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## A new framework for integrated climate finance and inclusive responses to sustainable development in Malaysia

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### ABSTRACT

With Malaysia's commitment to both mitigation and adaptation, the 21st Conference of Parties to the United Nations Framework Convention for Climate Change in Paris, 2015, will be both an opportunity to showcase best practices and a forum to promote international ownership of climate challenge before it becomes a catastrophe. Our experience with weather extremes is that the best time to intervene is at the risk level via prevention and preparedness, compared to any wait-and-see approach. As the Honourable Prime Minister of Malaysia, Dato' Sri Mohd Najib Abdul Razak, elaborated during the recent 11th Malaysia Plan presentation to the parliament, 'such an approach has to be seen as part of adopting green growth and increasing our commitment to long-term sustainability'. Malaysia is also aware that this requires policy support, technological interventions and financial commitment. It is for this reason the Malaysia's pledge at the Copenhagen COP-15 was to reduce its carbon emission by 40% from 2005 levels by 2020, subject to technology transfer and financial support by developed countries. Having achieved a 33% reduction in the last five years, Malaysia is convinced that it can reach the 40% target following an inclusive partnership framework for action.

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## 1. Introduction

Climate change is a problem with unique characteristics. It is global, long term and involves complex interactions between environment, economy, policy, institutions, society and technology. All climate-sensitive sectors of the economy such as agriculture, water, coast, health and infrastructure are projected to suffer adverse impacts, both at the national and global levels. This will have significant international and intergenerational implications in the context of broader societal goals for sustainable development.

The international political response to climate change began at the Rio Earth Summit in 1992, where the 'Rio Convention' included the adoption of the United Nations Framework Convention for Climate Change (UNFCCC), which set out a framework for action designed to stabilize atmospheric concentrations of greenhouse gases (GHGs) to avoid 'dangerous anthropogenic interference with the climate system'. The UNFCCC which now has a near-universal membership of 195 parties meet annually as Conference of Parties (COP). The 21st COP, for the first time in over 20 years of

UN negotiations, will target to achieve a legally binding and universal agreement on climate, with the aim of keeping global warming to 2 °C (Figueres 2015). COP-21 is also expected to decide on innovative ways to achieve this goal through both mitigation and adaptation to climate change and ways to mobilize technology and finance required to achieve timely results globally. The summit can be viewed as the last chance for the global community to meet the mandate countries agreed to back in 1992 – avoiding ‘dangerous human interference with the climate system’, the danger threshold of which has now been defined as global warming greater than 2 °C (IPCC 2014).

Given Malaysia’s vision for a fully developed economy by 2020, it has a unique opportunity to engage in enhanced climate action plan, promote green development and strive to achieve internationally agreed sustainable development goals (SDGs). Part of the technology required for this must be home grown and part made available through partnerships facilitated by the provisions of forthcoming climate and SDG agreements.

Our intention here is, therefore, to treat climate change within the whole context of sustainable development, and to explore the possibility of financing both challenges simultaneously within the scope of an integrated ‘framework’. At a time when the Addis Ababa Financing for Development (FFD 2015) agreement is considering consolidation of existing, new and emerging funding for development, and the possibility for substantial commitment for new climate financing to be identified at Paris 2015 and beyond, we wanted to see all these apparently diverse opportunities as part of a big picture through the lens of the unifying framework we have developed. As the schematics of figure 1 (see later) would suggest, we are much better off with an integrated approach to address climate change (CC) and sustainable development invoking multiple sources of finance comprising public, private, international multilateral and special funds, pooled together with budgetary allocations at



Figure 1. A conceptual framework for financing climate-proofed sustainable development.

the country level to deal with the double trouble of climatic disasters and the deteriorating prospects of SD pressures threatening human progress. Considered within our framework, there will be improved ownership of both sets of issues without having to push away one as someone else's responsibility (the climate change) while recognizing the other (SD) as a more pressing national problem. Not only funding, the framework would promote other resource use such as technology and human resource too. It is somewhat a similar situation that currently exists, and with additional input locally and from abroad, the prospects according to the framework are much better.

## 2. Background

The world meets in Paris to finalize a legally binding global agreement to tackle climate change challenge facing our generation and those who will follow us for the rest of this century, and beyond. Global climate finance will be a central part of the discussion to determine how best to mobilize the billions of dollars of funding that is needed for climate change mitigation and adaptation, especially in support of developing economies.

More than an environmental phenomenon, climate change creates a crisis for socio-economic development, which has historically been synonymous with high-carbon growth. It is essential for the world economy to make a rapid transition to a new, low-carbon style of growth. Developed countries might be expected to pay a large share of the total global costs of this transition, due to their ability to pay and their historical role in carbon emission. Because of the pace and pattern of economic growth in developing countries, they too are becoming major contributors to the global emission. Unabated emission can only lead to runaway climate change causing unprecedented catastrophes. However, this is not a destiny, but a choice we seem to be making. According to Lord Nicholas Stern, a leading UK climate change economist, existing economic models 'grossly underestimate' the costs of global warming, undermining the urgency for deep cuts in GHG emissions through a variety of ways such as energy efficiency, renewable energy, flexible market mechanisms, land use and forestry projects, green growth and sustainable development overall (Stern 2014).

According to Tangang et al. (2012), the average temperature in South-East Asia has increased 0.1–0.3 °C per decade over the last 50 years and the mean surface air temperature would increase between 0.75 and 0.87 °C by 2039, 1.32 and 2.01 °C by 2069, and 1.96 and 3.77 °C by 2100. In the case of Malaysia, according to the same authors, and the national consultant team of Malaysia for Rio+20 (CGSS 2012), for several locations in the country, the rate of warming for the last 40 years was as high as 0.4 °C per decade. Studies based on climate models and downscaling of projections to regional and local levels indicate that, depending on the emission scenario, the mean surface temperature over Malaysia would increase by 3–5 °C by the end of the twenty-first century. There are clear indications that the region is warming as predicted and the climate model scenarios also indicate a warming trend.

In the context of sea-level rise (SLR), Awang and Abd Hamid (2013) stated that although the global prediction for SLR is about 1.7–3.1 mm/year, the regional SLR in Malaysia is expected to be higher, owing to local climate and topographical conditions. Low-lying areas such as Penang, Klang and Batu Pahat with high population and socio-economic activities are at risk of being inundated. The study of the *Impact of Climate Change on Sea Level Rise in Malaysia* (NAHRIM 2010) was carried out in 2010, to project SLR in the Malaysian coast till 2100. The results showed that (1) there is a significant increase in SLR trend over the recent 5 years, compared to the trend over 20 years ago; (2) the observed mean SLR rate along the Malaysian coast (based on satellite altimetry data from 1993 to 2010) is between 2.7 and 7.0 mm/year; for example, Penang–Perak border (6.45 mm/year), Sabah–Sarawak–Brunei offshore (7.00 mm/year) and Perlis–Thailand border (6.08 mm/year); and (3) Peninsular Malaysia – the projected SLR for the year 2100 is 0.25–0.5 m, Sabah – the projected SLR for the year 2100 is 0.69–1.06 m, and Sarawak – the projected SLR for the year 2100 is 0.43–0.64 m. Comparable results produced by Tangang et al. (2012) showed that the SLR for Sabah and Sarawak coasts vary between 0.43 and 1.1 m by the end of the twenty-first century.

It is projected that in a warmer climate the frequency, magnitude and duration of events such as typhoons, floods, landslides and sea surges will be affected (IPCC AR5 2014). The general prediction for our region is that floods, droughts and typhoons are projected to increase in frequency and intensity causing widespread impacts on all major sectors of national and global economies. For example, the floods which affected some Eastern Malaysian states, Kelantan and Terengganu, in the peninsula in December 2014 were unprecedented in recent history and have caused widespread damage. According to Kelantan Flood Disaster Committee chairman Mustapa Mohamed, the floods swept across eight districts in Kelantan have damaged public assets and infrastructure with gross loss estimated at RM200 million (Free Malaysia Today 2015). Besides, he said Tenaga Nasional Berhad estimated a loss of over RM10 million, Royal Malaysian Police (over RM8 million) and Syarikat Air Kelantan Sdn Bhd (over RM3 million), while the Kelantan Health Department estimated a loss of over RM10 million in Kota Baharu alone. Meanwhile, the Public Works Department suffered losses of RM100 million, while utility providers Tenaga Nasional Berhad (TNB), Air Kelantan Sdn Bhd and the police suffered losses of RM10 million, RM3 million and RM8 million each, respectively. Meanwhile, the massive floods which crippled the state of Kelantan saw 1704 farmers suffer losses amounting to RM26.49 million last year, said Agriculture and Agro-based Industries Minister Datuk Seri Ismail Sabri Yaakob (The Malaysia Insider 2015). Similar events are expected to recur more frequently and with greater intensity as a result of a warmer climate and its effect on the phenomenon such Madden-Julian oscillation (MJO), and other modes of climate variability (Tangang 2015). The variability of monsoon rainfall in the South-East Asia region is observed to be decadal, and the frequency and intensity of intermittent flooding of some areas during the monsoon season have serious consequences on the human, financial, infrastructure and food security of the region (Loo et al. 2015).

Another regional concern is forest fires. This year's forest fires of Indonesia and the resulting regional haze are a classic example of the global warming feedback on such fires, especially during an El Nino year like 2015. The choking haze which has persisted over Malaysia and Singapore for the past two months has so far cost the economies of both countries hundreds of millions of dollars, yet the true cost is impossible to calculate until the skies finally clear (Scawen 2015). The total economic cost for 2015 will take months to assess, and will have to cover all aspects of daily life – lost productivity, lost tourism and lost workdays through respiratory illness, as well as higher prices for fresh food products. Professor Euston Quah, from Singapore's Nanyang Technological University, warned that the crisis could have a greater impact than the three-month long 1997 haze crisis, which caused an estimated \$9 billion in losses in economic activity across South-East Asia. Unless the CO<sub>2</sub> emission is regulated and controlled, the region will be heading for substantial damage (Varkkey 2015).

Climate finance, therefore, will mean multiple sources such as local, national or transnational, which may be drawn from public, private and other alternative sources of financing. This is required because large-scale investments are needed to significantly reduce emissions, notably in sectors that emit large quantities of GHGs. Climate finance is equally important for adaptation, for which significant financial resources will be required especially for developing countries.

### 3. Climate financing options: a global scenario

There are a wide range of suggestions and opinions from worldwide researchers, experts and practitioners to ensure the success of COP-21, especially in the context of climate finance. The Leadership Council of the United Nations Sustainable Development Solutions Network had prepared a working paper for COP-21 highlighting eight key criteria (SDSN 2015). They focus on the following: Criterion 1: a clear commitment to the 2 °C upper limit on global warming. Criterion 2: a clear commitment by all governments to achieve net-zero GHG emissions, no later than 2070 as required to stay below the 2 °C upper limit. Criterion 3: each national government should agree to prepare and submit an illustrative and aspirational National Deep Decarbonization Pathway (NDDP) to

demonstrate how it intends to shift to a low-carbon energy system by 2050 and achieve near-zero net GHG emissions no later than 2070. Criterion 4: all countries should commit to strong actions by 2025–2030 through Nationally-Determined Mitigation Contributions (NDMCs), and demonstrate that the NDMCs are consistent with and indeed part of their long-term NDDPs. Criterion 5: all countries should describe in as much detail as feasible how they intend to implement the NDMCs for 2025–2030 and the NDDPs for 2050. Criterion 6: developed countries should make clear how they plan to fulfil the pledge of mobilizing at least \$100 billion per year of climate finance as of the year 2020. Criterion 7: the Lima-Paris Action Agenda should include plans of action by subnational and key non-state actors. Criterion 8: the Lima-Paris Action Agenda should launch several global public–private partnerships on low-carbon technologies.

The call to shift to a low-carbon development pathway enabled by adequate financial backing is evident in these criteria. Moreover, according to the World Bank (WB), over the next 15 years, the global economy will require an estimated \$89 trillion in infrastructure investments across cities, energy and land-use systems, and \$4.1 trillion in incremental investment for the low-carbon transition to keep within the internationally agreed limit of a 2 °C temperature rise. Meanwhile, mitigation in developing countries could cost between \$140 and 175 billion per year over the next 20 years, with adaptation investments rising to an average of \$30–\$100 billion a year between 2010 and 2050, according to World Development Report (2010). With climate finance being a ‘hot topic’ of discussion and negotiations in Paris, one wonders where this kind of funding would come from. Perhaps, it is also time to firmly believe in the power of nations to come up with new agreements and deliver through dedicated funding mechanisms (Jacoby 2014).

Assuming that there is global agreement to cut carbon to stay within safe climate levels with climate finance playing a central role in the new Paris agreement, there is reason to be optimistic. It is important to build on the momentum of climate finance pledges and action generated in the recent past under various bilateral and multilateral agreements. Climate Funds Update, which is a joint initiative of the Heinrich Böll Stiftung (HBF) and the Overseas Development Institute (ODI), has compiled 10 most noteworthy insights from the ongoing efforts to monitor climate finance: (1) UN Secretary General’s climate summit in New York, September 2014, and the \$200 billion fund; (2) about 50% increase in finance for new projects approved since 2013, using Climate Investment Funds and Clean Technology Funds; (3) mitigation finance continues to increase with Clean Technology Fund, and new credit lines for low-carbon technology and mini-grids; (4) REDD+ investments increasing to \$2 billion in project approvals; (5) adaptation finance has now reached 2 billion; a full 43% of the adaptation finance approved in 2014 included a disaster risk reduction component; (6) UNFCCC assessed financial flow of \$40–\$175 billion from developed to developing countries between 2010 and 2012 (multilateral and climate-related ODA); (7) Multilateral Development Bank Fund partnering with developing country partners – large proportion of climate finance channelled through this way (Global Environment Facility [GEF], WB, Regional Development Banks, etc.); four-fold increase over the past five years; (8) Green Climate Fund (GCF) – a fund within the framework of the UNFCCC founded as a mechanism to redistribute money from the developed to the developing world, in order to assist the developing countries in adaptation and mitigation practices to counter climate change; currently, \$10 billion strong and projected to grow to \$100 billion/year from 2020; (9) Multilateral Climate Funds – about 10 such funds focusing on adaptation, mitigation, REDD+ and multiple foci; and (10) Financing for Development (FfD) – the Paris COP-21 and the Addis Ababa Conference on FfD need to converge on climate and poverty eradication agendas – and finance is key to unravelling low-emission and more resilient development solutions (Stiftung 2014).

Questions still remain as to *how much, from which* funds will emerge, and *how it will be invested* and *how it will be used?* In this context, there is no doubt UNFCCC needs to be financially strengthened; the same applies to multilateral agencies such as Global Environmental Fund, World Bank and Regional Development Banks, and there is a need for more bilateral, entrepreneurial and special funds too. Though serious concerns relating to adequacy, accessibility, predictability and reliability of climate financing still persist, the global financing landscape is undergoing deep and rapid

transformations and is evolving into a complicated mix of multifaceted and multidirectional financial flows.

#### 4. Climate financing options: a Malaysian scenario

According to IPCC AR5 climate change projection for South-East Asia, the temperature will rise 3–4 °C under RCP 8.5 (the most stringent Representative Concentration Pathway 8.5). The ‘wet region gets wetter and dry gets drier’ (i.e. more ‘warmer’ and ‘wetter’ weather).

This regional scenario is instructive for understanding that Malaysia is not immune to the effects of rising temperatures, which include a higher sea level, bleaching of coral reefs with potential adverse impact on other marine life and increased risk of flooding in the coastal areas of Kedah, Kelantan, Terengganu and Pahang as evidenced by the unprecedented floods of December 2014. In view of the severity of the Malaysian flood situation in 2014, according to the Prime Minister of Malaysia, Datuk Seri Najib Tun Razak, the government provided an initial RM500 million for rehabilitation activities. This is in addition to the allocation to the National Security Council, bringing the total to RM787 million. An initial RM800 million had also been allotted for repairs and reconstruction of basic infrastructure such as schools, hospitals, roads and bridges and RM893 million would be set aside under Budget 2015 for flood mitigation projects. Besides this, the Government will hand over 1000 units of completed low-cost houses and would provide an additional RM100 million each to Tekun and Amanah Ikhtiar Malaysia (AIM) as soft loans to support small and medium enterprises and micro enterprises among other low-interest loan arrangements from banks. (Ref. The Sun Daily: Posted on 20 January 2015 – 06:12 pm *Last updated on 20 January 2015 – 06:31 pm*; KarenArukesamy; newsdesk@thesundaily.com; The Star Online: Published: Wednesday, 21 January 2015, MYT 12:00:00 am. Updated: Wednesday, 21 January 2015, MYT 7:13:35 am);

Computer-model-based simulation results suggest that temperatures in Malaysia will become markedly warmer by the middle to end of this century. A substantial increase in monthly rainfall over the north-east coastal region and a decrease in monthly rainfall in the west coast of Peninsular Malaysia are anticipated. Future river flows in several watersheds in the east coast of Peninsular Malaysia are expected to surpass their hydrologic extremes when compared with their historical levels. By the end of the century, a more significant change in the annual rainfall may be expected in the western regions of Sabah and Sarawak. This scenario will have considerable impact on socio-culturally and economically sensitive sectors and the overall well-being of the people. This may have significant implications in the context of Malaysia’s broader societal goals such as millennium development goals (MDGs), equity and sustainable development.

In keeping with this commitment, Malaysia has been involved in clean development mechanism (CDM) projects and has raised funds from public and private sector sources through various concessional and non-concessional loans, grants, carbon finance, equities and guarantees, in addition to climate finance generated through domestic public sources (tax revenues) and private investors (Begum 2011). The Renewable Energy Act (2011) and its incentives such as the improved feed-in tariff (FiT) rates for renewable energy producers, and the Green Technology Financing Scheme (GTFS) have boosted the development of the local renewable energy industry, contributing to emission reduction.

Malaysia’s increase of carbon emission results from expansion of its industrial and automotive sectors, dependence on fossil fuel as Total Primary Energy Supply, unsustainable waste management, and also forest and grassland conversion. Therefore, Malaysia needs to invest both in mitigation and adaptation options to be internationally and nationally proactive in managing this pressing problem. As a rapidly industrializing economy with relatively higher per capita emissions compared with other developing countries, Malaysia may be required to play a greater role in the near future in international negotiations for emission reductions, especially in Paris 2015. Otherwise, it may face potential trade barriers to products with high-carbon footprints.

Malaysia’s National Policy on Climate Change (2009) provides the framework to mobilize and guide government agencies, industry, community groups and other major stakeholders to address

the challenges of climate change in a holistic manner that can help the nation navigate towards sustainability. Given the seriousness of the situation, during United Nations Climate Change Conference 2009 in Copenhagen, Honourable Prime Minister, Najib Razak, made the following announcement in his speech: 'I would like to announce here in Copenhagen that Malaysia is adopting an indicator of a voluntary reduction of up to 40 per cent in terms of emissions intensity of GDP by the year 2020 compared to 2005 levels', indeed a challenging goal to achieve nevertheless an achievable target.

In September 2014, Prime Minister Najib stated at the United Nations Climate Summit 2014 in New York that Malaysia had already reduced the emission intensity of its GDP by more than 33% in the last five years though the country did not receive the financial and technology transfer assistance promised by the developed countries during the Copenhagen meeting nor what was promised under Article 4.7 of the Convention (Panirchellvum 2014). During this time there was an average 5.7% growth in Malaysia's GDP, despite the fact that the country was hit by a number of environmental extremes; for example, unusual rain in December 2014 on the eastern part of peninsular Malaysia resulted in one of the worst floods in decades, claiming lives and destroying properties. This was followed by water supply crises triggered by prolonged drought in several states as well as tornadoes in Kedah. Malaysia spent nearly USD 2.6 billion (RM8.4 billion) in the last decade in coping with more frequent floods (Zulfakar 2014), whereas in 2015, the flood disaster recovery in the east coast had cost about USD 2.5 million (RM8.0 million) (Zain 2015).

## 5. Urgent need for a new outlook

It is generally true that developed countries will continue their efforts to sustain standards of living and maintain economic growth, and developing countries are on a fast track to their full potential development, and this is to be expected. While it is important to recognize every society's right to development, it is also imperative to be conscious of their responsibility to develop sustainably. In the genuine application of the principle, 'common but differentiated responsibilities', all countries have a unique opportunity to embrace an altogether new course of action to realize the dreams of our generation and those who will follow us, traversing the less travelled road of sustainability. In this regard, climate change, poverty and green economy are all part of the same concept – sustainable development. This journey is what we dub as 'development with a difference' (Kamarul et al. 2013), and we strongly feel that Malaysia has an inimitable opportunity to realize its full development potential following a sustainable pathway. This is the development paradigm Malaysia is envisaging in 11MP which is distinctly different than a 'grow first, and clean-up later' model (11th Malaysia Plan 2015).

This would involve new and innovative approaches to managing our affairs, in particular climate extremes and their adverse impacts on people, infrastructure and natural ecosystems. Although extreme events such as floods cannot be prevented, their disaster potential can be systematically *managed* to substantially minimize loss and damage to life and property. It is our firm belief that through such a *process* of continuous *risk management/reduction* and *resilience enhancement*, it is possible to move to a state of reduced risk which, when realized, will result in smaller and more manageable impacts. This will take disaster management out of the 'development drag basket' and place it in a 'development challenge' pool. Such disaster risk reduction is aligned with the Hyogo Framework for Action 2015, and its successor – the Framework for Disaster Risk Reduction endorsed in Sendai, March 2015, and the principles and practices of Sustainable Development articulated in the Rio+20 outcome, 'The Future We Want' (Koshy et al. 2015).

### 5.1. Resolve for mitigation and adaptation

As a climate change response strategy, therefore, we subscribe to the view that both mitigation and adaptation are equally necessary to effectively address current and future climate impacts –



mitigation for emission reduction, thereby addressing the root cause of the atmospheric build-up of GHGs and adaptation to deal with the impacts of climatic hazards such as flood, typhoons, drought and heat waves. While natural hazards themselves cannot be prevented, their disaster potential and risk can be systematically reduced through mitigation, and greater resilience can be built into the management of natural ecosystems and built infrastructure to ameliorate their adverse impacts. In so doing, it is not always what happens within a small country that matters most, the emission of neighbouring countries and the planet at large are equally important. Especially as the scientific knowledge points towards climate-related impacts will be greater than the natural climatic variability associated with regional phenomena such as the Monsoons, El Nino–Southern oscillation, Indian Ocean dipole and MJO, we believe each country has a role to play, however modest that might be. This broader risk is what needs to be reduced and managed.

With increasing intensity and frequency of extreme weather events, adopting green growth has now become an imperative for Malaysia. Therefore, the 11th Malaysia Plan under thrust four highlighted on ‘Pursuing green growth for sustainability and resilience’ with four focus areas. One of the areas was to strengthen resilience against climate change and natural disasters. Enhancing climate change adaptation is one of the strategies that will be undertaken to reach this focus area. Climate change adaptation measures will be enhanced to minimize the impact of increasingly frequent and severe extreme weather events through (1) developing a national adaptation plan, (2) building resilient infrastructure, (3) strengthening natural buffers, (4) Increasing resilience of agriculture sector, and (5) creating public awareness on health impact of climate change. However, if such measures in future are carried as part of a more structured framework of the sort presented in this paper, chances of success will be much better we believe.

In practical terms, we could also define risk more inclusively to cover all major sustainable development challenges, for instance, those ‘slow-onset high-impact’ phenomenon such as poverty, loss of biodiversity and advocate that here again; risk reduction and management approaches will reduce adverse impacts considerably. As disaster may be defined as realized risk, this approach requires pre-emptive action through compatible and sustained interventions.

Realizing these and other possibilities, there have been a number of indications that Paris is unlikely to be a repeat of the experience in Copenhagen in 2009. For example, the USA and China struck a climate agreement that would bring a massive expansion in China’s renewable energy use, and a peak in its carbon emissions by 2030. The USA has committed to cutting its emissions by up to 28% below 2005 levels by 2025. Recently, the leaders of six global oil and gas companies went on the record and made a commitment to UNFCCC stating that they realize ‘the challenge is how to meet greater energy demand with less CO<sub>2</sub> and they stand ready to play their part’. The agreement that is up for negotiation in Paris is entirely different from those in Copenhagen, and its predecessor Kyoto protocol in that it will be a ‘bottom-up’ product in which each country determines what it is willing and able to do to address its share to address the global warming challenge (Freedman 2015). Such commitments are being negotiated and confirmed through bilateral and multilateral agreements (e.g. EU, USA–China, etc.). In the changing economic landscape of today, because developing countries view climate change as a major development challenge and their individual and collective goals will form the basis of the final agreement to be signed in Paris. For success, it is imperative that politics and last-minute squabbles do not derail the process and details of the agreement’s form, and the required subsequent monitoring obligations do not stand in the way of a binding consensus (Hamzah 2015).

## 6. A framework for action

With the benefit of hindsight from a decade of funds mainly from global agencies and on the basis of the analysis of existing international financial mechanisms, the key objectives for an effective and efficient financial architecture for climate agreement should include the following: (1) ensuring that early preventive action is adequately supported; (2) cultivating a sense of

collaborative ownership of climate change responses to be implemented by both developed and developing countries; (3) ensuring coherence between the climate actions taken, international funding and national development strategies; (4) addressing properly the range of investments for adaptive and mitigative needs, technical assistance, capacity building and support for policy design and implementation; (5) ensuring effective partnerships to leverage global financing in a harmonized manner; and (6) including sound financial management and monitoring and evaluation arrangements.

This is why the recently released 11th Malaysia Plan acknowledges that ‘climate change continues to be a major threat as it adversely impacts economic and social development gains and deepens economic inequalities’. The challenge is to come up with a ‘Framework’ that creatively and adequately cater to all parties involved – the policy-makers and practitioners equally – will encompass, on the one hand, effective *national–international* engagement, and on the other, sound and sustained *mitigation–adaptation* responses.

### 6.1. A conceptual framework

The proposed framework is somewhat similar to the United Nations climate change framework (UNFCCC) itself – a framework as the title suggests. At this stage we do not intent to explore the mechanism of enforcement or the legal consequences of non-compliance, but focus on a solution-oriented approach to achieving the anticipated Paris commitments of COP-21, and the essential ingredients for its success.

Our concept for such a framework is illustrated in [figure 1](#). The national–international collaborations required for action is shown by the two interactive circles on the left and right of the diagram. We have identified three enabling factors, ‘policy, finance and technology’, for both circles. These are the larger issues on which normal practitioners have only limited capacity to address; but fortunately, these are also action areas that are identified and managed by the decision-makers and practitioners at the national and international levels, and mediated by the institutions established for these purposes, e.g. Conference of the Parties (COP-21). Therefore, this is where a meaningful, effective and enforceable global climate agreement could be reached.

We believe a conceptual framework would be a very useful way to proceed and make progress, because it would build on the grass-roots efforts and contributions from all nations around the world and unlike the Kyoto approach it does not count on top-down enforcement. Thus, this framework represents a model that is adaptable and scalable among countries and with time. However, it is important to identify the essential ingredients for success of such a framework by identifying the need for technology transfer, climate financing to address concerns relating to questions, such as ‘who should finance climate change issues?’ On the one hand, there is the view emanating from historical perspective that financing climate change must be the responsibility of developed countries whose emissions largely make up a major share of atmospheric carbon loading. At the same time, with the emergence of new developing countries such as Brazil, Russia, India, China and South Africa (BRICS) and their carbon emissions, there is the view among developed countries that the climate responsibility should be more widespread, and in between are developing countries, least developed countries and small island developing states who do most probably need the support of other nations to build greater resilience and adaptive measures in coping with the potential adverse impacts of anticipated climate warming. Since the challenge is unprecedented and multigenerational, urgent and global in nature, we are proposing an inclusive financing model based on agreed principles of *common but differentiated responsibilities*, *polluter pays* and *the right to develop*, but in a negotiated and consensus manner that befits global agreements. This is why we are citing traditional, new and emerging funding options, involving multiple players, as part of mitigation, adaptation and conservation. Not only finance, but technological and ethical exchanges too are key to adopting pathways leading to a sustainable world.

Once such an agreement is in place, a parallel set of processes and activities must be undertaken at the national and international levels, e.g. bilateral and multilateral meetings, action plans and their implementation are all part of such endeavour. This action needs to cover both climate mitigation and adaptation. As shown in the conceptual diagram, the former requires a variety of preventive measures involving reduction of emission at the source and enhancement of GHG sinks at all levels. The latter, adaptation, is for ‘here and now’ in most situations, involving climate risk reduction and disaster management strategies and investments. On policy front, awareness and capacity development are critical measures while there are also situations that demand adaptation options such as engineering practices and more resilient infrastructure to protect valuable life, property, and economic and cultural sectors. As we move inward into the diagram, the four circles interact at different areas and levels representing the joint efforts that this model calls for in bringing about the desired outcomes. These are not unnecessary overlap but must be seen as healthy synergies given the interdisciplinary nature of the interactions among the components of this very complex human–Earth systems.

## 6.2. Malaysia’s strategic action

Towards this multiprong approach that includes both mitigation and adaptation, a number of activities are undertaken by Malaysia as a part of its specific policies and action plans (i.e. Sustainable Development and Climate Change Policies; National Policy on Climate Change National Green Technology Policy; National Roadmap to Reduce the Emission Intensity of GDP; National Green Technology Roadmap; Green Township and Green Buildings Initiatives; Waste Management Initiatives).

The Environmental and Climate Change Management Division of the Ministry of Natural Resources and Environment has been working closely with United Nations Development Program (UNDP) with funding from the GEF; WB; the Asian Development Bank; the European Communities – Association for Southeast Asian Nations ASEAN Energy Facility; the DANIDA and Japan International Cooperation Agency on bilateral and multilateral cooperation, capacity building activities, information sharing and networking.

Other adaptation activities involving prominent stakeholders and sponsors include the following:

- The development of National Capacity Needs Self-Assessment for Global Environmental Management, with UNDP;
- Flood mitigation projects by Department of Irrigation and Drainage (DID), Malaysia on river basin and coastal management, integrated flood forecasting, warning and river monitoring, including infrastructure networks for 88 new telemetric systems, radar rainfall analyser and integrator for real-time flood forecasting in 13 river basins throughout the country with immediate plans for nationwide coverage;
- Atmosphere–Ocean General Circulation Models based research and climate scenario generations by Malaysian Meteorological Department (METMalaysia);
- Joint capacity building for youth for disaster risk reduction by National Security Council of the Prime Minister’s Department, Southeast Asia Disaster Prevention Research Institute hosted at the Universiti Kebangsaan Malaysia, the World Youth Foundation (NGO), the Force of Nature Aid Foundation and Mercy Malaysia;
- Development of the ‘Regional Hydro-Climate Model for Peninsular Malaysia (RegHCMMPM)’ to generate climate and hydrological projections;
- Development of a Coastal Vulnerability Index, including field-based testing of data collection, and the identification of climate-change-related vector-borne diseases;
- Research by MyCLIMATE on climatic hazards such as SLR, flooding and flash floods;
- National Hydraulic Research Institute of Malaysia’s (NAHRIM) Regional Environmental Hydroclimate Model (RegEHCM) for assessing the impact of climate and land-use changes on water resources (Theseira 2011).

### 6.3. Malaysia's mitigation and adaptation

In order to deliver on the international commitment made by Malaysia during COP-15, the country took several measures and by the end of 2013 achieved 33% reduction in its carbon emission intensity, of the 40% promised in Copenhagen in 2009. The COP-15 pledge was conditional upon technological and financial support from developed countries, which are not realized as yet.

To achieve this result, Malaysia used three strategic approaches: mitigation; adaptation and conservation. On the mitigation side, the energy sector, which is a major contributor to national GHGs emission, has undertaken steps to increase the use of clean and environmentally friendly sources. The Renewable Energy Act, 2011, implemented the FiT mechanism to accelerate renewable energy (RE) such as solar photovoltaic (PV), biomass, biogas and mini hydro in Malaysia's electricity generation mix. Since then RE-installed capacity has grown from 53 MW in 2009 to 243 MW in 2014. At the same time, energy demand management through the Minimum Energy Performance Standard for domestic appliances was gazetted in 2013. The implementation of the Sustainability Achieved via Energy Efficiency Programme (2011–2013) had reduced energy consumption by 306.9 GWh. This has resulted in GHG avoidance amounting to 208,705 tCO<sub>2</sub> eq. The retrofitting of four government buildings had reduced electricity use ranging from 4% to 19% monthly.

In the transportation sector, initiatives were undertaken to control emissions from motor vehicles along with higher use of energy-efficient vehicles and biofuels. The Government gazetted EURO 4M standards in 2013 and enforced its use in RON97 in 2015. To support implementation of biodiesel B5 Programme (5% biodiesel blending in automotive fuel), 35 depots were constructed nationwide with in-line blending facilities. As of 2013, the implementation of B5 Programme had managed to reduce GHG emission by 1.4 million tCO<sub>2</sub> eq. By the end of 2014, Malaysia had also introduced the biodiesel B7 programme (7% biodiesel blending) nationwide. Waste management initiatives have also helped avoid and reduce GHG emission. Conversion of empty palm oil fruit bunches to energy avoided GHG emission of 33.1 million tCO<sub>2</sub> eq, while paper recycling activities reduced GHG emission of four million tCO<sub>2</sub> eq, as of 2013. The Reuse, Reduce and Recycle (3R) programme was intensified during the 10th Plan, and household recycling rate rose from 5.0% in 2010 to 10.5% in 2012. To support waste-to-wealth initiatives, the National Biomass Strategy 2020 was launched in 2013 to assess how Malaysia will develop new industries by utilizing agricultural biomass waste for high-value products, including those for exports. An example is the use of palm oil biomass pellets for power generation and for other uses such as medium-density fibre boards.

Forest areas in the states of Pahang, Perak and Selangor were gazetted as Permanent Reserved Forest and this resulted in GHG emission avoidance of 11.8 million tCO<sub>2</sub> eq. The implementation of projects from the GTFS also resulted in GHG emission reduction of nearly 93,000 tCO<sub>2</sub> eq. In terms of meeting the Montreal Protocol commitment, Malaysia has achieved specific pre-2010 outcomes for reducing ozone-depleting substances and is on-track to comply with the post-2010 provisions of the Protocol by the end of 2015 with the phasing out of the hydrochlorofluorocarbon substances. To support the development of local green products, 73 eco-label licences were issued to companies producing such products, which included electrical appliances, cleaning agent for household and personal care, as well as products used for construction and steel industry. My Carbon Reporting Programme, a voluntary reporting mechanism, was launched in December 2013 to encourage and facilitate private entities to measure and report their GHG emissions, from which they could identify actions to reduce the emissions. As of January 2015, 26 companies volunteered to participate in the programme.

In adapting to climate change, nearly a million people have been shielded from the detrimental impact of floods through the implementation of 194 flood mitigation projects. In addition, 34 hazard maps were developed to facilitate disaster prevention and development planning in major high-risk areas. Coastal erosion prevention efforts were undertaken to rehabilitate and protect coastal areas from being further eroded. In this regard, 24.4 km of coastal areas in Johor, Kelantan, Pulau Pinang, Sabah, Sarawak, Selangor and Terengganu were rehabilitated. A new aerobic paddy variant, known

as MRIA1, was launched in 2013 with improved resistance to heat and water scarcity, allowing plantation of this staple food in water-poor areas and during off season.

During the 10th Malaysia Plan (2011–2015), forest cover has increased from 56.4% in 2010 to 61% in 2014. Various conservation initiatives were also undertaken, such as gazetting 23,264 hectares of forest as Permanent Reserved Forest under the Central Forest Spine initiative and the planting of 53 million trees. Along coastal areas, nearly 2509 hectares of mangroves and other suitable species were planted to protect coastlines against wave actions and coastal winds, reduce salt water intrusion into rivers and provide breeding grounds for fish and other marine life.

At the same time, relevant policy and legislation were reviewed to strengthen conservation and enforcement efforts. Additionally, 1500 flowering tree species were documented, and Crocker Range Park in Sabah was listed as Man and Biosphere Reserves by UNESCO in 2014. The National Policy on Biological Diversity, 1998, was revised to serve dual purposes – as the principal policy document to guide biodiversity management and to align with internationally accepted Aichi Biodiversity Targets (11th Malaysia Plan 2015).

#### **6.4. Climate change within sustainable development**

Adopting a balanced development paradigm, Malaysia started mainstreaming green growth focusing on environmental conservation and ratifying global agreements on climate change, biodiversity and desertification. Over the years, Malaysia's remarkable economic growth, resulting largely from prudent fiscal management, continued political stability and investments in infrastructure and industries, has brought about substantial reduction in poverty and enhancement of living standards. However, despite the significant advances of the past, many of the sustainability issues have persisted. Some have actually grown more acute and significant new ones have emerged.

In view of this, the government introduced numerous reforms; key among them were the Government Transformation Programme and the Economic Transformation Programme, underpinned by the 10th Malaysia Plan. The 11th Malaysia Plan, guided by the National Development Strategy, focuses on GDP growth through capital economy involving big business, industry and financial services, while the people economy will address what matters most to the people, such as jobs, small businesses, the cost of living, family well-being and social inclusion. This is expected to promote green production and consumption, innovative public transport and smart cities and villages and secure water, energy and food sectors, conducive for climate mitigation and national development.

As a practical way forward to achieve development goals, CGSS proposed a risk reduction strategy that decreases vulnerability, builds resilience and builds back better after disasters. Risk might arise from natural causes such as flood, typhoon, etc. or from other phenomena such as climate change, loss of biodiversity and poverty. Well considered risk reduction approaches thorough a variety of activities related to the root cause of the major issue when implemented will progressively reduce risk. World café approaches for stakeholder discussion and logical framework analysis for designing and managing risk reduction projects have been found very practical and engaging. Following an unprecedented flood event of 2014, USM/CGSS we applied this approach in Kelantan, northern peninsular Malaysia, and came up with about 50 action items each in five disaster management cycle areas – prevention, preparedness, response, recovery and governance which are being addressed at different levels. This overall approach of Disaster Risk Management for Sustainable Development is being promoted as means to achieve 'development with a difference' or sustainable development. We view 'financing for climate change' in this broad context.

## **7. Conclusion**

We are on the verge of a historical event that may lead to the development and implementation of a global agreement, and associated action plans, to address the challenge of climate warming for our generation and those who will follow us for the rest of this century, and beyond. For the Paris 2015

agreement to be meaningful and effective, it is imperative that the resulting agreement and action plan include a combination of policy, technology and finance with the ultimate goal of making future development sustainable, globally. In essence, the national and international plans and agreements should embrace and integrate the SDGs, and establish new partnerships and procedures for FfD accords to be reached in Addis Ababa. Climate and SDG agendas have to converge – and finance is key to unlocking low-emission and more resilient development solutions. As the Malaysian government has asserted during the presentation of the 11th Malaysia Plan in May 2015, the national strategy will be to shift from a ‘grow first, clean-up later’ development model to a resilient, low-carbon, resource-efficient and socially inclusive growth pattern in moving towards its Vision 2020. Since climate change is complex and involves the three pillars of sustainable development – environment, economy and society – all meetings and dialogues throughout 2015 should seek consensus on the role of public and private finance for an integrated framework that supports environmentally sustainable and socially inclusive development. No doubt, climate action is expensive, but inaction is even more so. We do hope that the global leadership and nations of the world seize this great opportunity to address this multigenerational challenge, as they did in 1970s by agreeing to reduce the atmospheric concentration of chemical substances that destroyed the protective ozone shield which prevents ultraviolet radiation reaching Earth surface and causing human health hazards. This historical precedence and its success are the best examples of how nations around the world can work together to address the global challenge of climate change.

## Disclosure statement

No potential conflict of interest was reported by the authors.

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