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**Social Aspects of the Green Economy
Goal in Malaysia:**
*Studies of Agriculture, Renewable Energy,
and Waste Initiatives*

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Abstract

A green economy demands a sharp reduction in carbon intensity in order to revitalize the ailing world economy. Following the global trend, the Malaysian government has in 2009 established the basic architecture for green economy by incorporating the green technology portfolio into a newly established Ministry of Energy, Green Technology and Water followed by a suite of interventionist policy instruments. However, Malaysia's approach begs the question of whether the full range of social, economic and environmental goals is considered in its policy objectives. The central thesis of the paper is that a green economy needs also to be a fair economy. Fairness refers to combining formal institutions with informal ones, while seeking growth from pro-poor environmental investments. To explore the reconciliation between the three sustainable development pillars, the paper examines three case studies namely agriculture, renewable energy and waste management, in Malaysia. These cases illustrate the engagement of communities in Malaysia toward a green economy, and the contribution of the three sectors in meeting social policy objectives. The paper concludes by arguing that a transition to a green economy requires more than a mere tinkering with the economy. Indeed this must include a credible reform of social institutions to deal with the underlying biophysical conditions.

Introduction

Green economy is the new buzzword of the sustainability goal. Moving away from the 'mystic reverence for nature' which had empowered earlier conservation and sustainability movements (Giddens 2009), the green economy/growth model is triggered by concerns over climate change. 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, it seems desirable to increase 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 propagate industrial development and urbanization which is low-emission. However, in pursuing the 'greening of catch-up growth' (United Nations 2009), it is important to ask 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 green economy (growth) alone. 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. Two related principles are especially relevant here. First, because sustainable development is about inclusive action, dependence on formal institutions alone might not lead to desirable improvements in livelihood security, poverty eradication, and other distributional objectives. Policymaking to promote a green economy requires a systems approach embedded into and promoted by the 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.

As an upper middle income country, Malaysia aims to not only to graduate into the high income category in the short term (by 2015), but also strengthening its economic foundation to shift into a new period of low carbon green development (Hezri & Dovers 2011). The National Green Technology Policy was launched in 2009 followed by suites of other policy instruments. Nevertheless, the haste with which the policy response on green economy was assembled begs the question of whether the Malaysian government is considering the full range of social, economic and environmental goals as it powers towards its sustainable policy objectives.

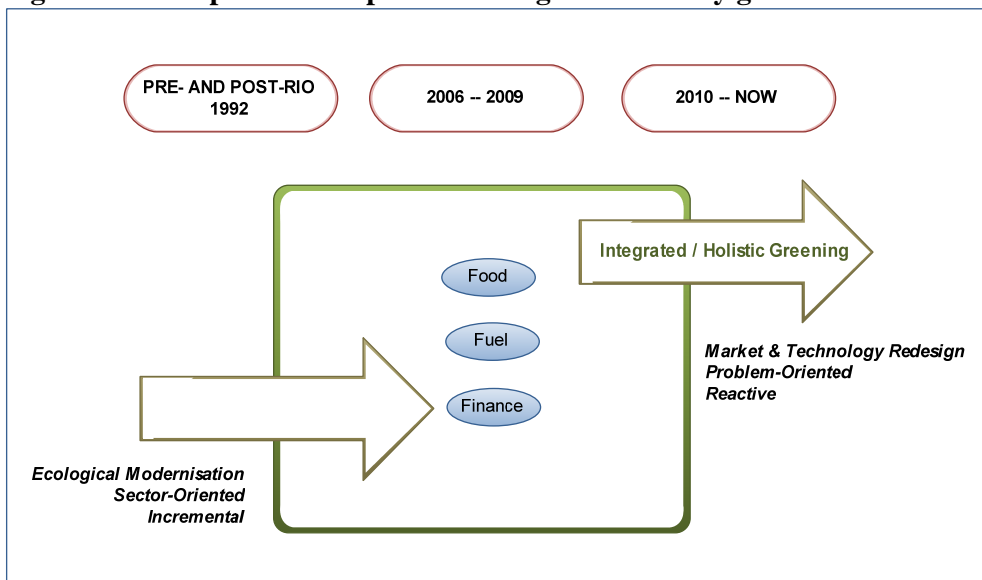
The paper proceeds in four steps. The first section reviews the meaning of green economy as defined by international institutions. Next, the second section analyzes what underpins Malaysia's national green economy framework. The subsequent segment presents three case studies. Interwoven in these studies is a survey of embedded greening in a sub-national context, particularly in Malaysia's rural frontier. The fourth section reflects on the implications of greening seen from six preconditions for social justice and sustainability. The papers concludes by arguing that a transition to a green economy in Malaysia demands beyond a mere tinkering with the economy. Indeed a green economy must include a credible reform of social institutions to deal with the underlying biophysical realities in the country and globally.

The elusive social dimension of green economy

The scale of industrial production has increased tremendously in the past decades. There is evidence that industrialization has tempered with the natural base of the Earth. Connected with the ‘century of the environment’ (Lubchenco 1998), the collective action and politics of environmentalism argues that human society is currently under threat from the global environmental deterioration. If the scale is to be reversed, or pattern of production to be changed, then ‘greening’ the economy is a requisite. In other word, a sustainable economy needs an industrial revolution where ‘greening’ is the focus, as much as Fordism was the basis for the first Industrial Revolution (Milani 2000).

The debate on a green economy is by no means a new intellectual trend. Arguably, ‘piece-meal greening’ has started way before the Earth Summit meeting was convened 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, 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 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 merely in dribs and drabs decoupling with only little policy integration happening between sectors. Market fundamentalism is still the guiding economic model pursued which is based on a capitalist economy. Although a welcome, a piece-meal greening scores only slightly better than a business-as-usual scenario on the scale of institutional change for sustainable development.

Figure 1: Conceptual development of the green economy goal



The contemporary language of green economy holds more promises. The ‘integrated- or holistic-greening is largely a reaction to the triple F crises – fuel, food, and financial – which struck the globe from 2006 to 2009. If anything these crises exposed the weaknesses of our

capitalist economy. The fossil fuel price hike in 2008 coupled with the growing anthropogenic evidence of climate change had rekindled strategic interests to develop renewable energy sources and energy efficient technologies. Plus, in responding to the 2007-09 global recession, some G20 countries had balanced their need to boost aggregate demand and growth with targeted expansionary policies incorporating ‘green fiscal stimulus’ amounting to about US\$522 billion (Barbier 2011). Fundamentally, such a response follows the Keynesian logic of pumping money into the economy during a recession. This economic policy strategy is widely known as the Global Green New Deal (Barbier 2010). The strategy therefore aims to develop a ‘win-win’ strategy for the economy and the environment, devoted as it were to find economic opportunities in the response to climate change and 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). 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, OECD outlined the 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, encourage investments in green technologies, eliminate fossil fuel subsidies, and introduce 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 this contemporary concept of a green economy has to offer, but also broadened the ‘green’ problem framing to encompass social issues. The UNEP report *Towards a Green Economy* (UNEP 2011) 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 tries to make 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).

The UNEP economist Fulai Sheng argues that green ‘growth’ does not refer to the standard definition of output growth; but rather, it embraces the broader notion of economic progress. An international formulation that is closest to the spirit of ‘qualitative growth’ is seen in the work of the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP)¹. Unimpressed with the remarkable poverty reduction record in the

¹ In March 2005, 52 Governments and other stakeholders from Asia and the Pacific convened in Seoul at 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 as well as environmental sustainability vis-à-vis environmental performance. UNESCAP identified four pillars for the transition to a greener growth namely: eco-tax reform; sustainable infrastructure; the greening of business; and sustainable consumption (UNESCAP 2008). Indeed, eco-efficiency is a key concept in UNESCAP's approach to the green growth goal.

From the cursory review above, there is no single concept of integrated/comprehensive greening, be they from 'green growth', and 'green economy' or 'global green new deal' formulations. However, there is a common approach to defining problems and solutions to what Bina and La Camera (2011: 2311) described 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'.

Such an instrumental perspective advocates fundamental structural change through investments (both public and private) in innovation, technology, infrastructure and institutions that economies shift their course. Therefore, at its most basic, the international formulations of green economy require the re-designing of market 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 again our choice of alternative pathways of development, it resurrects only partially the broader vision of sustainability (Jackson 2011)². We say partially, as the recent investments and applications for the 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. The difficult questions are 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 2006-09 had caused a total of 44,000 net jobs losses (Cai et al. in press). In summary, while a policy window had opened in recent years and elevated the discourse on green economy, our articulation on its implications for social justice, and specifically for people or places facing disadvantage, is still at an early stage.

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 fora.

² 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 United Kingdom in its publication *Prosperity without Growth? The Transition to a Sustainable Economy*.

Malaysia's green economy framework

Malaysia belongs to the club of upper-middle-income countries³. In the Human Development Index assessment, Malaysia is grouped under the high human development band. Since the past 50 years, the country had shown remarkable economic and social progress. Malaysia has long achieved the Millennium Development Goals primary objective of halving poverty (United Nations Country Team 2011). The aggregate figure fell from 17 per cent in 1990 to less than 4 per cent in 2009. In fact, Malaysia has achieved most of the MDG targets at aggregate level. Nevertheless, the picture is different at sub-national level whereby income inequality remains a policy challenge regionally.

On the environmental front, the process of greening Malaysia's economy had started as early as in the 1970s (Hezri and Hasan 2006). The piece-meal greening was first shaped during 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 Sani 1997:21). The *Environmental Quality Act 1974* was amended a few times to calibrate against the changing challenges in regulating pollution coming from agro-based and manufacturing industries. On energy development, Malaysia's policy framework evolved from a sole focus on fossil fuel supply in the 1970s to a diversification of supply sources which include renewable energy by the year 2000. The 2001 Fifth Fuel Policy launched the Small Renewable Energy Power (SREP) Programme which attempted to install 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, in Press). In yet another attempt at piece-meal greening, The Rural and Regional Development Ministry had recently launched its *New Rural Economic Model* to generate high income rural employment that ensures sustainable development (KKLW 2011).

Consistent with international trends, Malaysia also introduced the systemic architecture to respond to the green economy agenda. This is a logical response to Malaysia's per capita carbon dioxide emissions from fuel combustion which 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. Indeed, Malaysia had consistently ranked poorly in the global ranking of carbon emitters (number 157 out of 224 countries) undertaken by the International Energy Agency. A hotchpotch of policy statements and instruments were introduced since 2009 to loosely constitute Malaysia's green economy 'goal' (see Shing and Tick 2011):

- i. *Introduction of a ministerial portfolio in the Federal administration* – 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 Ministry of Energy, Water, and Communications);
- ii. *Formulation of a national policy statement on green technology* – The central role of green technology was emphasized by the release of the National Green Technology

³ 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 US\$ 8,914. It has a population of 27.6 million and a total land area of 330,083 square kilometres.

Policy overseeing ‘greening’ in four sectors, namely energy, buildings, water and waste management and transportation;

- iii. *Establishment of an implementing agency* – 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;
- iv. *Formation of an inter-ministerial council as a decision-making body on green technology* – To lead the green technology initiatives in Malaysia, the Prime Minister established and chaired the Green Technology Council with senior memberships from government and public sectors. The Council was later merged with the Climate Change Council;
- v. *Registration of a green building association* – Malaysia Green Building Confederation (MGBC) was established in 2009 to support the government’s objective of promoting sustainable built environment. The Green Building Index had also been launched to enable green grading and certification of Malaysian buildings;
- vi. *Initiation of a green financing scheme* – In 2010, a soft loan incentive, the Green Technology Financing Scheme was launched to create a policy environment that will attract innovators and users of green technology. It includes a US\$470 million soft loan to companies (technology developers and technology users) in which government would subsidize 2 per cent of the interest rate;
- vii. *Launching of green townships framework* - Green Township Framework would outline comprehensive guidelines for new and existing townships in the country to go green by incorporating environmental friendly technologies. Putrajaya and Cyberjaya have been picked to spearhead the project and to become models of green township in the country;
- viii. *Introduction of green procurement in all government agencies* - Green procurement manual, 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; and
- ix. *Formulation of legislation to promote renewable energy* – 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).

Judging from above, green technology policy is a misnomer because responses formulated point to ‘green growth’ rather than technology alone. If the tempo of change is an indicator of political will, the speed with which the government formulated its green economy goal is a sure indicator of commitment. The policy was launched within 100 days of the ministry being established, compared with a six-year gestation period for the National Policy on the Environment, for example. The formulation of instruments highlighted above together formed what the Prime Minister called green economy’s ‘adoption edge’. The next step, the ‘green production edge’, involves the goal of increasing the GDP contribution from green business from 2 per cent currently to 8 per cent by 2020. This would involve the creation of

about 500,000 green jobs in sectors by 2020 from 95,000 green jobs in 2009. If implemented successfully, Malaysia's macro-economy 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. In summary, Malaysia's solutions to green economy follow UNEP's and OECD's framing. That is, enabling mechanisms should be established at the national level involving incentives, legislation, et cetera. Be that as it may, what are benefits from a greener economy that will accrue to society members who are disadvantaged economically and geographically? The next section explores this conundrum.

Localising green economy

One of the two themes for the United Nations Conference on Sustainable Development in Rio de Janeiro next year 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 sub-national level. The rural areas, whereby around 35 per cent of Malaysians live, remain the major site for poverty incidence⁴. In a comparative term, the rural communities benefit least from Malaysia's economic progress than its urban counterpart. As evident 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 socio-economic development challenges in Malaysia's rural hinterland to the national- and planetary-scale green economy goal? We argue that this is an important convergence to be made because development and conservation needs, as well as most human experience and meaning are still locally-based. An added nuance is found in the Malaysian rural context whereby segments of its population are still marginalized from mainstream development. By examining three case studies namely agriculture, renewable energy and waste management, this section problematizes the nature and extent of 'greening' process in Malaysia. These cases serve to illustrate the engagement of communities in Malaysia toward a green economy, and the contribution of the three sectors in meetings social policy objectives such as income generation and distributional social justice.

Green agriculture through System of Rice Intensification

Rice is a staple food for Malaysians and it provides about 30 percent of their daily calorie intake. Rice economic activities have always been associated with the 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 livelihood of the rice growers. Among the instruments used include input subsidies, the construction of irrigation and drainage system, price supports and extension services. Thus, this sector has been referred as a highly protected sector.

Since 1970s, Malaysia has adopted the Green Revolution (GR) package 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 livelihood of the rice growers. Yield rose from 2.6 tonne per hectare in early 1970s to 3.5 tonne per hectare in 2008. At the same time, the

⁴ For comparison with Malaysia, the percentage of rural population of total in 2001 was 25 per cent for Mexico, 55 per cent for Nigeria, 58 per cent for Indonesia, and 72 per cent for India.

incidence of poverty among the rice growers had 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 which were equipped with modern infrastructures such as irrigation and drainage systems, farm roads, milling facilities and farm mechanizations. Whereas, areas without these infrastructures recorded low yields. For example, irrigated areas recorded yield as high as 6.2 tonne per hectare compared to 2.5- 3 tonne per hectare in non-irrigated areas (MADA, 2006). 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 analyzed by Ishak and Jomo (1983). More sharply, critics argue that, although productivity is boosted, GR did not conduce to sustainability of natural resources leading to environmental problems such as land and soil degradation, pesticide pollution, and loss of biological diversity. These shortcomings led to the proposal for 'a truly green revolution in agriculture' – one that addresses both environmental sustainability and livelihood of farmers (United Nations 2011).

In Malaysia, one example towards the 'new greening' trend is seen in the State of Kedah, which is a major rice granary of Malaysia equipped with modern irrigation and drainage systems. Its total planted area is 192,776 hectare with double cropping successfully practiced for decades (Malaysia, 1994). The cultivation of rice is the mainstay for the majority of Kedah's 1.9 million agrarian populations. Irrigated rice is the major farming system which covers 96,558 hectares and 55,130 farmers (MADA, 2009). Rice is also being produced by rain-fed system with the total area of about 38,000 hectares and manned by 25,000 farmers. Resource-wise, water availability is a major problem in rain-fed system because it depends entirely on monsoon season for planting rice. Apart from that, 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 even in worst cases some of the lands were abandoned.

To reverse this trend, the Kedah Regional Development Authority (KEDA) has since 2010 started to rehabilitate idle lands chiefly the ex-paddy lands. In particular, the management unit of KEDA has embarked on the System of Rice Intensification (SRI) as one of the potential economic activities. Kampung (village) Lintang in the Sik District has been chosen to implement the SRI's project. The main objective of this project is to eradicate poverty among the local people through the sustainable rice farming practices. Besides KEDA, this project has also received supports from Department of Agriculture (of the state of Kedah), Malaysian Agricultural Research and Development Institute (MARDI), National Co-operative Commission, and the Ministry of Domestic Trade, Co-operatives and Consumerism. In the national policy framework, the project is not recognized as a green economy activity as it does not fall under the purview of Ministry of Energy, Green Technology and Water.

The pilot project was initiated in October 2010 involving eighteen farmers. Currently the number of farmers involved has increased to twenty-five. In terms of education level, majority of them have attained primary school certificate. The involvement of farmers was based on three schemes which are: (1) full-time farmer with owned-land; (2) part-time farmer with owned-land; and (3) employed farmers. Farmers in scheme 1 and 2 have agreed to lease their lands for 15 years for implementing SRI. To date, only 18 farmers have registered under the scheme 1. The total area is about 25 acres involving land parcels which had been

abandoned for twenty-five years. The activity is managed in the form of co-operative. In terms of payment, the farmers have been paid according to their type of involvements. On average, they have received RM250- RM500 per month.

Before the commencement of SRI projects, farmers attended a two-week training course in Nagrak, Sungkabumi Indonesia where they were trained and exposed to SRI practices including formulating organic fertilizers and pesticides. Organic manuring is an essential activity in SRI. Nutrients from organic manures improve soil structure, allowing more air into the soil and improve the soil drainage condition. It also helps the sandy soil holds more water and does not drain so quickly. As the soil conditions in Kampung Lintang is poor in nutrient contents, the co-operative decided to apply more organic matters (fertilizers) in order to enhance the fertility of the soils. Following the training, farmers in Kampung Lintang then 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 cabin for fermentation process. The process takes three to four weeks before it can be applied to rice plants. In the mean time, farmers are also using environmentally-friendly methods and their indigenous knowledge to combat pest problems in rice fields.

The area has a serious problem in water supply due to the absence of drainage and irrigation system. Hence, the co-operative utilized a natural river adjacent to the project area as the main source for water supply. PVC pipes are used to channel water to their farms. The same source of water is also used for households needs due to the absence of public water supply system. In terms of farm mechanization, the conventional rice machines are modified to be appropriately used for SRI.

The implementation of SRI's project in Kampung Lintang, Sik District has shown the commitment of poor community towards the green economy initiatives. Besides that, SRI encourages the poor community to actively participate in poverty eradication programs which 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 kilo. Currently rice cultivated using SRI technique is receiving good demand from hospitals and organic food suppliers. According to the project manager, the current production is not enough to meet the growing demand for the product. The SRI pilot project is a showcase how an economic activity alleviates poverty while simultaneously preserving the environment.

Rural electrification using renewable energy

Malaysia currently boasts one of the highest electrification rates in Southeast Asia, which is 98 per cent. Even the rural and sub-urban areas in Malaysia are 95 per cent connected by the electricity grid and received adequate supply (United Nations Development Programme 2007). The success of electrification owes to the Malaysian government's continuous effort to allocate large funds to provide electrification service in the rural areas. Currently there are only about 10,000 to 20,000 households that are still not served by energy supply. Malaysia aims to achieve total electrification by 2020.

However, rural energy provision is more challenging for the most remote and inaccessible parts of Malaysia. For the 2.4 million population of Sarawak in East Malaysia, the penetration 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 and grid-based electrification through the construction of large-scale hydroelectric power project. The strategic aim is not just to address energy accessibility in the remote areas, but also to support the state's economic development (Sovacool and Valentine 2011). The flagship initiative is the construction of the 2400 megawatt (MW) Bakun Hydroelectric Project which began in the 1980s. Although a 'green' choice from a strictly technology perspective, the Bakun project is a high capital or 'hard path' energy option which has been criticized by many as a socially and politically difficult policy decision to implement, apart from the inherent high cost constraint (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 development could help improve energy security and alleviate poverty in the rural areas. In recent years, Malaysia is actively venturing into alternative renewable energy sources for electrification. The complexity of rural electrification in the remote highland areas are exemplified below through case studies of Bario and Belaga in the State of Sarawak, both from social and economic perspectives.

Bario (meaning 'wind' in the local language) is located in the centre of the Kelabit Highlands in the Upper Baram, north east of Sarawak, Malaysia. It is home to about 6,000 people. The Bario town is little more than a collection of dirt roads and long houses surrounded by rice paddies, with about 1,000 residents, and a few shops and lodgings.⁵ 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. Earlier on, limited energy supply is provided through fuel wood and diesel generators. However, diesel fuel in Bario costs 6 times more than in the city, as the fuel has to be flown in from a city 200km away. In addition, it is well known that the hazards of diesel exhaust and 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 in 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 the mini hydro-electric project to generate electricity for the communities there who had to rely on diesel fuel to power their generators. However, the RM12.5million hybrid diesel-hydro-electric project failed to function due to low river water pressure. In February 2002, though every house in Bario had been wired up 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.

⁵ The population is mainly aged between 31-60 years old (72.9 per cent), with an approximate 83 per cent of the population in the actively working group age. The Bario community are mainly farmers (67.2 per cent) planting both wet and hill paddy. About 18.6 per cent of them are government servants, 10.7 per cent of them are small time business persons and about 1.4 per cent of the population work in the private sector. Nevertheless, most of these people are involved in farming on a part-time basis. The mean monthly income of a household in Bario is RM597.

In 2009 the State Public Utilities Ministry through the state Cabinet had decided that a hybrid solar-wind power was the best option for the highlands because the highlands have plenty of sunshine and wind for most of the year. The project, the first of its kind in the state, uses a combination of solar and wind energy to generate power for use in the 2,000m-high mountainous region at the Sarawak-Kalimantan border. Following a technical study that suggested the construction of twelve wind turbines, only four were erected in location unsuitable for wind technology, leading to yet another failed electrification attempt.

The unreliability and high cost associate with diesel generators forces the residents of Bario to continue experimenting with renewable technologies. Using the infrastructure housing the failed mini-hydro project, the local community in the year 2007 had enlisted the help of an NGO called PACOS to purchase and install the RM200, 000 micro-hydro turbine. As a result 57 households in the Bario Asal village are now connected to a 24-hours electricity generation from a renewable source. Other long-houses are also using smaller capacity micro-hydro turbines to meet their electricity demand. In addition, solar PV panels are currently used by a number of government offices and community long-houses as an electricity source. The hybrid solar PV application is also providing a clean and sustainable energy what is known as the E-Bario project, an ICT centre which has won the community many international accolades. However, one of the challenges of using PV panels includes its vulnerability to the cloud and the dense haze problems.

A showcase of a successful community-based renewable energy application may be found in the Long Lawen village located near Belaga, Sarawak (Green Empowerment and Richards 2004). The Kenyah Badang community of Long Lawen had actually earlier on refused to be resettled to accommodate the Bakun Hydroelectric Project. For their energy source since the year 2002, the community uses a functional 10 kW micro-hydro system, supplying electricity to more than 70 households. The community's micro-hydro unit has been used as power source in a rice mill in the turbine house to provide mechanical energy for husking and grinding. This green energy source also provides electricity to a communal saw mill and an icehouse. 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 RM 110,000 (US\$35,700) a year from not having to buy diesel at a nearby timber camp. This savings, which amounts to US\$500 per household, is significant when one considers that the average annual income in this region is likely less than US\$2000 per year. Thus, there is evidence that the local economy directly benefits from the provision of such energy services.

Women's' empowerment through waste- to-wealth initiative

Solid waste management is one of the key environmental problems confronting Malaysian municipalities (Ghazali and Siwar 2001). Population growth and the expansion of urban areas are the cause of increased solid waste generation. On average, Malaysians produce about 0.5-0.8 kg/person/day solid waste. Recently, the figure has escalated to 1.7 kg/person/day particularly in the cities. Generally, there are two methods to dispose solid waste - landfill and illegal dumping. Recycling activity is still very low with only 5 percent of wastes generated recycled (Hezri 2010). In recent years, there is much discussion in green economy about the potential of creating wealth from wastes. 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 handcrafts such as basket, bags and souvenirs. Besides gaining

additional income, the activity has also presented a significant contribution towards women empowerment.

The role of women in Malaysia's development has been significantly intensified since 1970. This is shown in terms of participation in the labour force, in overall university enrolments as well as in 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 such as Japan, Korea and Turkey in terms of gender equality (UN, 2005). Statistics from the Ministry of Women, Family and Community Development (MWFCD) reveal that the rate of women in national workforce is 47 per cent over past 30 years. The commitment of Malaysian government towards empowering the role of women in economic development was demonstrated by the increase of annual budget from RM1.8 million (USD 0.5 million) in 2001 to RM 30.5 million (US\$ 8.6 million) in 2005.

The above notwithstanding, income inequality may still affect the women group in Malaysia. Tuba Island is one of the three islands near Langkawi Island (located in the state of Kedah) 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) to the island. The Tuba island consists of five villages with approximately 3,000 people. Majority of the islanders depend on fishing activities to generate income and sustain their livelihoods. Other economic activities include tourism (e.g. boat service, tourist guide and homestay program), subsistence agriculture, small enterprises (e.g. food processing) and arts and handcrafts. Poverty is a major social problem in Tuba Island. The island recorded 69.2 percent in poverty incidence in year 2009 which is higher than the average in the State of Kedah which is about 13.5 percent. The total mean household income is RM 609.91 per month (Halim et al., 2011).

Over the generations, women in Tuba Island have been traditionally involved in informal economic activities as the means to generate additional sources of household's income. The activities were carried out in their individual capacity and on a small-scale basis. Government agencies as well as private companies have 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.

The Kedah Regional Development Authority (KEDA) plays a major role in implementing livelihood programs Tuba Island. Entrepreneurship is among the program which focuses on women as the target group in particular. Handicraft is one of the products which have been successfully generated by the women group. Interestingly, this project is organized by the poor single mothers in the form of co-operative under the name of Pertubuhan Ibu-ibu Tunggal (Single Mother Association- SMA). Currently four single mothers are actively involved in this group and headed by Mrs. Ropian Musa. SMA produces handicrafts such as baskets, bags, pencil boxes and souvenirs. From a green economy point-of-view, the main uniqueness of these products is that they all utilize recycled newspapers. Old newspapers are manually altered through cutting, shaping, folding, rolling, waxing and colouring processes prior to weaving. The supply of old newspapers is obtained from the local people as well as recycled operators. The cost of old newspapers is between 20–35 cents per kilogram. However, the price of wax is relatively expensive (RM24.00 for every 1.5 litre wax) and they need to be purchased from outside Tuba Island.

Before the project started, all members of SMA members attended a two-day training course on handicraft-making skills. The course was conducted by KEDA in collaboration with the Department of Community Welfare (the state of Kedah). More than 20 single mothers have attended the training and it was conducted at Ropian Musa's house. However, only four of them have applied this skill to produce the handicraft products. The remaining sixteen are not involved in the handicrafts production citing reasons such as the activity is time consuming, not interesting and less profitable. According to Ropian Musa, the lack of commitment and interest among the single mothers in improving their livelihood and economic conditions contributed to the poor response for this activity.

Although lacking participation, SMA's activities received overwhelming supports from private and public sectors alike. The production of handicrafts takes place at a workshop which is built and funded by KEDA. Besides KEDA, the workshop has also obtained assistance for their activities from Tenaga Nasional Berhad (TNB, the country's main power provider) for electricity connection and the CIMB Group (a major commercial bank). This workshop is also used to produce traditional Malay cakes (Kueh Baulu and Putu Kacang) as well as banana and tapioca chips. To date, the handicraft products produced by SMA received good demand from tourists, both local and international as well as corporate firms. The demand for handicrafts further increased during school holidays especially in November and December. Orders are also obtained for special occasions such as wedding and 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 to market their products. Occasionally, the demand for handicraft products exceeded the production capacity of the SMA. Hence, the additional supply is obtained from individual entrepreneurs on the island who are also producing handicrafts. Income generated from this activity ranges between 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. If the 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. In other words, focusing on green growth does not automatically lead a community to sustainability pathways. Similarly, a pro-poor investment alone cannot guarantee the diffusion of 'green' projects that can lead to positive socio-economic development outcomes. As demonstrated above, challenges arising from a green economy and responses to it vary from people or places based on their own peculiar vulnerability. In what follows, the section explores the main features of 'greening' in the three case studies, including their forms and extent. Conceptually, a socially just transition to a low carbon economy and society may be looked upon from 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 the questions of governance, voice and participation within decision-making. In both, there are six issues of equity or fairness, either relating to processes or outcomes.

Urban bias in the green economy interventions

The international flavour and macro-economic focus associated with the 'green turn' concept encourages 'urban bias' in the articulation of policies. As shown 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. In some instances, 'greening' decisions may incur financial burden for the disadvantaged rural poor, as in the case of Malaysian government banning the use of incandescent bulbs by 2012 to promote energy-saving compact fluorescent lights (CFL).

The institutional design for Malaysia's rural development ministry does not include an environmental portfolio. The main agency for rural development is yet to house a dedicated environmental division. In the Ministry's about to be released strategic plan, the environment is identified as one of the new sectors. Nonetheless, various echelons in the civil service responded to the idea with only a lukewarm reaction by avoiding recruitment into the new division.

Policy implementation and coordination

The implementation of the greening agenda are beset by the silo effect. Policy integration is made difficult for the following reasons. First, green technology is designed as a sector in the current government machinery. As a result, its broader reach is limited by its narrow legitimate mandates. Also, as a new ministry, its junior status in the hierarchy of government may be one of the constraining factors to mainstreaming the green economy. Second, rural development involves a number of agencies from many ministries. Thus, the planning and implementation of programmes are undertaken by many agencies. There are cases whereby the same target group is handled by many agencies at times to the effect of creating redundancies and turf wars. Third, the novelty of green economy invites sporadic interventions, both from private and public sectors. To circumvent these challenges, it is imperative that platforms for inter-agency and multi-stakeholders consultations are established and adequately resourced.

Problem-framing and scaling of responses in the course of greening

The importance of knowing 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 frame the problem and calibrate the needed actions 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 are offered to the building contractor in charge. The failure to do so had caused 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 gain in spending adequate resources to scale 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 towards holistic approaches and sustainable solutions.

Securing livelihood through income-generation activities

Since Independence (1957) until the 1980s, the Malaysian government adopted pro-growth programs to develop rural communities in which economic component have been accorded a main priority. Land development schemes were successfully used as a policy instrument to help the poor escaped the poverty trap. Correspondingly, many new land development agencies were set up including the Federal Land Development Authority (FELDA) and the Federal Land Consolidation Authority (FELCRA) to govern the related agricultural resources. However, inadequate consideration of environmental aspects had resulted in the rise of environmental crises such as deforestation, land degradation, water pollution and loss of biodiversity.

In response to the crises, the government agencies adopted the integrated and holistic approach in implementing the rural livelihood programs. The activities are listed in Table 1. Green activity is one of the initiatives that incorporate the economic, social and environmental components in tandem. The case studies of SRI and SMA presented in this paper are consistent with the ‘greening’ initiative. Focusing on ‘green revolution agriculture’ presents a shift in Malaysia’s process of greening. Unlike the greening the industrial-scale agriculture (for example the palm-oil industry) which has been going on since the 1970s, SRI greening broadens the base for justice by benefiting the small farmers. It does so by addressing the imbalance of focus between sub-sectors in the agricultural domain.

Other than agriculture, there are many opportunities for greening the sources of rural livelihood. The case in Langkawi focuses on craft-making from renewable sources. The commendable aspect is that the project proponent considers the whole supply-chain in designing the policy intervention. This is an exemplary economic strategy to adopt in a resource-poor region such as in Tuba Island.

Mainstreaming participatory learning

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

The learning process should by no means be a one way communication. What the communities consider as best for their livelihood 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 with increased number of vehicles and higher use of diesels to power the generators. This in turn reduces 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 recognize the anatomy of local power structure and the actors involved to ensure distributional and procedural justice when designing technological interventions. In Bario Asal, the community perceived self- interest in their technological choice and has gained from their investments on mini-hydro technology. One contributing

factor for this enhanced capacity of local institutions is the catalytic role played by outside agents, such as PACOS (an NGO) in Bario and KEDA (a government entity) in Kedah. These project partners became important agents in mainstreaming high-technology practices based on mutual learning.

Concluding remarks

The green economy debate brings together questions of technology, economics, politics and morality. Differently phrased, it resurrects the deeper and more challenging shift towards sustainability, although only partially. As ‘green economy’ is too vague a term to describe social policy that need to be made, the paper proposes that seeking growth from pro-poor and pro-disadvantaged environmental investment should be considered as the key attribute of a green economy. The article has sought to understand what a socially just transition to a low carbon economy or society might look like and core interventions required in achieving this. This is seen in the context of ‘localism’ although recognizing that potential levers for change may lie at international level. Five preconditions were identified based on cursory empirical appraisal. 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 analysis of policy development would best require at least 20-30 years of change. Because of its novelty, it is not evident if the ‘greening’ process is creating a new identity, what more an environmental citizenship based on greater environmental stewardship. What is in fact evident is that the current policies on green are still tinkering at the margin of economic policy and the broader public policy. It seems that most beneficiaries of ‘greening’ are unconscious of their technological or procedural choices in the context of global green new deal. Be that as it may, it is incumbent upon Malaysia to enhance the six preconditions identified in order to move beyond a parochial focus on quantitative growth, however green they may be.

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Table 1: Summary of Green Economy Initiatives by the Communities

Case studies	Objective	Mechanism	Significant to the community
<p><u>Agriculture</u></p> <ul style="list-style-type: none"> - Application of System of Rice Intensification (SRI) or Organic Rice. - Located in <i>Kampung Lintang Sik</i> District (the state of Kedah) Malaysia. - One of the poorest areas in the state of Kedah. - Involvement by poor rice growers (~25 registered members) 	<ul style="list-style-type: none"> - To alleviate poverty among the local people; - To promote an alternative practice in rice production; - To promote natural resources conservation particularly water resource and free of synthetic fertilizers and pesticides usage; - To empower community participation especially among the poor through cooperative groups. 	<ul style="list-style-type: none"> - 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 	<ul style="list-style-type: none"> - Economic benefit and opportunity for the locals realized - Premium price for rice ~ RM8.00-RM12.00 per kg - Served as a niche market especially for hospital needs and organic products. - Promote sustainable use of natural resources
<p><u>Waste management (Recycling)</u></p> <ul style="list-style-type: none"> - Located in Tuba Island of Langkawi. - Involve fishermen community which records high poverty incidence - Actively involved in making traditional handicrafts - Other activities are producing banana and tapioca chips. 	<ul style="list-style-type: none"> - To alleviate poverty among the local people; - To create economic activity to the poor people particularly the single mothers group. - To empower the women group 	<ul style="list-style-type: none"> - Started as an individual-based activity. - Managed by the Single Mothers Association (SMA) - Received financial assistance from private sectors (CIMB and <i>Tenaga Nasional Berhad</i>) 	<ul style="list-style-type: none"> - Raised monthly income of participants from RM350.00- RM900.00