



**The Republic of the Union of Myanmar**

**Myanmar's Intended Nationally  
Determined Contribution–INDC**

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## Foreword

Climate Change is the most threatening global challenge faced by humanity. Myanmar is one of the most highly vulnerable countries in the world to the adverse impacts of climate change facing threats from extreme weather events, sea level rise, flooding and drought. Without action to adapt to these threats, the prospects for the economic development of our population of over 50 million will be hindered and our environment degraded.

With the largest standing forests on mainland South East Asia, Myanmar currently absorbs more greenhouse gases than it emits, thereby already making a significant contribution to global efforts to tackle climate change. However, we are currently in the process of rapid industrialisation and increasing urbanisation which will lead to an increase in our emissions of greenhouse gases. We therefore intend to implement a series of policies and actions to maintain the harmony between growth and mitigating climate change. This means planning the development of our economy so it takes place in a sustainable manner, whilst also confronting multiple challenges such as poverty alleviation and protecting our population against climate related disasters.

Ahead of the next UNFCCC Conference of the Parties in Paris (COP21) in December 2015, governments are preparing their Intended Nationally Determined Contributions (INDCs). INDCs are a key input to the negotiations of a new international climate agreement that will be finalised at COP21 and come into effect in 2020. By designing ambitious INDCs, countries have the opportunity to lay the foundation for a new climate agreement that sets the path towards maintaining temperature change below 2°C relative to pre-industrial levels. It is up to each country to determine an ambition level for their INDC that reflects national priorities, capabilities and responsibilities.

Myanmar is determined to play its role in the global effort and to crystallise this will into our INDC. Despite being a relatively low greenhouse gas (GHG) emitter and being a net GHG sink, Myanmar wishes to undertake a series of actions to demonstrate its commitment to climate change mitigation and highlight options for adaptation.

The development of the INDC is a nationally led process. Political guidance has been sought from the highest institutional level within the Government of the Republic of the Union of Myanmar. The Ministry of Environmental Conservation and Forestry (MOECF) has acted as INDC focal point, facilitating the inputs from other line ministries. In accordance with relevant decisions of the Conference of the Parties to the Convention, Myanmar hereby presents its enhanced mitigation actions, policies, strategies and adaptive efforts on climate change, and wishes to contribute to making the Paris Conference agreement negotiation a great success.

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# Myanmar's Intended Nationally Determined Contribution-INDC

## 1. National Circumstances

Since 2011, Myanmar has been engaged in an active process of institutional and political reform leading to democratisation, and is gearing towards rapid socio-economic change and development. As part of this process, the Government of Myanmar is putting in place the necessary legal, procedural and governance instruments while building the institutional, technical and human capacities needed to achieve sustainable development in all sectors of the economy.

Myanmar considers climate change as a major challenge to its socio-economic development and is therefore determined to play its part in mitigating global climate change, while actively adapting to its effects. In effect, the country is extremely vulnerable to the negative effects of climate change. In 2015, for the third consecutive year, Myanmar was ranked globally by studies<sup>i</sup> as the second most vulnerable country in the world to extreme weather events over the last 20 years<sup>i</sup>. Tropical Cyclone Nargis caused the loss of 138,000 lives in 2008 and devastated infrastructure, causing long-term adverse socio-economic impacts. The estimated total cost of loss and damage due to Nargis to the national economy is estimated to be over USD4bn<sup>ii</sup>. During mid-2015, Myanmar experienced floods of unprecedented proportions. Observed changes<sup>iii</sup> in the last decades include rain patterns variations that are causing climate-driven migration that affect, for instance, the socio-economic conditions of dry regions due to increased occurrences of drought. In addition, climate models predict further sustained impacts from climate change in future, which will further expose Myanmar to the negative impacts of climate change<sup>iv</sup>.

Myanmar is therefore actively engaged in designing and implementing the required policies, governance, financial and programming instruments to address climate change. In terms of policy development, the Government, for example, has made environment one of the seven strategic pillars of its National Comprehensive Development Plan (2011-30); it has promulgated the Environmental Conservation Law (2012); and it is resolute in mainstreaming environment into the national policy and development agenda. This will take place under the guidance of the National Environmental Conservation Committee and Myanmar Climate Change Alliance established by the Union government's cabinet in 2013. In addition to fulfilling its reporting responsibility to the UNFCCC, with both the Initial National Communication and the National Adaptation Programme of Action were submitted in 2012, Myanmar is now developing its National Climate Change Strategy and associated action plans. These will present a vision for achieving climate resilient, low-carbon, resource efficient and inclusive development as a contribution to sustainable development. To support this vision, Myanmar is also developing its Green Economy Strategic Framework again with associated action plans. With respect to adaptation, in 2016 Myanmar will start the elaboration of the National Adaptation Plan (NAP) to provide more detail to guide its on-going adaptive efforts.

The process of socio-economic development will likely lead to increased demand for services, products and infrastructure development, particularly in the energy, agriculture, industry, human settlements and environmental resources sectors, which may increase GHG emissions. Currently Myanmar's annual electricity consumption is only 180 kWh per capita per annum and access to electricity is relatively low, i.e. 27% in 2011-12 and 31% in 2015-16 per households<sup>v</sup>. Among other means to achieve its Millennium Development Goals (MDGs) of poverty alleviation, the Government of Myanmar wants to increase the electrification rate to 45% by 2020-21, 60% by 2025-26, and 80% by 2030<sup>vi</sup>. However, Myanmar is willing to limit the emissions through appropriate policies and development choices. With the largest expanse of tropical forest in mainland South East Asia, Myanmar is already a net greenhouse gas (GHG) sink<sup>vii</sup>.



Myanmar will require the cooperation and assistance of the international community to further its capacities to achieve socio-economic development, while containing emissions.

This INDC is Myanmar's opportunity to confirm its commitment to climate change mitigation, by pursuing the correct balance between socio-economic development and environmental sustainability. To this end, Myanmar has identified mitigation actions and policies in the primary areas of forestry and energy, complemented by supporting policies in other sectors. These actions have been selected as they will not only deliver reductions in GHG emissions, but also have significant development co-benefits. For example, actions in the forestry sector will not only preserve one of the world's most important GHG sinks, but will also prevent soil erosion and therefore reduce the risk to the population of floods and landslides.

Alongside identified mitigation actions, Myanmar would continue to increase its capacity to adapt to the negative effects of climate change. Adaptation actions in agriculture, forestry, water, infrastructure and bio-diversity, among others, are being currently implemented, while reducing risks of disasters remains a main programme and policy focus. Myanmar wishes to highlight to the international community that, while committed to making an evidence-based contribution to global mitigation efforts, the national priority is to adapt to the devastating effects of climate change.

In addition, Myanmar recognises a number of important emerging themes which are key to addressing both future emission reductions and adaptation to climate impacts, including the need for sustainable urban development; a more consistent inclusion of civil society perspectives; the empowerment of groups at risk of the short and long-term impacts of climate change, (such as children and other younger members of society); and the integration of gender considerations into climate change policy design. Ultimately, the effort to mitigate and adapt to climate change is seen as a contribution to alleviate suffering caused by climate change and enable sustainable and durable development of the poor, both in rural and urban areas.

However, as one of the world's least developed countries (an "LDC"), existing technological, financial and capacity gaps limit Myanmar's ability to achieve its vision for sustainable development while balancing socio-economic development with environmental sustainability. For this reason, Myanmar requires significant support from the international community for capacity building, technology development and transfer and financial resources to implement the actions proposed in this INDC. Once received Myanmar looks forward to developing its contribution further to the global effort to mitigate climate change while increasing its capacity to adapt to the negative consequences of climate change.



## 2. Mitigation Contribution

Myanmar would undertake **mitigation actions** (Section 2.1 – Mitigation actions) in line with its sustainable development needs, **conditional** on availability of international support, as its contribution to global action to reduce future emissions of greenhouse gases. The document also presents planned and existing policies and strategies (Section 2.2 - Institutional Arrangements and Planning for Implementation) which will provide the policy framework to implement identified actions and prioritise future mitigation actions.

### 2.1. Mitigation Actions

The actions presented below will result in significant reductions in greenhouse gas (GHG) emissions. The **implementation of these actions will be contingent to a number of factors**. This includes support for capacity-building, technology development and transfer, and financial resources from the international community, as well as the active participation of the national and international private sector.

The information required to estimate GHG emissions was collected and an estimate produced. However, given the deadline and the current available data, it was **decided not to include the estimate in the INDC**, as deemed **not sufficiently reliable**. Further analysis to quantify the GHG emission will be conducted as a result of the actions and strategies below, i.e. as part of the implementation plan described in Section 4. This will allow Myanmar to **present projections of anticipated GHG impact assessments in future revisions of its INDC**.

Action	Objective	Intended Implementation Plan
<b>Forestry Sector</b> National Permanent Forest Estate Target	By 2030, Myanmar's permanent forest estate (PFE) target is to increase national land area as forest land with the following percent of total land area): <ul style="list-style-type: none"> <li>• Reserved Forest (RF) and Protected Public Forest (PPF) = 30% of total national land area</li> <li>• Protected Area Systems (PAS) = 10% of total national land area</li> </ul>	The Government of Myanmar is following the implementation plan as set out in the <b>30-Year National Forestry Master Plan (2001-30)</b> . To develop its capacity to meet such ambitious targets, Myanmar has set about a number of activities under the plan at the national and regional level: <ul style="list-style-type: none"> <li>• In 2011, Myanmar joined the <b>UN-REDD Programme</b> (United Nations collaborative initiative on Reducing Emissions from Deforestation and forest Degradation in developing countries). The REDD+ Core Unit was established in the Ministry of Environmental Conservation and Forestry (MOECAF), and has the task of coordinating and guiding REDD+ related actions at national level. Myanmar developed its REDD+ Readiness Roadmap in 2013 and prioritised the activities for the implementation. In 2015 a new proposal was submitted for UN-REDD Support for the Implementation of the Myanmar REDD+ Readiness Roadmap.</li> <li>• In 2014, Myanmar joined the <b>European Union's Forest Law Enforcement Governance Trade (FLEGT) programme</b> which provides capacity building on legal aspects related to forestry.</li> </ul>



Action	Objective	Intended Implementation Plan
<b>Energy Sector</b>	Actions described here are taken on both the supply and demand side of energy. Please see below for identified actions in different sub-sectors of the energy sector. The development of hydropower, depending on the case and scale, will require rigorous Environmental Impact Assessments and Social Safeguarding, to ensure sustainability. MOECA is in the process of finalizing such instruments.	
(1) Renewable energy - Hydroelectric power	Increase the share of hydroelectric generation within limits of technical Hydroelectric potential. Indicative goal - 9.4 GW by 2030	<p>The Government of Myanmar is currently developing policies in this area, for example:</p> <ul style="list-style-type: none"> <li>• The <b>Long Term Energy Master Plan</b> (draft) which estimates that by 2030 total installed hydropower capacity could reach approximately 9.4 GWe.</li> <li>• The <b>National Electrification Master Plan</b> (draft) is being developed alongside the Energy Master Plan. The Electrification Master Plan forecasts, 38% of the primary electricity generation capacity will be hydropower resource in 2030. The specific installed capacities will be confirmed once the draft policies and plans described in section 2.2 are finalised and harmonised.</li> </ul> <p>Environmental Impact Assessment and all related tools, including social safeguards, and measurable monitoring framework.</p>
(2) Renewable energy – Rural electrification	To increase access to clean sources of electricity amongst communities and households currently without access to an electric power grid system.  Indicative goal: Rural electrification through the use of at least 30% renewable sources as to generate electricity supplies.	The Ministry of Livestock, Fisheries and Rural Development has received co-funding from a number of international development partners to develop mitigation actions in this sub-sector (such as the drafting of the <b>Comprehensive Village Development Plan</b> ). As a final result of the overall action, <b>6 million people in rural areas will have access to electricity generated by a variety of sources</b> , at least <b>30 % of which will be sourced from renewables</b> such as of mini-hydro, biomass, solar, wind and solar mini-grid technologies.
(3) Energy efficiency – industrial processes	To mitigate GHG emissions in the rapidly developing industrial production sector by:	The project “ <b>Improvement of Industrial Energy Efficiency</b> ” (Global Environment Facility (GEF) project #5321) is being carried out by the Government of Myanmar in partnership with UNIDO. The Government of Myanmar and the industrial private sector in Myanmar are providing USD13.8m towards the project which is also being supported a grant from the GEF Trust Fund (the total project



Action	Objective	Intended Implementation Plan
	<p>(a) Improving energy efficiency within the Myanmar industry</p> <p>(b) Focusing on the implementation of energy management systems compatible with the international standard ISO50001</p> <p>(c) Energy system optimisation</p> <p>Indicative goal: To realise a 20% electricity saving potential by 2030 of the total forecast electricity consumption.</p>	<p>cost is USD16.5m).</p> <p>The objective is to promote sustained GHGs reduction in the Myanmar Industry by improving policy and regulatory framework, institutional capacity building for industry energy efficiency; implementation of energy management system based on ISO 50001; and optimization of energy system in industry.</p> <p>This is an example of a project which will be carried in accordance with the <b>National Energy Efficiency and Conservation Policy, Strategy and Roadmap for Myanmar</b> which is currently being drafted (please see section 2.2 for further details).</p>
(4) Energy efficiency - Cook-stoves	<p>To increase the number of energy efficient cook-stoves disseminated in order to reduce the amount of fuel wood used for cooking.</p> <p>Indicative goal: To distribute approximately 260,000 cook-stoves between 2016 and 2031.</p>	<p>MOECAAF, as part of the <b>Comprehensive Plan for Dry Zone Greening (2001-31)</b>, has distributed approximately 286,000 cook-stoves during 2001-15, and plans to distribute an additional 260,000 cook-stoves between 2016 and 2031.</p> <p>The project falls under the <b>National Forestry Master Plan</b> and <b>National Energy Policy</b>, in order to reduce the use of wood from natural forests for cooking by 2030 (please see section 2.2 for further details).</p>





## 2.2. Institutional Arrangements and Planning for Implementation

In addition to the actions described in Section 2.1, Myanmar has and will implement a number of climate change mitigation policies and strategies, which will not only make the mitigation contributions identified above feasible, but also help to identify other mitigation actions for future implementation.

Policy Area	Objectives	Specific elements
<b>Climate Change &amp; Environment</b>	<ul style="list-style-type: none"> <li>To achieve climate resilient, low-carbon, resource efficient and inclusive development as a contribution to the overall policy for sustainable development.</li> <li>To mainstream environment and climate change into the national policy development and reform agenda.</li> <li>To strengthen the climate change related institutional and policy environment through sharing of technical knowledge and best practice, training and institutional support.</li> <li>To promote evidence-based planning and policy making through the integration of climate change mitigation experience into sub-national, state and regional development planning initiatives.</li> <li>To increase awareness of climate change at national, state and region and local level.</li> <li>To promote an economy based on green growth.</li> <li>To consistently monitor and take stock of the status of national environmental quality(i.e. through the use of standardised indicators).</li> </ul>	<ul style="list-style-type: none"> <li>The <b>National Climate Change Strategy and Action Plans</b> are under development and will be adopted in 2016. The strategy will devise the means to achieve the overall vision, and will set out a detailed implementation framework to address climate change in each sector.</li> <li>A <b>National Climate Change Policy</b> will be developed in 2016.</li> <li>The National Climate Change Policy, Strategy and Action Plan are being developed by the <b>MCCA programme</b> and MOECAAF. The programme is funded by the European Union's Global Climate Change Alliance Programme (approximately USD5m), and implemented by UN-Habitat and UNEP. The programme, which runs from 2013-17 is designed to increase awareness of climate change in Myanmar, to strengthen institutional capacity to develop policies address it, and to develop eco-system based adaptation practices. The programme is supported by a <b>Technical Working Group</b>, with representatives from all relevant ministries, cities, academia, Civil Society Organisations (CSOs) and technical partners. A <b>Climate Change Unit</b> within MOECAAF has been established to provide technical support with respect to climate change mitigation and adaptation.</li> <li>A MCCA has been established by the Union Government's cabinet, which is chaired at Ministerial level.</li> <li>The <b>Green Economy Strategic Framework</b> is under development and will be ready in 2016. The framework's development is supported by the WWF. The <b>National Environmental Policy, Framework and Master Plan (2030)</b> is also currently being developed with UNDP support and will update the <b>National Environmental Policy (1994)</b>.</li> <li>The <b>Environmental Conservation Law (2012)</b> is being implemented, and includes provisions to address climate change, as well as make provisions for <b>Environmental Impact Assessments</b> for development projects.</li> <li>The <b>State of Environment Report 2015</b> is being finalised for publication</li> </ul>





Policy Area	Objectives	Specific elements
<b>Forest Management</b>	<ul style="list-style-type: none"> <li>To decrease the rate of deforestation so that a significant mitigation contribution from the sector can continue to be realised.</li> <li>To preserve natural forest cover to maintain biodiversity and ecosystems in Myanmar</li> <li>To realize the co-benefits of the policy such as reducing soil erosion, thereby decreasing the risk of floods and landslides that may occur near rivers</li> <li>To increase the resilience of mangroves and coastal communities which are at risk of flooding.</li> <li>To increase capacity Sustainable Forest Management.</li> </ul>	<ul style="list-style-type: none"> <li>The <b>National Forestry Master Plan</b> was implemented in 2001 and will expire in 2030, upon which the next strategy will be designed and implemented. As part of implementing the Master Plan, each district in Myanmar produces a 10 year management plan so that overall goals can be met by 2030.</li> <li>In 2011, the <b>National Biodiversity Strategy and Action-Plan</b> was published as a complementary strategy to the Master Plan, and it was here that the level of ambition of increasing Protected Area Systems to 10% of national land cover was made.</li> <li>In the catchment areas of rivers, streams, lakes and dams, forest plantations, agroforestry practice, community forestry have been done and also to reduce soil erosion, contour bunds, sediment trapping dams, conserving natural springs and bioengineering measures are being done.</li> <li>Developing a coastal zone management plan to effectively conserve terrestrial and under water resources including mangrove forests. Also cooperating with international organizations providing technology and funding to reduce the risk of climate related disaster risk for local communities. The National Strategy Action plan (NSAP, 2015) has been published as well.</li> <li>Myanmar joined the UN-REDD Programme in November 2011, submitted its REDD+ Readiness Roadmap document in 2013, and developing country programme and taking actions in line with the REDD+ roadmap.</li> </ul>
<b>Energy</b>	<ul style="list-style-type: none"> <li>To achieve the optimal level of renewable sources in the primary energy fuel supply mix.</li> <li>To increase the understanding of the potential of renewable power in Myanmar's future growth plans of the National Energy Management Committee, to support the preparation of sustainable policies and strategies in the energy sector and assist in the formulation of a long-term Energy Master Plan.</li> <li>To realise a 20% electricity saving potential by 2030 of the total forecast electricity consumption.</li> </ul>	<ul style="list-style-type: none"> <li>The <b>National Energy Policy (2014)</b> is the overarching national policy which provides the framework for energy development and planning in Myanmar.</li> <li>The <b>Long Term Energy Master Plan</b> is in the final stage of drafting and is expected to be approved by the end of 2016.</li> <li>The <b>National Energy Efficiency and Conservation Policy, Strategy and Roadmap for Myanmar</b> draft is finalised and is expected to be approved in 2015.</li> <li>The <b>National Electricity Master Plan</b>, draft is finalised. It aims to harmonise the medium and long term decisions on primary energy source selection and transmission system planning.</li> </ul>



Policy Area	Objectives	Specific elements
Other sectors	<ul style="list-style-type: none"> <li>• Rural electrification through the use of at least 30% renewable sources as to generate electricity supplies.</li> <li>• To reduce the increasing rate of GHG emissions and air pollution caused by the transport sector, especially from road transport.</li> <li>• To ensure that increasing urbanisation takes place in a sustainable manner.</li> <li>• To mitigate emissions, generate power and reduce pollution from non-recyclable waste.</li> <li>• To mitigate GHG emissions from the agriculture sector from combustion of agricultural residues and growing rice in paddy fields.</li> </ul>	<ul style="list-style-type: none"> <li>• The Myanmar National Rural Development and Poverty Alleviation Programme includes a Rural Electrification Plan which is currently being drafted and expected to be finalised in 2017.</li> <li>• Policies such as the National Transport Master Plan and National Implementation Plan on Environmental Improvement in the Transport Sector are being developed. Cities, like Yangon, are studying options for sustainable transport development for example, and CSOs are engaged in proposing solutions to challenges for implementation</li> <li>• To promote sustainable urbanisation, the Government of Myanmar is drafting a National Urban and Regional Development Planning Law, a National Housing Policy, National Urban Policy, and is expanding its urban planning capacity. Approximately 75 township-level planners are being to achieve policy goals, they are the first in Myanmar to receive such training.</li> <li>• The National Waste Management Strategy and Action Plans are currently being developed and are expected to be completed in 2017.</li> <li>• The Ministry of Agriculture and Irrigation is researching alternative wet and dry paddy production techniques. This is an example of how Myanmar is resolving the need to mitigate climate change whilst also adapting to it. To reduce GHG emissions from the burning of crop residues in fields, the Ministry of Agriculture and Irrigation is implementing effective mitigation actions such as energy from crop residues, promoting the use of organic fertilisers, and methods to shorten the time of composting agricultural by-products. The bio-char program is also being planned and will reduce GHG emissions to atmosphere as a result of less anaerobic decomposition in the production process. At the same time, this will increase crop production.</li> <li>• Research and development is vital to find the means and methods of reducing GHG emissions from agriculture sector. To perform the systematic research necessary Myanmar requires the support of technical experts, access to tools and relevant apparatus. Technology transfer and assistance from experienced countries will therefore be required. The major requirement for research works related to GHG emission reductions will be considered and prioritised in Myanmar's national comprehensive development strategy.</li> </ul>



## 2.3 Fair and Ambitious

As set out in Myanmar's Initial National Communication, due to its rich forest land, Myanmar is a net GHG emissions sink. It is therefore already providing a positive contribution to the global fight against climate change. Despite this, Myanmar is facing the serious negative impacts of climate change caused by industrialised nations. Myanmar now wishes to develop its economy, but without measures to address emissions in the future, economic growth may affect its status as a net GHG sink in the years to come. Myanmar is therefore committed to take the actions set out in this INDC in order to limit growth of its future GHG emissions and by doing so to create harmony and balance between economic development and environmental sustainability.

Myanmar has for example been implementing the National Environmental Policy since 1994. A series of strategies are also under development including the National Climate Change Strategy, a National Energy Master Plan, an Energy Efficiency Strategy and a Green Economy Green Growth Strategy. As the National Environmental Policy stipulates, development activities must integrate environmental considerations in order to achieve harmony and balance between socio-economic development and environmental sustainability. Continued development of such strategies will help in the identification and planning of climate change mitigation and adaptation projects and policies in the future. Myanmar is already implementing projects that will inform these strategies (e.g. in the industrial energy efficiency sector) which will result in significant direct emissions reductions and indirect emissions reductions through demonstrating technologies and processes.

This is the first time Myanmar has offered a mitigation undertaking under any UNFCCC process and given its LDC status and low contribution to global emissions, the contents of this INDC are considered to be a fair and ambitious contribution to global action on climate change.

## 3. Adaptation

### 3.1 Rationale for Adaptation

As a consequence of its geographic location and characteristics, Myanmar is inherently exposed to severe natural weather events, which have been increasing in intensity and frequency over the last sixty years. Being located in the centre of the southwest monsoon area of South East Asia, heavy-rain induced floods occur in many parts of the country which is crossed by large river systems and the Delta. The nation's coastal area covers more than 50% of the entire eastern side of the Bay of Bengal and the Andaman Sea and is therefore particularly prone to cyclones and associated strong winds, heavy rains and storm surges. Droughts are frequent, particularly in central Myanmar. Importantly, the largest part of the total 51.4 million population (2014 census) is concentrated in the Ayeyarwaddy basin area, so it sustains many significant socio-economic sectors and many livelihoods. The population is concentrated in two main areas: the Delta area (~50,400 km<sup>2</sup>) which is most exposed to recurring tropical storms, cyclones and floods and potential storm surge, and the 'Dry Zone' area, which is exposed to chronic droughts. In 2014, 70% of the population that resided in rural areas and depended on rain-fed agriculture, livestock and fishery and forest resources. According to the National Implementation Report of the Department of National Planning in 2012-13, the agriculture sector contributed 32.9% of national GDP. The livelihood of rural communities and the productivity of the agricultural sector as a whole are therefore largely influenced by climate conditions in these areas.

The economy of Myanmar and its society is therefore highly sensitive and vulnerable to climate change, climate variability and natural disasters. Adaptation to the changing climate is a priority. However the capacity to reduce risk and mitigate the effects of climate change is limited due to lack of technical, human resources, financial and legislative processes. This results in significant loss and damage, hampering the process of national development.



Myanmar's population recurrently suffers from loss of life and damage to infrastructure as a result of climate related disasters. Climatic changes have been recorded in the last six decades and they include increased temperatures, changes in total rainfall (increasing in some regions and decreasing in others), decreases in the duration of the south-west monsoon season as a result of late onset and early start times, and increases in the recurrence and severity of extreme weather events, such as floods, cyclones and droughts. Importantly, models predict ever more extreme changes in temperature, drought periods, changing rainfall patterns, increased risk of flooding, cyclones and strong winds, flood/storm surges, intense rains and sea-level rises along the nation's significantly long coastline by 2100. In line with vision (as stated in section 1 - National Circumstances section), Myanmar, after cyclone Nargis in 2008, has consistently invested in improving national capacity to respond to and recover from such disasters by reconstructing in a sustainable manner which will mitigate future loss and damage. However, the dimension and scale of the challenges to achieve sustainable rehabilitation are beyond the nation's current capacity. Myanmar therefore requires continuing support in this regard. The nature of support from international community has been elaborated under section 5 – Means of Implementation.

### **3.2 Priorities for Adaptation and Emerging Issues**

Increasing climate-induced hazards, significant exposure and vulnerabilities to climate change, make adaptation and disaster risk reduction (DRR) a priority for the country. In 2012, Myanmar identified short, medium and long-term priority actions in the sectors of: i) agriculture; ii) early warning systems; iii) forestry; iv) public health; v) water resources; vi) coastal zone; vii) energy, and industry; and viii) biodiversity by adopting the National Adaptation Programme of Action (NAPA). Within these sectors, the NAPA establishes four priority level sectors:

1. First priority level sector: resilience in the agriculture sector, developing early warning systems and forest preservation measures
2. Second priority level sector: public health protection and water resource management
3. Third priority level sector: coastal zone protection
4. Fourth priority level sector: energy and industry sectors, and biodiversity preservation

In addition, since 2011 the rapid institutional, technical, financial context has evolved and new issues are emerging. Among those, the need to communicate and inform effectively at all levels (primary education, public opinion, policy makers), the need to make fast-growing cities resilient, and to further upscale the achievements in the disaster risk reduction area need to be addressed.

Planning and prioritisation capacity is also developed under the Myanmar Action Plan on Disaster Risk Reduction (MAP-DRR, 2012) and the Disaster Management Law (2013).

### **3.3 Current and Planned Adaptation Efforts**

In line with the priorities established by the NAPA, and considering priorities that are emerging, the Government of Myanmar is implementing a series of actions both at the policy, legal and program level. These actions will facilitate adaptation to climate change in the short, medium and long-term, through both its national budget and with international support. The list of all actions identified is not listed of this document. Instead, this INDC capture several examples of actions which demonstrate the determination of the country to adapt to climate change and to reduce risks of disasters, as follows:

- 1) Sectoral actions: Ministries are streamlining adaptation to climate change in their planning. The agriculture sector is implementing climate smart agriculture approaches through implementation actions such as legume crops diversification, measures in the agro-forestry sector and systematic control of soil quality and irrigation water. In addition, Myanmar is working to reduce climate change vulnerability and reduce poverty in rural areas and for subsistence farmers as a priority. Crop varieties are being researched with the involvement of universities, research institutions and local communities across the country for example. For instance, research is being carried out on the resilience of rice varieties' resilience to drought, flood tolerance, salt tolerance and into alternative varieties that are resistant to



pests and disease. Another important on-going project is “Addressing Climate Change Risks on Water Resources and Food Security in the Dry Zone of Myanmar” (funded by the Adaptation Fund and implemented by UNDP with line ministries, CSOs, communities and other stakeholders). In the livestock sector, actions have been taken in the recovery stages of areas affected by climate change through livestock management, loans for farmers, animal feed management research and provision of training to minimise risk of disease. The responsible ministry implement those activities within their own budget as well as with international support and co-operation with national non-governmental organisations (NGOs), international non-governmental organisations (INGOs) and the private sector. In the forestry sector, project examples include restoring degraded and sensitive forest areas through community based reforestation and enhancing rural livelihoods in degraded watershed areas, coastal areas and northern hilly regions. Specifically, Myanmar is implementing projects such as the *Rehabilitation and Restoration of Degraded Land and Reserved Forest through Community Participation, To Contribute to Climate Change Resilience and Socio-Economic Development of Local Communities Living the Central Dry Zone of Myanma*. A further example is the *Project for Mangrove Rehabilitation Plan for the Enhancement of Disaster Prevention in Coastal and Delta Areas*. With respect to early warning systems, projects include assessing the hydrological impact of climate change on river systems and developing flood and drought early warning systems for reducing the vulnerability of local communities to extreme weather events. End-to-end early warning system capacities are being developed with the assistance of international expertise. The Monsoon Forum is organised yearly to provide updates on forecasted data. Technical and financial resources in Myanmar today limit the extent in which data is collected, analysed and used however. Assistance to increase capacity in this area is therefore required. An Emergency Operation Centre (EOC) is being established to upgrade the response capacities to disasters. Among other issues which are being addressed include a focus on townships planning for adaptation. Eco-system based approaches to adaptation at township level will be tested during the course of 2016-18, including a vulnerability analysis of the following elements: urban planning, infrastructure development, environmental risk and livelihood patterns. This will be followed by implementation of solutions to identified issues. Adaptation activities are also being conducted in the water sector, with projects on water way improvement to reduce flooding, improving the control of the transportation of commodities and on river bank erosion. Small-scale infrastructure to reduce risk of reduction is also being promoted, with construction of cyclone shelters in coastal areas for instance.

2) Policy and legal instruments: The National Climate Change Strategy and associate action plans (to be approved in 2016), with its associated Capacity Development Assessment, will be used to enable adaptation to be featured into ministerial programming and planning. Existing tools include the Myanmar Action Plan on Disaster Risk Reduction (MAPDRR, 2012) currently being revised with the support of DRR partners, as well as the Disaster Management Law (2013). A Disaster Risk Reduction Working Group (DRR-WG) was formed in 2008 during the early recovery phase of cyclone Nargis, and is increasingly active with a diverse network of agencies working to increase capacity for DRR in Myanmar (over 60 members). Based on the Law of Protection of Farmers’ Rights and Enhancement of their Benefits (2013), farmers are entitled to receive assistance and the Ministry of Agriculture and Irrigation will provide assistance when affected by disasters. The National Water Resource Committee was formed in 2014 and the Water Policy (2014) and associated water directives were adopted. The Ministry of Construction is working to develop Myanmar specific national building codes with international support. An integrated water resource management strategy is now also being developed. The Forest Department within MOECAF is focusing on the sustainability of watersheds and to prevent sedimentation inside dams and reservoirs by drafting a National Watershed Management Policy (2014) and formulating Action Plans for establishing watershed plantations in watershed areas of major dams, reservoirs and water sources. Approaches on eco-system based adaptation are being explored, for instance by the UNDP and by MCCA programme with MOECAF.





3) Capacity-building, education, awareness and communication: Myanmar is in the process of establishing a Disaster Management Technical Centre to provide technical support on disaster management to ministries, sub-departments and other institutions at regional, state and lower administrative levels. The Ministry of Education is also including disaster risk reduction and climate change concepts and practices in school curricula and learning materials to achieve long-term positive impacts. The government, through the MCCA programme, will facilitate a communication campaign with media, working with CSOs and other stakeholders to increase broadcasts and news on climate change and production of awareness materials throughout 2016-17. The government is also increasing awareness and actions to mitigate health risks related to the negative impacts of climate change, including for example seasonal information on vector borne diseases using national media channels.

Myanmar is benefiting from major programmes, such as the BRACED project (£5m, 2015-18) funded by the UK's Department of International Development (DFID), a consortium of INGOs and UN partners, which aims at increasing resilience of communities to disasters in Myanmar. The projects funded by Adaptation Fund and Global Environment Facility will also have major impacts in vulnerable regions, as well as the already mentioned MCCA programme.

### **3.4 Requirements for Additional Planning, Financial and Technical Capacities**

The information above illustrates the attention given by Myanmar to adaptation, but more support and action is required. The NAPA highlighted priorities which the Government of Myanmar and partners are consistently implementing in the area of climate change adaptation and disaster risk reduction. Two elements should be considered. Firstly, priorities level sectors established under NAPA need to be elaborated under the framework of an overall adaptation plan, including the costing and monitoring framework that highlights the roadmap to resilience. Secondly, Myanmar requires sizeable support in terms of capacity-building, technology development and transfer, and financial support for effective implementation as the existing efforts are inadequate.

With respect to institutional capacity building, the MCCA programme is supporting mainstreaming of climate change in various sectors, analysing gaps and promoting training. This action itself will require more coordinated support, with an actionable monitoring and evaluation systems, and close coordination among development partners.

Capacity-building is also required in all sectors, to increase the ability to devise and implement adaptive solutions in all key sectors such as forestry, agriculture and early warning systems. Myanmar calls on the international community to continue supporting the development of capacities to achieve self-sustained adaptation as soon as is practically possible. A major obstacle continues to be access and availability of technologies. This is particularly true, for instance in the area of climate data analysis and short to long-term forecast, i.e. lack of advanced computing facilities to enable accurate warning and information and scenarios.

The needs to achieve the goals of the adaptation actions identified, as well realize the intended mitigation actions listed above contribution are described in more detail in Section 5 of this INDC.

Finally, Myanmar is budgeting for adaptive actions in all sectors with the national budget. However, the scale of the adaptation effort, considering the current level of capacities, and the trend of worsening changes in climate, means major support and investment is required. Investments, both from the Private and Public International Cooperation will be oriented for capacity building and technology development and transfer.

### **3.5 Ensuring Monitoring of Adaptation Efforts**

Given the evolving national and climate context and increasing challenges, Myanmar requires further planning to expedite progress and put a cost to the overall effort. A stock-taking exercise is planned by MoECAAF with UNEP in September 2015, which will constitute the basis for updating priorities and support advanced planning. A National Adaptation Plan will be developed too, to respond to these needs





starting from 2016. Myanmar will develop appropriate mechanism for monitoring of climate vulnerability, funds allocated for adaptation and the results of adaptation actions. However Myanmar requires the support of the international community in improving its planning and monitoring for adaptation efforts., and to implement priorities which may be re-prioritised.

## **4. Implementation of the INDC**

### **4.1 Planning Process for Producing the INDC**

The development of the INDC is a nationally led process. Political guidance has been sought from the highest institutional level within the Government of the Republic of the Union of Myanmar. MOECAF has acted as INDC focal point, facilitating the inputs from other line ministries. The INDC has been prepared through the review of key documents and a government drafting and validation process with all line ministries, which included: one kick-off meeting in March-April 2015, which highlighted priority areas; three interministerial consultations between April and July 2015 (which refined possible options), and a final validation workshop in August 2015. In addition, specific advanced technical meetings were conducted in priority sectors such as the Ministries of Environmental Conservation and Forestry; Energy, Electric Power, Rail Transportation, Transport, Agriculture and Irrigation, Science and Technology, Social Welfare, Relief and Resettlement and Industry. Following the consultation process a final round of ministerial consultations was carried out by MOECAF before the INDC was submitted to the Union Government' cabinet for approval before submission to the UNFCCC. MOECAF also worked with the MCCA for technical facilitation of the process.

Technical assistance for the development of the INDC has been received from the UK Foreign and Commonwealth Office and delivered by Ricardo-AEA Ltd of the UK, and MCCA. Financial support by the Global Environment Facility via the UNEP and technical advice provided by UNEP-DTU partnership was also received to facilitate the preparation of the INDC.

### **4.2 Implementation Plan**

Five main aspects are crucial for successful implementation of the INDC, and international support is required for each aspect. The first is the development of a clear strategy and co-ordination plan which assigns responsibilities and sets deadlines for activities. The second and third, are separate needs assessments for mitigation and adaptation activities respectively which have to be carried out to identify specific requirements and gaps in technology, finance and to identify capacity building requirements in both areas. This has been detailed out in section 5 - Means of implementation. Fourth, mobilising resources for policy development, identification and purchase of suitable technologies for planned actions will be required. Implementation of projects can then begin and finally the fifth aspect of the plan will need to be implemented; a monitoring system will assist with the implementation of the plan at many stages, as outlined below.

A costing exercise including considering short, medium and long term priorities will be conducted to ensure the implementation plan has the necessary resources to deliver on intended contributions, intended actions and future policy development. The coordination of different ministries and stakeholders will be needed at all stages to successfully implement the plan.

Therefore, for implementation, the following activities will be necessary:

- The Union Government's cabinet will identify and mandate one of the existing national inter-ministerial committees to supervise and foster the implementation of the INDC. This may be the National Environmental Conservation Committee or National Energy Management Committee for example.
- Under this arrangement, MOECAF should serve as focal-point for coordination with the guidance of the selected national committee. MOECAF will assist relevant ministries to identify what is



needed to implement identified mitigation and adaptation actions, as well as to develop Myanmar's ability to attract climate finance. MOECA's role will also be to assist with the monitoring of the progress achieved by the line ministries in charge of the respective proposed actions and sectoral strategies outlined in the INDC.

- Myanmar would like to put in place a monitoring framework so that the selected national committee, through its ministry focal-point, will be able to further define financial and technical means of implementation most accurately, to measure progress on a regular basis and to issue policy guidance to the respective line ministries as needed. Myanmar recognises that high quality Measurement, Reporting and Verification-MRV system is the cornerstone of project management as it demonstrates progress against plans, allows responsible entities to steer activities to achieve set policy goals and provides valuable lessons for improving future design and implementation of activities. The set-up of an MRV system for Myanmar's INDC implementation will require the clear allocation of responsibilities, e.g. to the implementing agency concerned, the building of capacities within the relevant agency and relevant stakeholders providing data or performing other MRV activities is also necessary. The set-up of clear processes for data collection, evaluation, quality assurance and quality control, reporting and documentation/ archiving. These activities will require international support in the form of capacity building and financing. Where possible, Myanmar will use existing institutional structures, capacities and processes as a basis for this MRV system.
- The MRV system will have to include a component on costs and financial analysis. For this to be developed, Myanmar requires financial and technical assistance in order that the MRV system can efficiently, effectively and economically:
  - Update and provide financial data to support of the Ministry of Finance and the relevant line-ministries responsible for implementing identified actions
  - Collect information to provide updates on project progress on a regular basis, by establishing clear and straightforward reporting procedures for the line ministries in charge of the policies and actions which fall within their mandate to develop
  - Make the process of completing UNFCCC National Communications and other data requests with respect to emissions data a more efficient and accurate process
  - Provide analysis of observed changes in climate, as well as providing data for the update of models and projections for projects implemented with domestic resources and / or international partnerships
  - Can continue to improve collection of sectoral data and other key information.
- In addition, the development of the National Climate Change Strategy and its associated action plans will provide a platform for the coordination of stakeholders involved in the implementation of the INDC.
- Concerning adaptation, a National Adaptation Plan (NAP) will be developed to plan, cost, and guide actions to meet adaptation objectives and priorities. The NAPA implementation will be continued as planned in the document submitted to the INDC.

## **5. Means of Implementation**

As an LDC, Myanmar requires further capacity-building along with access to technological and financial support from the international community to implement the INDC. In order to realise the intended mitigation contribution set out above and meet the nation's needs with respect to adaptation, Myanmar requires a significant amount of international support. The success of the mitigation and adaptation activities in Myanmar is wholly dependent on receiving sufficient technology-transfer, capacity-building and financial support from developed and more experienced countries, international agencies, donors, and the wider international community.



As defined in Myanmar's Initial National Communication, the NAPA and other documents related to climate change in Myanmar, support is required as follows:

**Technology Development and Transfer.** A preliminary Technology Needs Assessment (TNA) was completed by MOECA as part of the preparation of the Initial National Communication. There is a clear need for the transfer of Environmentally Sound Technologies (ESTs) such as renewable energy and energy efficiency technologies for mitigation and flood control technology and early warning technologies for adaptation. Myanmar's technology development and transfer needs also include technologies and skills transfer which support the implementation and operation of ESTs such as those that ensure the operation, repair and maintenance of ESTs. The understanding of technology development and transfer needs in Myanmar is still developing and an additional TNA should be completed with international support to better understand these requirements. Particularly in the energy sector, Myanmar needs to develop its knowledge, understanding and gain further access to technology that can support goals. Other examples would be the increased use of meteorological modelling technologies as these can help with the planning of renewable which are dependent on seasonal conditions, and also reduce the impact of extreme weather events by improving weather forecasting.

**Capacity-building.** Mitigating climate change and adapting to its impacts will require significant capacity building in all aspects of Myanmar's plans to implement actions identified in the INDC. Further, capacity building will help in the capturing of lessons learned so future policies and actions can be designed and implemented with maximum effect and efficiency. Human resources, scientific research, technical and institutional capacities all require development and international assistance is an important requirement in order that this can be achieved. The Initial National Communication highlighted that further work is required to develop an understanding of the specific capacity-building needs in the above mentioned areas. In addition, and of great importance, is the fact that Myanmar's current capacity with respect to MRV is at a very primary stage. As a consequence, there is limited reliable data to support the attraction of finance and calculate emission reductions. There are various stages of the MRV capacity building process but Myanmar will require international support at each step. Whilst the end goal may be a national greenhouse gas inventory system, this will most likely take years to develop. The first steps are likely to be readiness assessments, personnel and institutional capacity building and also sector level MRV system design.

**Financial Support.** Myanmar needs sufficient and sustained financial assistance across its climate change agenda. Myanmar strongly favours support from the international community in the form of targeted and systematically implemented new funds for LDCs such as the GCF. Increased co-ordination of financial support for mitigation and adaptation measures, outreach programmes and activities, and long-term research projects will make Myanmar's goals more likely to be realised, therefore Myanmar wishes to work closely with such funds to ensure financial support is used effectively. Myanmar also intends to build its capacity to effectively and efficiently participate in future market based mechanisms.

Financial support will first need to be determined by completing a detailed costing estimate in the very short term. It is envisaged that financial support will be utilised by Myanmar in a variety of ways including but not limited to:

- Financial support required for the Technology needs assessment for mitigation and adaptation activities, financial need assessment for estimation of implementation and operational and maintenance cost, identification of need assessment for capacity building for implementation and monitoring of mitigation and adaptation activities,
- Implementing identified actions in the forestry sector (e.g., forest assessments, reducing and stopping deforestation, rehabilitation of degraded forest lands, reforestation, forestry sector specific MRV and implementation of REDD+ projects,



- Implementing identified actions in the energy sector. For example clean technology development, implementation of technologies, making the use of ESTs financially viable for end users and the private sector,
- Addressing financial needs of the other key sectors which are emerging such as sustainable transportation, urbanisation, waste management and agricultural practices
- Development and implementation of other sectoral and eventually national MRV systems for monitoring of actions, producing GHG emissions inventories, quantifying development co-benefits, accounting for funds received,
- Reduction in vulnerability for example by setting up more effective early warning systems and increasing preparedness for disaster risk reduction,
- Recovering from damage already caused by climate change, e.g. rehabilitation of degraded forests and restoration of local ecosystems for people affected due to extreme weather events.

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<sup>i</sup> Global Climate Risk Index 2015, *Who Suffers Most from Extreme Weather Events? Weather-Related Loss Events in 1994 to 2013* and in 2013, Germanwatch and V.

<sup>ii</sup> *Union of Myanmar Post Nargis Joint Assessment*, US Centers for Disease Control and Prevention, United Nations, World Health Organization, *Union of Myanmar Post Nargis Joint Assessment*

<sup>iii</sup> *National Adaptation Programme of Action (NAPA) 2012*, UNEP with the Department of Meteorology and Hydrology, Ministry of Transport, Republic of the Union of Myanmar, page 26

<sup>iv</sup> Cit. NAPA 2012, PRECIS Model still to be validated, page 28

<sup>v</sup> Myanmar Census 2014

<sup>vi</sup> National Energy Policy, The Republic of the Union of Myanmar, National Energy Management Committee, 2014

<sup>vii</sup> Initial National Communication, 2012