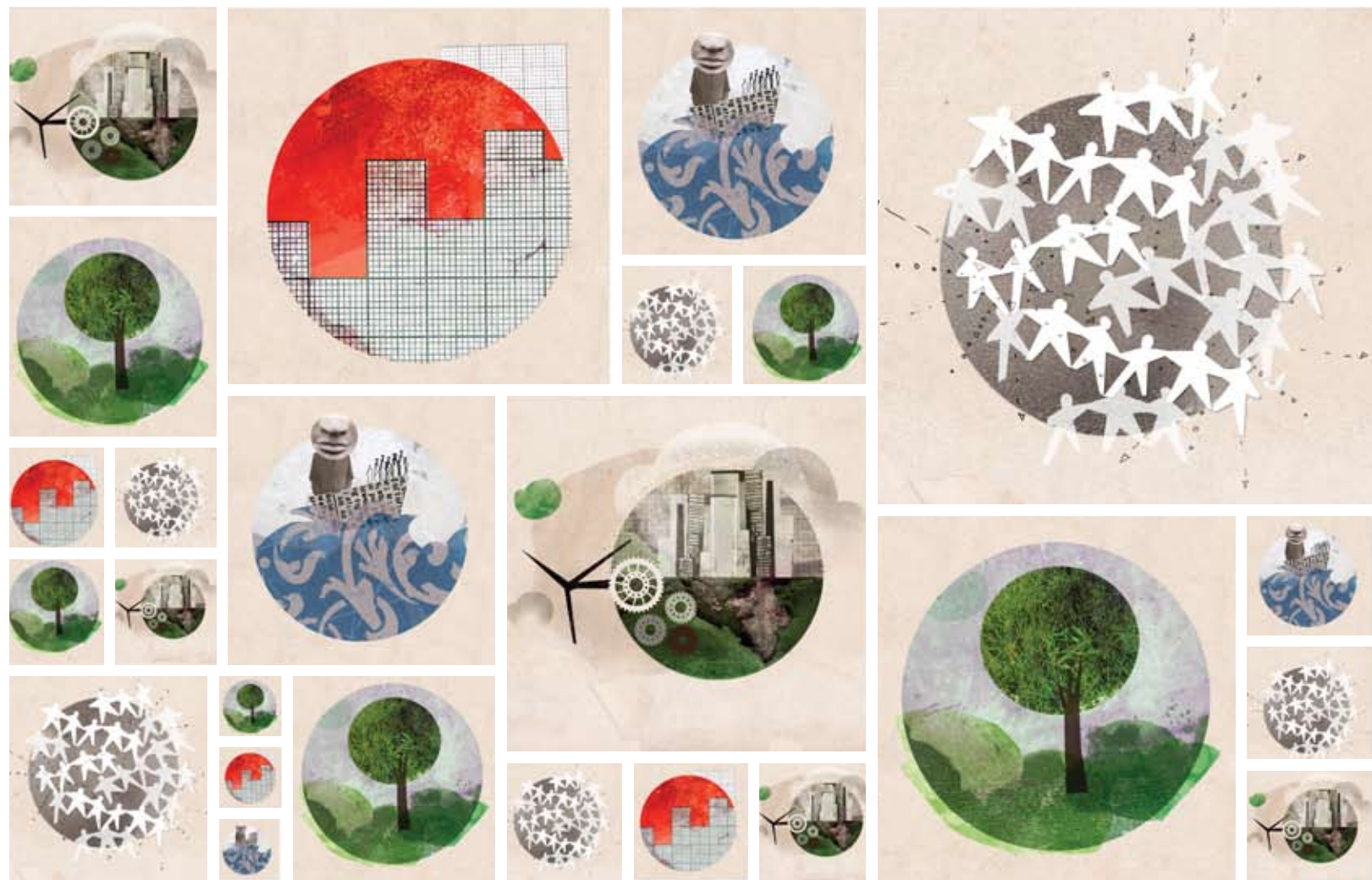
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A Fair Green Economy? Studies of Agriculture, Energy and Waste Initiatives in Malaysia

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United Nations
Research Institute
for Social Development

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STIFTUNG**

Occasional Paper Two

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Social Dimensions of Green Economy
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Acronyms

FELCRA	Federal Land Consolidation and Rehabilitation Authority
FELDA	Federal Land Development Authority
GDP	Gross domestic product
GEF	Global Environment Fund
GR	Green revolution
HYV	High-yielding variety
ICT	Information and communication technology
KEDA	Kedah Regional Development Authority
MARDI	Malaysian Agricultural Research and Development Institute
MCED	Ministerial Conference on Environment and Development
MGBC	Malaysia Green Building Confederation
NEM	New Economic Model
NGO	Non-governmental organization
OECD	Organisation for Economic Co-operation and Development
PACOS	Partners of Community Organisation
RM	Ringgit Malaysia
SEDA	Sustainable Energy Development Authority
SMA	Single Mother Association
SREP	Small Renewable Energy Power
SRI	System of Rice Intensification
TNB	Tenaga Nasional Berhad
UNEP	United Nations Environment Programme
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific

Summary

This paper proposes that a green economy needs also to be a fair economy. Following broader global trends, in 2009 the Malaysian government established the basic architecture for green economy by incorporating a green technology portfolio into the newly established Ministry of Energy, Green Technology and Water. This was followed by a suite of interventionist policy instruments. However, Malaysia's approach raises the question whether the full range of social, economic and environmental goals is considered in its policy objectives, since a strictly economic approach to sustainability risks marginalizing the social equity aspects of green economy.

Parallel to the debate on sustainability, the social dimension of green economy has proven elusive both in definitional and substantive terms. There is no single understanding of integrated/comprehensive greening coming from either green growth, green economy or global green new deal discourses. However, the allocation of green goods and services is considered key, and it is recognized that this will eventually demand greater resources (not just economic) to achieve the necessary level of greening. For these reasons, although green economy does present an alternative pathway for development, it only partially resurrects the broader vision of sustainability as originally outlined by the sustainable development concept. For instance, focusing on green growth does not automatically lead a community to pathways to sustainability. Likewise, pro-poor investment alone cannot guarantee the diffusion of green projects that can lead to positive socioeconomic development outcomes. Since established poverty reduction programmes do not necessarily target the environment and vice versa, a green economy must integrate both poverty and environmental objectives.

Malaysia's national green economy framework reflects a mainstream economics framing, such as that of the United Nations Environment Programme (UNEP) and the Organisation for Economic Co-operation and Development (OECD). That is, it attempts to strengthen the economy via incentives, the tax system, pricing, regulatory frameworks and prioritized investments. Its target group, however, is industries located in urban centres and not the poor communities living in the rural areas of Malaysia. Consequently, the social dimension is not clearly spelled out in terms of programme and policy tools, despite the fact that "improving the quality of life for all" is one of the four pillars of Malaysia's National Green Technology Policy. This is manifested in the country's green policy design, evincing an urban bias. Given this scenario, the empirical section of this paper surveys piecemeal greening projects in a subnational context, particularly in Malaysia's rural frontier where poverty is still a major challenge. These projects are not officially considered a part of the country's recent response to the green economy agenda. Through case studies of agriculture, renewable energy and waste-to-wealth initiatives, the paper illustrates that green economy in Malaysia has most potential when it arises from the engagement of communities. The paper explores the contribution of these three sectors in meeting social policy objectives, as well as the challenges. Specifically, the paper investigates the benefits from a greener economy that will accrue to society members who are disadvantaged economically and geographically.

The first case study describes the application of the System of Rice Intensification (SRI), a sustainable agricultural technique. It illustrates how green economic activity can alleviate poverty while simultaneously preserving the environment. Capitalizing on local leadership and technical assistance from government agencies, the SRI broadens the base for justice by benefiting small farmers (as opposed to industrial agriculturalists). The promotion of sustainable practices has also resulted in smallholders receiving a premium price for their rice products, thus helping to alleviate poverty.

The second case study focuses on the challenges in improving electrification rates in remote areas. Green economy approaches to energy should shift away from "hard path" solutions such as hydroelectric dams, toward decentralized "soft path" energy systems such as micro-hydropower and solar photovoltaic. However, past efforts to improve energy security and

alleviate poverty in the rural areas in Sarawak have been bedevilled by failures in implementation. Best practice cases point to the need to spend adequate resources (technical and financial) in order to find appropriate solutions at the community level.

The third case study shows the potential of using a waste-to-wealth project to empower a marginalized group (in this case, single mothers on Tuba Island) by improving their livelihood via income-generating activities. Focusing on making crafts from waste, the project considers the whole business supply chain to ensure that handicraft products are properly marketed and eventually sold. With better resources and coordination, the (currently small-scale) economic strategies practiced in Tuba Island could be scaled up and replicated elsewhere as a means to achieve economic growth through pro-poor and pro-disadvantaged investments.

There are issues of distributional and procedural justice in the greening of any economy. The paper considers the distributional justice or consequences of greening policies or practices on different groups of people and places. Procedural justice considers questions of governance, voice and participation within decision making. They are elusive at first glance, and therefore require increased attention from scholars and policy makers. In both, there are five areas in which issues of equity or fairness relate to either processes or outcomes. Together, they form the preconditions for a greener economy in Malaysia.

1. Rectify urban bias in national green economy formulation.
2. Address the silo effect by improving policy coherence through better coordination and implementation.
3. Improve problem framing and scaling of responses.
4. Enhance locality-based green income-generating activities.
5. Address distributional and procedural justice through improved consultation and public participation.

The paper concludes by arguing that a transition to a green economy requires more than a mere tinkering with the economy. Indeed, it must also include the reform of social institutions to address underlying biophysical conditions at local, national and global levels.

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Introduction

Green economy resurrects debates on what constitutes the nebulous sustainability goal. Moving away from the “mystic reverence for nature” that had empowered earlier conservation movements (Giddens 2009:52), the green economy or green growth model has been triggered by concerns over climate change and economic crisis. It demands a sharp reduction in carbon intensity in order to revitalize the ailing world economy on a more sustainable basis. Across the developed world, there is increased public investment in energy conservation, photovoltaic installations, urban public transport, housing rehabilitation and organic agriculture (United Nations 2011). Similarly, for developing countries, the policy challenge posed by climate change must be answered with low-emission industrial development and urbanization. However, in pursuing the “greening of catch-up growth” (United Nations 2009), the paper asks, what constitutes the building blocks for this transformation to take place beyond technological and fiscal considerations?

Arguably, there is an inherent risk in framing sustainable development through the lens of the mainstream green economy (growth) definitions. A strictly economic or quantitative approach to sustainability may result in a declining focus on social equity. The central thesis of the paper is that a green economy needs also to be a fair economy. In the ensuing discussion, a fair green economy is defined as one that considers the role of different informal and social institutions in the course of greening, and where the participation of stakeholders is maximized, especially those belonging to socially and geographically disadvantaged groups.¹

As an upper middle income country, Malaysia aims not only to graduate into the high-income category in the short term (by 2020), but also to strengthen its economic foundation in order to shift to a new period of low carbon green development (Hezri and Dovers 2011). Accordingly, the Malaysian government launched its National Green Technology Policy in 2009, and subsequently designed suites of policy instruments for implementation (MEGTW 2009:4). Its target group, however, is industries located in urban centres, and not the communities residing in rural parts of Malaysia, where the incidence of poverty is most prevalent. With this urban focus, the social objective of combating poverty and inequality is not clearly prescribed in programme and policy tools contained in the National Green Technology Policy, despite the fact that “improving the quality of life for all” is one of its four pillars.

The paper is organized into four sections. The first section reviews the meaning of green economy as defined by international institutions. This is followed by an analysis of Malaysia’s national green economy framework. The subsequent sections present three case studies. Interwoven in these studies is a survey of piecemeal greening in a subnational context, particularly in Malaysia’s rural frontier. The paper then reflects on the implications of greening in terms of five preconditions for social justice and sustainability. It concludes by arguing that a transition to a green economy in Malaysia demands going beyond a mere tinkering with the economy. Indeed, a green economy must also include the reform of social institutions in order to address the underlying biophysical realities both in the country and globally.

The Elusive Social Dimension of Green Economy

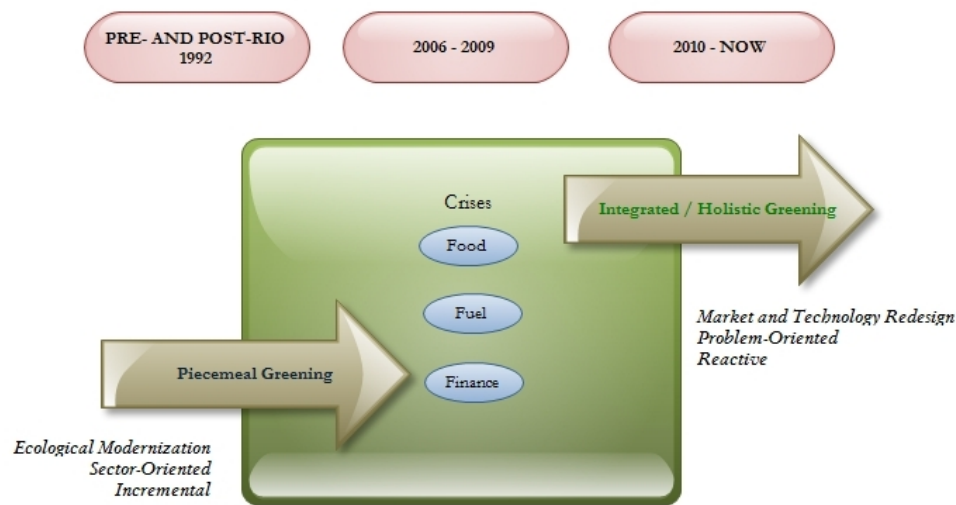
The scale of industrial production has increased tremendously in the past few decades. There is evidence that industrialization has altered the natural base of the Earth. In the “century of the environment” (Lubchenco 1998), the politics of environmentalism has widely argued that human

¹ Two principles are especially relevant in this definition. First, because sustainable development is about inclusive action, dependence on formal institutions alone might not lead to the desired improvements in livelihood security, poverty eradication and other distributional objectives. Policy making to promote a green economy therefore requires a systems approach embedded in, and promoted by, cultural, social, political and economic institutions. Second, without significant mobilization of non-governmental players through bottom-up processes, governments are less likely to be innovative and effective in framing solutions to socially unsustainable development.

society is currently under threat from global environmental deterioration. If this is to be reversed, and patterns of production changed, then greening the economy is clearly required. In other words, a sustainable economy needs social and economic revolution where greening is the focus, in the same way that Fordism was the basis for the first Industrial Revolution (Milani 2000).

The debate around green economy is by no means a new intellectual trend. Arguably, piecemeal greening began long before the Earth Summit in 1992 (see figure 1). The process of greening has been taken up across sectors, in a manner best described as incremental, and guided by the principles of ecological modernization. For instance, in the agriculture sector, the growing popularity of organic farming is driven by social processes in which entrepreneurs, farmers, market forces, social movements and the government act together to adopt more environmentally sound methods (Harris and Kennedy 1999; Horlings and Marsden 2011). Similarly, researchers have observed that innovation and adoption of clean, renewable technology in different parts of the world is inter alia dependent on country-specific institutional arrangements and the market's competitive advantage (Murphy and Gouldson 2000; Green 2009). Greening, or economic reconfiguration in these two examples, progresses in dribs and drabs with little policy integration happening between sectors. Market fundamentalism (which is based on a capitalist economy) is still the guiding economic model pursued. Although welcome, piecemeal greening scores only slightly better than a business-as-usual scenario in terms of its potential to create institutional change for sustainable development.

Figure 1: Conceptual development of the green economy goal



The contemporary language of green economy holds more promises. Representing a more integrated—or holistic—greening, it is largely a reaction to the triple F crises (fuel, food and finance) which struck the globe from 2006 to 2009. If anything, these crises exposed the weaknesses of capitalist economies. The fossil fuel price hike in 2008, coupled with the growing anthropogenic evidence of climate change, had rekindled strategic interest in developing renewable energy sources and energy efficient technologies. Plus, in responding to the 2007–2009 global recession, some G20 countries had balanced their need to boost aggregate demand and growth with targeted expansionary policies incorporating green fiscal stimulus packages amounting to (approximately) \$522 billion² (Barbier 2011). Fundamentally, such a response follows the Keynesian logic of pumping money into the economy during a recession. This

² All \$ figures refer to US dollars.

economic policy strategy is widely known as the Global Green New Deal (Barbier 2010), which aims to develop a win-win strategy for the economy and the environment, through finding economic opportunities in the response to climate change and the need for energy security.

As a result, a policy window emerged internationally between 2007 and 2009 involving international organizations and governments. The Organisation for Economic Co-operation and Development (OECD) promotes green growth, acknowledging that “green and growth can go hand in hand” by “fostering economic growth and development, while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies” (OECD 2011:1,7). The *OECD Green Growth Strategy* provides an actionable framework to foster the necessary conditions for innovation, investment and competition that can give rise to new sources of economic growth. In a series of policy documents, the OECD outlined a central role market instruments should play in ensuring the diffusion of clean technologies and other environmental goods and services internationally (OECD 2009, 2010, 2011). This involves getting the price right, encouraging investments in green technologies, eliminating fossil fuel subsidies and introducing corrective taxation. The OECD approach to green growth has a social dimension to it. A greener growth is expected to address the social issue of high unemployment in OECD countries as a result of the 2008–2009 economic recessions.

Another important green economy formulation is spearheaded by the United Nations Environment Programme (UNEP). Its Green Economy Initiative (launched in October 2008) not only aimed at seizing the economic opportunities that this contemporary concept of green economy has to offer, but also broadened the framing of the green problem to encompass social issues. The UNEP report *Towards a Green Economy* (UNEP 2011:2) presents a working definition of a green economy “as one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities”. For UNEP, a green economy is “one which is low carbon, resource efficient and socially inclusive”. The report puts forth a macroeconomic case—output and job—for investing in sectors that produce environmentally enhancing products and services, while also guiding ways to boost pro-poor investments. However, not unlike the OECD policy prescription, UNEP also accords a strong emphasis on getting the market and prices right in creating the enabling conditions for a green economy (Bina and La Camera 2011).

Economic growth that lowers quality of life or damages the biosphere will not lead to a greener economy. Highlighting a positive environment-economy nexus, UNEP economist Fulai Sheng (2010) argues that green growth does not refer to the standard definition of output growth. Rather, it embraces the broader notion of economic progress by emphasizing qualitative growth. The work of the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) on green growth is perhaps the closest to the spirit of qualitative growth.³ Unimpressed with the poverty reduction record in the region, UNESCAP and a number of its member states have organized soul-searching dialogues to explore what constitutes the quality of economic growth. Apart from emphasizing development that enhances quality of life and human well-being, UNESCAP also advocates countries to move beyond the sustainable development rhetoric and pursue a path of green growth. The basic principles for greening growth in UNESCAP countries are quality and eco-efficiency of economic growth, and environmental sustainability vis-à-vis environmental performance. UNESCAP has identified four pillars for the transition to greener growth: eco-tax reform; sustainable infrastructure; the greening of business; and sustainable consumption (UNESCAP 2008). Its growth focus is to find tailored actions that enable Asia-Pacific countries to transition to a new development trajectory by creating a systems change (as opposed to tackling development on their own).

³ In March 2005, 52 governments and other stakeholders from Asia and the Pacific convened in Seoul at the Fifth Ministerial Conference on Environment and Development (MCED). Since the 2005 MCED, ESCAP has engaged regional governments in discussing policy options and approaches for promoting green growth at various policy forums.

From the review above, there is no single concept of integrated/comprehensive greening within green growth, green economy or global green new deal formulations. However, there is a common approach to defining problems and solutions; what Bina and La Camera (2011:2311) describe as the green turn:

All responses subscribe to mainstream economic thinking, arguing that proposed solutions will contribute to economic recovery, to fight against poverty, and to promote justice, since greener growth would also ensure that planet resources are available to develop the poorest countries and their populations...The *framing of the problem is mainly in terms of allocation*, a traditional and a central concern of mainstream economics, which seeks solutions through the well-rehearsed *pursuit of greater resource* [emphasis added].

Such an instrumental perspective advocates fundamental structural change through investments (both public and private) in innovation, technology, infrastructure and institutions, so that economies shift their course. Therefore, at its most basic, the international formulations of green economy require the redesigning of markets by stimulating demand for green technologies, goods and services, which will eventually create new job opportunities. For these reasons, although green economy calls into question our choice of alternative pathways for development, it resurrects only partially the broader vision of sustainability (Jackson 2011).⁴ We say partially, as most recent investments and projects for economic recovery tend to focus more on smart solutions such as buildings, energy grids and transportation than on re-engineering the social foundations for a greener economy. Difficult questions, however, include whether the attainment of such an economy constrains other aspects, including economic growth of poor countries and social goals such as poverty eradication and job creation. For instance in China, green jobs is an elusive concept when mitigation policies in the electricity sector from 2006–2009 had caused a total of 44,000 net jobs losses (Cai et al. 2011). Indeed, while a policy window had opened in recent years and elevated the discourse on green economy, the articulation on its implications for social justice – and specifically for people or places facing disadvantage – is still at an early stage.

Malaysia's Green Economy Framework

Malaysia belongs to the club of upper-middle-income countries.⁵ In the Human Development Index assessment, Malaysia is grouped in the high human development band. In the past 50 years, the country has shown remarkable economic and social progress. For example, Malaysia has achieved the Millennium Development Goals' primary objective of halving poverty, whereby the aggregate figure fell from 17 per cent in 1990 to less than 4 per cent in 2009 (United Nations Country Team 2011). In fact, Malaysia has achieved most of the MDG targets at aggregate level. Nevertheless, the picture is different at the subnational level, where income inequality remains a policy challenge regionally.

On the environmental front, the process of greening Malaysia's economy had started as early as the 1970s (Hezri and Hasan 2006). Piecemeal greening was first exemplified with the introduction of regulations to manage pollution from the palm oil industry. Revenues from pollution licenses show that discharges from palm oil wastes declined by 88 per cent in 12 years, and effluents from rubber wastes by 44 per cent in 10 years (Sham 1997:21). The 1974 Environmental Quality Act has also been amended to suit the changing realities of regulating pollution from agro-based and manufacturing industries. In energy development, Malaysia's policy framework evolved from a sole focus on fossil fuel supply in the 1970s to a

⁴ Beyond concepts of green growth or sustainable growth there is also that of no growth. One example is found in the radical proposal by the Sustainable Development Commission of the United Kingdom in its publication, *Prosperity without Growth? The Transition to a Sustainable Economy*.

⁵ The Federation of Malaya attained political independence from the British in 1957. The Federation of Malaysia, comprising Peninsular Malaysia, Singapore, Sabah and Sarawak was formed in 1963. Singapore became an independent republic in 1965. In 2010, Malaysia's gross national income per capita was \$8,914. It has a population of 27.6 million and a total land area of 330,083 square kilometres.

diversification of supply sources, which included renewable energy, by the year 2000. The 2001 Fifth Fuel Policy launched the Small Renewable Energy Power (SREP) Programme which attempted to generate 500 megawatts (5 per cent of total electricity generation) from renewable energy sources by the end of 2005. However, by the end of 2010, only 61.7 megawatts of capacity had been successfully built in the country (Sovacool and Drupardy 2011). In yet another attempt at piece-meal greening, the Rural and Regional Development Ministry (KKLW 2011) had recently launched its New Rural Economic Model to generate high income rural employment that ensures sustainable development. Drivers of rural growth include projects such as “turning waste into wealth” and “back to nature” ecotourism packages.

Consistent with international trends, Malaysia has also introduced the systemic architecture to respond to the green economy agenda. This was necessary largely because Malaysia’s per capita carbon dioxide emissions from fuel combustion had increased by 32 per cent from 2000 to 2006 (United Nations Country Team 2011). This figure is higher than Indonesia, the Philippines and Thailand, although lower than some developed economies. Since 2009, a hotchpotch of policy statements and instruments has been introduced to loosely constitute Malaysia’s green economy goal and the means to achieve it (see table 1).

Table 1: Malaysia’s policy instruments on green economy

	Policy instrument	Functions of policy instruments
1	<i>Introduction of a ministerial portfolio in the federal administration</i>	In April 2009, the Malaysian government announced the incorporation of the green technology portfolio into a newly established Ministry of Energy, Green Technology and Water (replacing the Ministry of Energy, Water and Communications).
2	<i>Formulation of a national policy statement on green technology</i>	The central role of green technology was emphasized by the release of a National Green Technology Policy, overseeing greening in four sectors—energy, buildings, water and waste management and transportation.
3	<i>Establishment of an implementing agency</i>	On October 2009, Malaysia’s Energy Centre was restructured and rebranded as the Malaysian Green Technology Corporation, to implement the ministry’s agenda for green technology.
4	<i>Formation of an interministerial council as a decision-making body on green technology</i>	To lead the green technology initiatives in Malaysia, the Prime Minister established and chaired the Green Technology Council with senior membership of government and public sectors. The council was later merged with the Climate Change Council.
5	<i>Registration of a green building association</i>	The Malaysia Green Building Confederation (MGBC) was established in 2009 to support the government’s objective of promoting sustainably built environments. The Green Building Index had also been launched to enable green grading and certification of Malaysian buildings.
6	<i>Initiation of a green financing scheme</i>	In 2010, a soft loan incentive, the Green Technology Financing Scheme, was launched to create a policy environment that would attract innovators and users of green technology. It includes a \$470 million soft loan to companies (both technology developers and technology users) in which government would subsidize 2 per cent of the interest rate and guarantee 60 per cent of the loan amount.
7	<i>Launching of the Green Townships Framework</i>	The Green Townships Framework would outline comprehensive guidelines for new and existing townships in the country to go green by incorporating environmentally friendly technologies. Putrajaya and Cyberjaya have been chosen to spearhead the project and to become models of green townships in the country.
8	<i>Introduction of green procurement in all government agencies</i>	Green procurement manuals, procedures and standards are currently under development by the Ministry of Finance in collaboration with the Ministry of Energy, Green Technology and Water, and Malaysia’s research and standards development organization, SIRIM.
9	<i>Formulation of legislation to promote renewable energy and the corresponding quantitative targets</i>	The Renewable Energy Act 2011 (Act 725) provides for the establishment and implementation of a special feed-in-tariff system to catalyse the generation of renewable energy in Malaysia. The law is to be administered by the newly established Sustainable Energy Development Authority (SEDA). The quantitative targets set are: 6 per cent (or 985 megawatts) of national energy mix to come from renewables by 2015; and 11 per cent (2 gigawatts) of electricity generation to come from renewables by 2020.

Source: Adapted from Shing and Tick (2011).

In 2009, Malaysia announced a new development policy framework called the New Economic Model (NEM). It outlined the three-pronged goals of inclusiveness, high income and sustainability in powering the nation to graduate to a high income country by 2020. Green technology is earmarked as an important driver for the twin goals of high income and sustainability. Evidence of convergence of the three goals includes Malaysia's success in attracting \$4 billion worth of foreign direct investments to the solar photovoltaic industry (MEGTW 2011). Taken together, the instruments highlighted in table 1 constitute what the prime minister has coined as green economy's "adoption edge". The next step, the green production edge, involves increasing the GDP contribution from green business to 8 per cent by 2020, from the current 2 per cent. This would involve the creation of about 500,000 green jobs by 2020, from 95,000 green jobs in 2009. If implemented successfully, Malaysia's macroeconomy would achieve the objective of reducing total carbon emissions by 15 per cent and reducing total emissions per GDP by 40 per cent by 2020, compared to 2005 levels.

Malaysia's policy response to integrated greening raises three analytical issues from a policy process standpoint. First, the instruments and targets described above are, at the time of writing, only at the formulation stage in the policy cycle. Hence, it remains to be seen how these tools are implemented in the forthcoming years, and whether they achieve the macro-level aims contained in the National Green Technology Policy. Second, the Malaysian government has managed to articulate the operationalizable policy objectives within a short period of time.⁶ That is, the meso-level interventions are clearly designed with considerations of time and space, such as in the case of green townships and building. Third, however, there is a mismatch between instrument choice and the ambitions set out at the abstract level of goals. We argue that although Malaysia chose the term green technology as the collective label for instruments described in table 1, the scope of these policies goes beyond merely a choice of technology. Indeed, Malaysia's policy design resembles what countries such as the Republic of Korea call a "green growth development strategy". Put in this light, Malaysia's solutions to green economy follow a mainstream economics framing, such as that of UNEP and the OECD, by emphasizing economic parameters such as incentives, the tax system, pricing, regulation and investments.

However, comparable with green growth policy design in a number of countries, the social dimension is not clearly spelled out. While "improving the quality of life for all" is stated as one of the four pillars of the National Green Technology Policy, its clear expression in terms of instruments and programme choices is yet to be seen (MEGTW 2009:4). Given this scenario, what benefits from a greener economy will accrue to those who are disadvantaged economically and geographically? The next section explores this question by looking at Malaysia's experience with piecemeal greening across sectors.

Localizing Green Economy

One of the two themes for the United Nations Conference on Sustainable Development in Rio de Janeiro in 2012 is "green economy in the context of poverty eradication and sustainable development". As a middle income country, the specific challenge for Malaysia is to address poverty at the subnational level. Rural areas, where around 35 per cent of Malaysians live, remain the major sites of poverty incidence.⁷ Comparatively, rural communities benefit less from Malaysia's economic progress than urban communities. As discussed above, Malaysia's response to the green economy goal has an unmistakably urban bias. This begs the question whether there are opportunities to connect the socioeconomic development challenges in Malaysia's rural hinterland to the national (and global) green economy goal. We argue that this

⁶ If the tempo of change is an indicator of political will, the speed with which the government has formulated its green economy goal is a sure indicator of commitment. The policy was launched within 100 days of the ministry being established, compared, for example, with a six-year gestation period for the National Policy on the Environment.

⁷ In comparison, in 2001 the percentage of rural population was 25 per cent for Mexico, 55 per cent for Nigeria, 58 per cent for Indonesia and 72 per cent for India.

is an important convergence to be made because development and conservation needs are, in the main, felt locally. An added challenge exists in the Malaysian rural context, as segments of its population are still marginalized from mainstream development. By examining three case studies of agriculture, renewable energy and waste management, this section problematizes the nature and extent of greening process in Malaysia. These cases serve to illustrate the contribution of the three sectors—agriculture, energy and waste—in meeting social policy objectives, such as income generation and distributional social justice, as well as the potential for the local engagement of communities to help push Malaysia toward a green economy.

Green agriculture through a System of Rice Intensification

Rice is a staple food for Malaysians, providing about 30 per cent of their daily calorie intake. Rice production has always been associated with a high incidence of poverty, low income, poor agronomic practices and inefficient use of resources (Pletcher 1990; Chamhuri 1992). Therefore, massive incentives and supports have been put in place by the Malaysian government to improve this sector as well as the livelihoods of rice growers. Policy instruments used include input subsidies, the construction of irrigation and drainage systems, price supports and extension services. This sector is, as a result, highly protected.

Since the 1970s, Malaysia has adopted the green revolution (GR) approach in producing rice for local consumption needs. The use of high-yielding varieties (HYVs), agro-chemical inputs, farm mechanization as well as the construction of modern irrigation and drainage systems have resulted in increased yield and improved livelihoods for rice growers. Yield rose from 2.6 tonnes per hectare in the early 1970s to 3.5 tonnes per hectare in 2008. At the same time, the incidence of poverty among the rice growers has been significantly reduced from 88.1 per cent in 1970 to 29 per cent in 1990. However, the application of GR practices was successful only in favourable areas that were equipped with modern infrastructure such as irrigation and drainage systems, farm roads, milling facilities and farm mechanization. By contrast, areas without such infrastructure recorded low yields. For example, irrigated areas recorded yield as high as 6.2 tonnes per hectare compared to 2.5 tonnes-3 tonnes per hectare in non-irrigated areas (MADA 2009). As a result, rice growers in the irrigated areas earned a higher income compared to the rice growers in non-irrigated areas.

The green revolution has been criticized on many grounds. Gaps in relation to equity and distributional aspects of Malaysia's GR in rice production have been well analysed by Ishak and Jomo (1983). More sharply, critics argue that although productivity was boosted, GR did not lead to the sustainable use of natural resources, but instead to environmental problems such as land and soil degradation, pesticide pollution and loss of biological diversity. These shortcomings resulted in a proposal for "a truly green revolution in agriculture"—one that addressed both environmental sustainability and improved livelihoods for farmers (United Nations 2011).

In Malaysia, one example of the new greening trend is seen in the state of Kedah, a major rice granary equipped with modern irrigation and drainage systems. Its total planted area is 192,776 hectares, with double cropping successfully practiced for decades (MoA Malaysia 1999). The cultivation of rice is the mainstay for the majority of Kedah's 1.9 million agrarian inhabitants. Irrigated rice is the major farming system covering 96,558 hectares and involving 55,130 farmers (MADA 2009). Rice is also being produced by a rain-fed system with a total area of about 38,000 hectares and manned by 25,000 farmers. As far as resources were concerned, water availability is a major problem in rain-fed systems, as they depend entirely on the monsoon season for their water needs. Additionally, the high frequency of pest attack has often caused crop damage and income losses to the farmers. Consequently, most of the farmers have converted their land to other high value crops, and some have even had to abandon their land.

To reverse this trend, the Kedah Regional Development Authority (KEDA) has, since 2010, started to rehabilitate idle, ex-paddy lands. In particular, the management unit of KEDA has

embarked on the SRI⁸ as one of the potential economic activities. The village of Kampung Lintang in the Sik District has been chosen to implement the SRI project. It is a small village with only 35 household heads. The main objective of this project is to eradicate poverty among Kampung Lintang's inhabitants through sustainable rice farming practices. Besides KEDA, this project has also received support from the Department of Agriculture (of the state of Kedah), the Malaysian Agricultural Research and Development Institute (MARDI), the National Co-operative Commission, and the Ministry of Domestic Trade, Co-operatives and Consumerism. In the national policy framework, however, the project is not recognized as a green economy activity as it does not fall under the purview of the Ministry of Energy, Green Technology and Water.

The SRI pilot project was initiated in October 2010 involving 18 farmers. The number of farmers involved has since increased to 25. In terms of education levels, the majority of participants have attained their primary school certificate. The involvement of farmers was based on three categories:

1. full-time farmers with their own land;
2. part-time farmers with their own land; and
3. employed farmers.

Farmers in schemes 1 and 2 have agreed to lease their lands to the SRI project for 15 years for implementation. To date, 18 farmers have registered under scheme 1; five farmers under scheme 2; and the remaining two are employed farmers. The total area is about 25 acres, involving land parcels which had been abandoned for 25 years. The activity is managed in the form of cooperatives, and farmers have been paid according to their type of involvement. On average, each farmer has received RM250–RM500⁹ per month.

Before the commencement of SRI projects, farmers attended a two-week training course in Nagrak, Sukabumi, in Indonesia, where they were trained and exposed to SRI practices which included formulating organic fertilizers and pesticides. Using organic manure is an essential activity in SRI. Nutrients from organic manures improve soil structure and drainage, and allow more air into the soil. As the soil in Kampung Lintang is poor in nutrient content, the cooperative decided to apply more organic fertilizer in order to enhance its fertility. Following the training, farmers in Kampung Lintang now make their own fertilizers. Plant wastes from the surrounding area such as dry leaves, twigs, banana stems and other plants are mixed together and placed in a cabin for fermentation. The process takes three to four weeks, after which it can be applied to rice plants. Farmers are also using environmentally friendly methods and their indigenous knowledge to combat pest problems.

The area has a serious water supply problem due to the absence of drainage and irrigation systems. Hence, following sustainable water resources management principles, the cooperative has utilized a natural river adjacent to the project area as the main source of water supply. Pipes are used to channel water to their farms, and the same source is also used for household needs (due to the absence of a public water supply system). In terms of farm mechanization, conventional rice machines have been modified to be appropriately used for SRI.

⁸ SRI was introduced in 1983 by the French Jesuit Father Henri de Laulanie in Madagascar. The central principles of SRI are (i) rice field soils should be kept moist rather than continuously saturated, minimizing anaerobic conditions, as this improves root growth and supports the growth and diversity of aerobic soil organisms; (ii) rice plants should be planted singly and spaced optimally widely to permit more growth of roots and canopy and to keep all leaves photosynthetically active; and (iii) rice seedlings should be transplanted to shallow water when young, less than 15 days old with just two leaves, quickly and carefully, to avoid trauma to roots and to minimize transplant shock.

⁹ \$1 = 3.2 RM approximately (December 2011).

Despite its current small scale, the implementation of the SRI project in Kampung Lintang has shown the commitment of a poor community to work toward green economy initiatives.¹⁰ In addition, SRI encourages the community to actively participate in poverty eradication programmes that also consider environmental conservation and sustainable management of agricultural land. More importantly, SRI has offered a premium price of rice which ranges between RM10.00 to RM12.00 per kilogram, higher than the price of rice produced by conventional methods (between RM1.70 to RM2.50; see table 2). At the time of writing, rice cultivated using the SRI technique is in demand by hospitals and organic food suppliers, and according to the project manager, the current production is not enough to meet the growing demand for the product. The SRI pilot project in Kampung Lintang is a showcase for how an economic activity managed by a small community alleviates poverty while simultaneously preserving the environment.

Table 2: Summary of green economy initiatives by the communities

Case studies	Objective	Mechanism
<i>Agriculture</i>		
Application of SRI or Organic Rice. Located in Kampung Lintang Sik District, state of Kedah, Malaysia. One of the poorest areas in the state of Kedah. Involvement by poor rice growers (~25 registered members)	To alleviate poverty among the local people. To promote an alternative practice in rice production. To promote natural resources conservation, particularly water, and to keep them free of synthetic fertilizers and pesticides usage. To empower community participation, especially among the poor, through cooperative groups.	Initiated by the state government machinery. Established local cooperative. Promote bottom-up approach through local community participation. Farmers attended training course before the commencement of project.
<i>Waste management (Recycling)</i>		
Located in Tuba Island of Langkawi. Involves fishermen community with high incidence of poverty. Actively involved in making traditional handicrafts. Other activities include producing banana and tapioca chips.	To alleviate poverty among the local people. To create economic activity for the poor, particularly the single mothers' group. To empower women's groups.	Started as an individual-based activity. Managed by the SMA. Received financial assistance from private sectors (CIMB and Tenaga Nasional Berhad).

Rural electrification using renewable energy

Malaysia currently boasts one of the highest electrification rates in Southeast Asia (98 per cent). Ninety-five per cent of the rural and suburban areas in Malaysia are connected to the electricity grid and receive an adequate supply (UNDP 2007). The success of electrification is due to the Malaysian government's continuous effort to allocate large funds to provide electrification services to rural areas. Currently, only around 10,000 to 20,000 households remain unconnected to the energy supply. Malaysia aims to achieve total electrification by 2020.

However, rural energy provision is challenging for the most remote and inaccessible parts of Malaysia. For the 2.4 million population of Sarawak in East Malaysia, the electrification rate is much lower, only about 67 per cent. Half of the Sarawak population is dispersed over a wide spatial area, inhabiting small villages not well connected by roads. To ensure energy security, the Sarawak government's main energy infrastructure is built around a centralized grid-based system through the construction of a large-scale hydroelectric power project. The strategic aim is not just to address energy accessibility in these remote areas, but also to support the state's economic development (Sovacool and Valentine 2011). The flagship initiative is the construction of the 2,400 megawatt Bakun Hydroelectric Project which began in the 1980s. Although a green

¹⁰ The state government of Selangor is now promoting SRI for wider adoption in another rice granary nearer to the capital, Kuala Lumpur. Following a national conference on SRI involving farmers, government officials, and businesses, a country network called SRI-Mas was launched early in 2011 to mainstream this form of rice cultivation.

choice from a strictly technological perspective, the Bakun project is also a high capital or hard path energy option which has been criticized by many not only for its high cost, but also as a policy decision that was socially and politically difficult to implement (Choy 2004). To date, the potential supply from the Bakun dam is already committed to providing energy for big-scale industries in Sarawak, as opposed to benefiting geographically isolated communities.

As an alternative for a green economy, a decentralized, soft path energy system could help improve energy security and alleviate poverty in rural areas. In recent years, Malaysia has actively ventured into alternative renewable energy sources for electrification. The social and economic complexity of rural electrification in the remote highland areas is discussed below, through case studies of Bario and Belaga in the state of Sarawak.

Bario (meaning wind in the local language) is a town located in the centre of the Kelabit Highlands in the Upper Baram, north east of Sarawak. It is home to about 6,000 people. Bario is little more than a collection of dirt roads and longhouses¹¹ surrounded by rice paddies, with about 1,000 residents and a few shops and lodgings.¹² Nestled 1,500 meters above sea level, the highest settlement in the Malaysian state of Sarawak is surrounded by mountain ranges on all sides. As one of the most isolated places in Sarawak, Bario cannot be linked with the state's main electrical grid link due to its remoteness and mountainous terrain. Its limited energy supply has previously been provided by fuel wood and diesel generators. However, diesel fuel in Bario costs six times more than in the city, and it is well known that the hazards of exhaust fumes from the use of diesel generators can cause both serious health and environmental problems.

A renewable energy source may provide a cost-effective option for the electrification of remote rural communities such as Bario. Be that as it may, the diffusion of soft path energy systems in Bario is bedevilled by a series of implementation failures. In 1996, funded by the Federal Ministry of Rural Development, the state government built a mini hydro-electric project to generate electricity for the communities there who had to rely on diesel fuel to power their generators. However, the RM12.5 million hybrid diesel-hydro-electric project failed to function due to low river water pressure. In February 2002, although every house in Bario had been wired and fitted with electricity meters, the much-awaited electricity supply lasted less than one hour. The government authorities tried in vain to revive the project, including enlisting the help of dam experts, but to no avail.

In 2009, the State Public Utilities Ministry through the state cabinet decided that hybrid solar-wind power was the best option for the highlands, as they had plenty of sunshine and wind for most of the year. The project, the first of its kind in the state, combined solar and wind energy to generate power for use in the mountainous region on the Sarawak-Kalimantan border. Following a technical study that suggested the construction of 12 wind turbines, only four were erected, in locations unsuitable for wind technology, leading to yet another failed attempt at electrification.

The unreliability and high cost associated with diesel generators forced the residents of Bario to continue experimenting with renewable technologies. In 2007, using the infrastructure housing the failed mini-hydro project, the local community enlisted the help of a non-governmental organization (NGO) called Partners of Community Organisation (PACOS) to install a micro-hydro turbine. PACOS had also assisted the community in sourcing a Small Grants Programme of the Global Environment Fund (GEF) to fund the RM200,000 project. This added to the community's own efforts to collect money among themselves. As a result, 57 households in the

¹¹ Many of the inhabitants of the island of Borneo (now Kalimantan, Indonesia, and the states of Sarawak and Sabah, Malaysia), the Dayak, live traditionally in buildings known as longhouses, which are usually built on stilts and divided into a public area along one side and a row of private living quarters along the other.

¹² The population is aged mainly between 31–60 (72.9 per cent), with an approximate 83 per cent in the actively working group age. The Bario community consists mainly of farmers (over 60 per cent), planting both wet and hill paddy. The mean monthly income of a household in Bario is RM597.

Bario Asal village are now connected to 24-hour electricity generation from a renewable source, and other longhouses are using smaller capacity micro-hydro turbines to meet their electricity demand. In addition, solar photovoltaic panels are currently used as an electricity source by a number of government offices and community longhouses. The hybrid solar photovoltaic application is also providing clean and sustainable energy through the E-Bario project, an ICT centre that has won the community many international accolades. However, one of the challenges of using photovoltaic panels includes its vulnerability to cloud and haze problems.

An example of a successful community-based renewable energy application can also be found in the village of Long Lawen, which is another remote settlement near Belaga, Sarawak (Green Empowerment and Richards 2004). The Kenyah Badang community is one that refused to be resettled to accommodate the Bakun Hydroelectric Project. Since 2002, the community has used a functional 10 kilowatts micro-hydro system for its energy source, supplying electricity to more than 70 households. This green energy source also provides electricity to a communal saw mill, an icehouse and a rice mill. Over the years, the facility had displaced 56 diesel- and gasoline-powered generators that consumed about 15,000 litres of diesel per year. According to the study by Sovacool and Valentine (2011), local community members had managed to save RM110,000 (\$35,700) a year by not having to buy diesel at a nearby timber camp. This saving, which amounts to \$500 per household, is significant when one considers that the average annual income in this region is less than \$2,000 per year. Thus, there is evidence that this local economy directly benefits from the provision of such renewable energy services.

Women's empowerment through waste-to-wealth initiatives

In recent years, there has been much discussion about the potential for creating wealth from waste in a green economy. In Tuba Island (in the state of Kedah), a group of rural women is implementing the 3Rs concept (Reuse, Reduce and Recycle) in producing traditional handicrafts such as baskets, bags and souvenirs from recycled newspapers. Although currently operating at a small scale, the activity has contributed to both additional income and empowerment for the women involved.

The role of women in Malaysia's development has significantly intensified since 1970. This is shown in terms of participation in the labour force, overall university enrolment and high-level decision-making processes (United Nations Country Team 2011). According to the *Economic and Social Survey of Asia and the Pacific 2007*, Malaysia outranks several countries in terms of gender equality, including Japan, the Republic of Korea and Turkey (UNDP 2005). Statistics from the Ministry of Women, Family and Community Development reveal that the participation rate of women in the national workforce has increased to 47 per cent over the past 30 years. The commitment of the Malaysian government toward empowering women in economic development was demonstrated by the increase in the annual budget for women's development from RM1.8 million (\$0.5 million) in 2001 to RM30.5 million (\$8.6 million) in 2005.

The above notwithstanding, income inequality can still affect women in Malaysia. Tuba Island is one of three islands near Langkawi Island that is inhabited by people. It is relatively remote compared to other settlements in the state, requiring a 20-minute journey by boat from Langkawi (the islands' economic centre). Tuba Island consists of five villages with approximately 3,000 people. The majority of islanders depend on fishing activities to generate income and sustain their livelihoods; other economic activities include tourism (such as boat services, tourist guides and homestay programmes), subsistence agriculture, small enterprises (such as food processing) and arts and handicrafts. Poverty is a major social problem in Tuba Island: in 2009, the incidence of poverty was 69.2 per cent, higher than the average for the state of Kedah (13.5 percent). The total mean household income is RM609.91 per month, whereas the figure for the state of Kedah is RM2,667 (Halim et al. 2011).

Over the generations, women in Tuba Island have traditionally been involved in informal economic activities as a means of generating additional sources of household income. These

activities have been carried out in their individual capacity and on a small-scale basis, but government agencies as well as private companies have also been involved in many ways to train and finance these activities. However, some of the activities could not be sustained due to financial and marketing problems, lack of knowledge about the business, inconsistency in production and inadequate project management skills.

KEDA plays a major role in implementing livelihood programmes in Tuba Island. Their entrepreneurship programme about making handicrafts targets women in particular. Interestingly, this project is organized by a small group of poor single mothers in the form of a cooperative called *Pertubuhan Ibu-ibu Tunggal* (Single Mother Association/SMA), which is headed by Ropian Musa. SMA produces handicrafts such as baskets, bags, pencil boxes and souvenirs. From a green economy point of view, the uniqueness of these products is that they all utilize recycled newspapers. Old newspapers are altered through cutting, shaping, folding, rolling, waxing and colouring processes prior to weaving. The supply of old newspapers is obtained from the local community as well as from recycling operators. The cost of old newspapers is between 20–35 cents per kilogramme. However, wax is relatively expensive (RM24.00 for every 1.5 litres of wax), and this needs to be purchased from outside Tuba Island. Before the project started, all members of the SMA attended a two-day training course on making handicraft. The course was conducted by KEDA in collaboration with the Department of Community Welfare of the state of Kedah. More than 20 single mothers have attended the training, which was conducted at Ropian Musa's house. At the beginning of the project, all attendees practised their skills in producing handicrafts. However, only four of them continue the activity on a sustainable basis. The remaining 16 said they found the activity time consuming, not interesting and not profitable. According to Ropian Musa, the lack of commitment and interest among single mothers to improve their livelihoods and economic conditions has contributed to the poor response.

Although lacking participation, SMA's activities received overwhelming support from private and public sectors alike. The production of handicrafts takes place at a workshop that is built and funded by KEDA. The workshop was also helped with its electricity connection by Tenaga Nasional Berhad (TNB, the country's main power provider) and the CIMB Group (a major commercial bank). This workshop is also used to produce traditional Malay cakes (*Kuih Baulu* and *Putu Kacang*), and banana and tapioca chips. To date, the handicraft produced by SMA have received an encouraging demand from both local and international tourists as well as from corporate firms. The demand for handicrafts increases during school holidays, especially in November and December, and for special occasions such as weddings, thanksgiving ceremonies and corporate events. These products are also marketed to resorts and hotels in Langkawi and Penang. In addition, other relevant government agencies are also playing an important role in supporting SMA in marketing their products. Occasionally, the demand for handicraft products exceeds SMA's production capacity. An additional supply is obtained from individual entrepreneurs on the island who also produce handicrafts. Income generated from this activity ranges from RM250 to RM450, depending on the demand. Furthermore, members of the SMA are occasionally invited by tourism agencies to demonstrate the art of making handicrafts.

The case exemplified here shows the feasibility of generating income from waste for a disadvantaged group in a poor society. The project design, however, has to be improved to ensure increased participation of women's groups. If concerted efforts by various players are further amplified, the experience in Tuba Island could be scaled up to turn a cottage industry into a financially feasible and environmentally sustainable endeavour.

Preconditions for a Fairer Green Economy

Social justice is not a given benefit in the transition to a green economy, as the case studies above demonstrate. In other words, focusing on green growth does not automatically lead a

community to sustainability pathways. Similarly, pro-poor investment alone cannot guarantee the diffusion of green projects that lead to positive socioeconomic development outcomes. As demonstrated above, challenges arising from a green economy and responses to it vary between people and places based on their own peculiar vulnerability. Ideally, a fair green economy is underpinned by a Rawlsian social contract that requires a strong institutional base to ensure equal distribution of green goods and services, but also guided by Sen's idea of justice with a focus on human development and freedom (see Rawls 1999; Sen 2008). The following section explores the main features of greening in the three case studies, including its form and extent. Conceptually, a socially just transition to a low carbon economy and society may be considered through the lens of distributional and procedural justice. The former considers the different effects of policy or practice responding to greening across groups of people and the places they belong to. The latter—procedural justice—considers questions of governance, voice and participation within decision making. In both, there are five issues of equity or fairness relating to processes and outcomes.

Urban bias in green economy interventions

The macroeconomic focus associated with the green turn concept encourages policy designs with an urban bias. As discussed earlier, most of the post-2009 green economy initiatives in Malaysia have industries in the urban centres as their target. In this regard, other than relying on trickle-down effects, the rural poor do not stand to benefit directly from the green economy paradigm. Employment opportunities for the poor are restricted if green industries are located mainly in urban centres. Moreover, most of the low-skilled jobs in Malaysia's urban-based manufacturing sector are now taken up by foreign workers. In some instances, greening decisions may incur financial burdens for the disadvantaged rural poor, as had occurred when the Malaysian government banned the use of incandescent bulbs to promote energy-saving compact fluorescent lights (which cost 15 times more than incandescent bulbs). There is clearly a need to fashion a bundle of instruments that could mainstream green economy in the rural sector where poverty is still a major challenge.

Policy implementation and coordination

The implementation of the greening agenda is beset by the silo effect, with policy integration made difficult for the following reasons. First, green technology is designed as a sector in the current government machinery. As a result, its reach is limited by narrow government mandates. Also, the Ministry of Energy, Green Technology, and Water—which, as a new ministry, has a junior status in the hierarchy of government—may be one of the constraining factors in mainstreaming the green economy. Second, rural development involves a number of agencies from many ministries, thus leading to several agencies undertaking the planning and implementation of programmes and handling the same target groups. This results in redundancies and turf wars. Third, the novelty of green economy invites sporadic interventions, both from private and public sectors. To circumvent these challenges, governments have to modify the behaviour of actors involved in policy implementation. A possible way forward is to establish platforms for interagency and multistakeholder consultations which should be adequately resourced. As evident in the three case studies, positive interactions between both formal and informal institutions are a success factor in programme implementation (examples are: KEDA and the local cooperative in the case of SRI; NGO, local community leadership, and UNDP in the case of renewable energy; and SMA, KEDA and commercial banks in the case of the waste initiative). There is no shortcut for a better policy design on green economy than to undertake a study to explore functional connections that match policy instruments to goals, policy problems, social impact and organizations.

Problem framing and scaling of responses

The importance of understanding a local context for policy intervention cannot be overstated. Consistent failures of well-meaning projects, for instance in the repeated efforts to adopt renewable technologies in Bario, present a sobering case. The classic problem of “tarmac” bias

happened when engineers and bureaucrats did not venture, or spend adequate time, in remote areas of Bario to frame the problem and understand the actions needed for energy provision. For instance, measurements for the volume and flow of river water should have been recorded for both low and high seasons, before engineering solutions were offered to the building contractor in charge. The failure to do so had cost the government a heavy price of RM12.5 million.

More constructively, the success of locally adapted solar and micro-hydro technologies, as seen in Bario and Long Lawen, points to the potential gains from spending adequate resources to scale up appropriate solutions for the communities. The lessons learned should then be replicated in comparable localities. Indeed, ministries and donors need to move away from technical fixes toward holistic approaches and sustainable solutions.

Securing livelihoods through income-generation activities

Between independence (1957) and the 1980s, the Malaysian government adopted pro-growth programmes to develop rural communities in which the economic component had been accorded main priority. Land development schemes were successfully used as a policy instrument to help the poor escape the poverty trap and to push development to less developed states (Hamzah 1992). Correspondingly, many new land development agencies were set up, including the Federal Land Development Authority (FELDA) and the Federal Land Consolidation and Rehabilitation Authority (FELCRA), to govern the related agricultural resources and the well-being of the settlers. The socioeconomic benefits of these land development schemes in alleviating poverty are well recorded and applauded. However, inadequate consideration of environmental aspects resulted in the rise of environmental crises such as deforestation, land degradation, water pollution and loss of biodiversity.

In response to these crises, government agencies adopted a more integrated and holistic approach in implementing rural livelihood programmes. These activities are listed in table 2, where green activities are shown to incorporate economic, social and environmental components. The case studies of SRI and SMA presented in this paper are consistent with the greening initiative. Focusing on a “real green revolution” presents a shift in Malaysia’s process of greening, albeit on a small scale. Unlike the greening of industrial-scale agriculture (for example, the palm oil industry) that has been ongoing since the 1970s, SRI greening broadens the base for justice by benefiting small farmers. Promotion of sustainable practices has also offered smallholders a premium price for their products.

Other than agriculture, there are many opportunities with a potential for greening rural livelihoods. The case of Tuba Island—a low-income area—focuses on craft-making from renewable sources. The commendable aspect in this case is that the project considers the whole supply chain in designing its policy intervention, which has improved the livelihoods of those involved. With better resources and coordination, the economic strategies of Tuba Island and Sik should be scaled up and replicated elsewhere as an example of encouraging economic growth from pro-poor and pro-disadvantaged investments.

Mainstreaming participatory learning

The choice a society makes for any renewable technology often involves decisions that have high stakes and a high degree of uncertainty. Therefore a democratic process that factors in the communities’ voice should be put in place to enable procedural justice in its selection. On one hand, the government’s decision to develop the Bakun Hydropower Project promises economic development for Sarawak, but on the other, it also leads to ecological scarcity and causes displacement of indigenous peoples. Had a genuine democratic process been put in place, the resentments felt among the resettled communities might have been less widespread than they currently are.

The learning process should by no means be a one-way communication. What the communities consider best for their livelihoods may turn out to be a bad choice for the environment. As seen in Bario, the fuel subsidy granted to the community by government has led to greater pollution, a rise in the number of vehicles and a higher use of diesel to power the generators. This, in turn, has reduced the incentive for the community to switch to renewable solutions.

As a precondition to establishing a participatory process on greening local economies, the baseline conditions need to be well understood before strategizing community involvement. Donors and project developers must understand the behaviour of target groups at the micro level. There is a need to recognize the local power structure and actors involved in order to ensure distributional and procedural justice when designing technological interventions. In Bario the community realized that its technological choice was in its interest, and gained from its investment in mini-hydro technology. One contributing factor for this enhanced capacity of local institutions was the catalytic role played by outside agents, such as PACOS in Bario and KEDA in Kedah. These project partners—from civil society and the state—became important agents in mainstreaming high-technology practices based on mutual learning.

Conclusion

The green economy debate brings together questions of technology, economics, politics and morality. It resurrects the deeper and more challenging shift toward sustainability, although only partially since this would require the convergence of social, environmental and economic goals. As green economy is too vague a term to describe social policy changes that need to be made, the paper proposes that seeking growth from environmental investment targeting poor communities should be the key component in shifting to a green economy. We have sought to understand what a socially just transition to a low carbon economy or society might look like and core interventions required to achieve this. This is seen in the context of localism, which also recognize that potential levers for change may lie at the international level. Five preconditions have been identified. However, they are tentative at best. This is inevitable, given the fact that the so-called green goal in Malaysia is still embryonic. The country's response to integrated greening is at most only two years old, whereas the analysis of policy development in the policy change literature would at best require at least 20–30 years of change. Because of its novelty, it is evident that, at the time of writing, green policies are still tinkering at the margins of economic policy and broader public policy. It seems that most beneficiaries of greening are still unaware of their technological or procedural choices in the context of a global green new deal. The case of Malaysia plausibly reflects the general trends seen in developing (and developed) countries, whereby the social aspects of green economy are not factored in prominently in green economy's problem definition. Be that as it may, it is incumbent upon Malaysia to enhance the five conditions identified in order to move beyond a sole focus on quantitative growth.

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