Distribution sustainability and climate actions in Myanmar

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Abstract. Myanmar as one of the most vulnerable country like among other countries in the world face adverse impacts of climate change like monsoon season changes, temperature rising, sea level rise, storms, floods and the other onset events throughout some decades. Urbanization and population growth call for economic growth and environmental degradation. Sustainability is the matter most for the country to align with environmental integrity and climate change impacts. Policy development, technology transfer, finance allocation and capacity building are essentially needed to combat climate change impacts, to obtain environmental integrity and to meet the goals of sustainability. Climate change Policy and Environmental Policy are being developed within last five years and legislated in 2018 overarching on the sectors of building, transport, industries, renewable and efficient energy, forestry, agriculture, and disaster risk management to mainstream the climate change impacts. Multilateral cooperation and coordination for climate actions are gradually established in Myanmar collaborating with other countries such as Japan and international organizations, INGOs and NGOs. Mitigation measures are carried out in the areas of energy efficiency (CDM and JCM projects) and renewable energy (CDM projects). Adaptation measures are initializing in some urban and coastal areas to adapt and be resilient of climate change adverse impacts at project level. However, cost-benefit analysis to implement the climate actions and raising ambitions at national level to meet the global climate target to limit the 1.5-degree Celsius temperature raising are still needed to compromise for sustainability and environmental integrity while social wellbeing should not be left behind other than the cases.

1. Introduction
Myanmar is the largest mainland country in the south-eastern of Asia with diverse geophysical features ranging from iced-capped mountains, dry land areas to extensive stretch coastal areas and abundant with natural resources; forests, rivers, minerals, and biodiversity, etc. Population is estimated 53.63 million in 2018 [1] and GDP is $71.54 billion USD at annual growth rate of 6.80% in 2018 [2]. In 2018, the country ranked global environmental performance index (EPI) at 138 among 180 countries compared to the ranking of 164 in 2014 [3]. Today, country is one of the most vulnerable countries in the world and climate related disasters affects 0.6 % of GDP in 2018 [4].

2. International Context of Climate Change and Environment
The idea of environmental protection is environmental remediation to prevent very specific environmental threats whereas sustainability concept tends to be far more holistic and focuses on the long term. In 1987, World Commission on Environment and Development stated that sustainability is
economic-development activity that “meets the needs of the present without compromising the ability of future generations to meet their own needs” [5]. Sustainability can be achieved only by simultaneously protecting the environment, preserving economic growth and development, and promoting equity and that achievement in one pillar cannot and should not be accomplished by sacrificing another.

The links between climate change and sustainable development are strong. For several decades, evidence has shown that global temperatures are rising, mainly as a result of burning fossil fuels, and that the release of carbon into the atmosphere plays a very significant role in the rise and this warming climatic system is expected to impact the availability of basic necessities like freshwater, food security, and energy. Poor and developing countries will be among those most adversely affected and least able to cope with the anticipated shocks to their social, economic and natural systems.

The international political response to climate change began at the Rio Earth Summit in 1992, with the adoption of the United Nations Framework on Climate Change (UNFCCC). The UNFCCC which entered into force on 21 March 1994 now has a near-universal membership of 197 parties. In 2015, the 21st Session of the Conference of the Parties (COP21/CMP1) convened in Paris, France adopted the Paris Agreement, which aims to keep a global temperature rise for this century well below 2 degrees Celsius, and to limit the temperature rise to 1.5 degrees Celsius above pre-industrial levels.

In the 2030 Agenda for Sustainable Development, Sustainable Development Goal 13 aims to take urgent action to combat climate change and its impacts while acknowledging that the UNFCCC is the primary international, intergovernmental forum for negotiating the global response to climate change. Efforts to move toward sustainability involve issues of climate change mitigation and adaptation. Mitigation focuses on actions to reduce the extent to which global temperatures will rise, and to avoid the consequences associated with temperature increases, particularly sea-level rise and increasingly intense and destructive extreme weather events. On the other hand, if the increase of carbon emissions emitted into the atmosphere will unavoidably push global temperatures and sea levels higher, and if efforts to cut carbon emissions continue to be ineffective, then the adaptation efforts will have to be made to understand and prepare for these consequences.

3. **Evolution of Policy in Myanmar**

Political commitments to achieve sustainable development were Myanmar Agenda 21 formulated in 1997 and National Sustainable Development Strategy (NSDS) prepared for long-term framework in 2009 which opened up new opportunities for the creation of green technology and green policy or the “green deal”. Primary objective is to reduce the poverty through the implementation of the “green deal” strategy [6]. National Environmental Policy was drafted in 1995 and approved in 2018 which reiterates the obligations contained in the Environmental Conservation Law (2012) and the commitments under the 2030 Agenda for Sustainable Development and the Sustainable Development Goals (SDG). Awareness on climate change was started in Myanmar since 1978 due to long term changes in monsoon season which came lately, leave early, short duration, unstable, weak, less rain and storm, rising heat index, abnormal weather events occurrences and the mid-term climate changes since 2006 with the occurrences of thunderstorms, flash flood, landslide (MCCA). Myanmar climate change alliance (MCCA) was the first large program in Myanmar focusing on climate change issues and it created the awareness through various ways among communities, media and policy makers [7]. Myanmar climate change policy were legislated in 2018 to address climate change, integrating climate change mitigation and adaptation considerations in national, subnational and sectorial policies and priorities, and pursuing a low-carbon carbon, climate resilient development path.

4. **Climate Actions in Myanmar**

Myanmar actively participated at the UNCED in Rio de Janeiro and signed the UN Framework Convention on Climate Change in June 1992 and ratified as a non-Annex I Party in 1994. In 1997, the preliminary greenhouse gas (GHG) inventory and mitigation options assessment was undertaken in the Asian Least Cost Greenhouse Gas Abatement Strategy (ALGAS) Regional Project (1995-2000). Initial
national communications report was prepared in 2008 and reported to UNFCCC in 2012. The total GHG emission in Myanmar for the year 2000 was estimated to be \((-67,820.1)\) GgCO₂e [8]. It mentioned the projections for potential hazard levels across the whole country as a result of climate change; floods and storm surges; intense precipitation; extreme day temperature; drought and sea level rise and the extreme vulnerability of the country and modelled changes in temperature and precipitation up to 2100. Myanmar submitted its Intended Nationally Determined Contribution (INDC) to the UNFCCC in August 2015 to contribute to the objectives of the Paris Agreement under UNFCCC setting priorities on both mitigation and adaptation. For mitigation actions, initiatives actions are forest conservation, renewable energy and energy efficiency. Actions on forest conservation aim to increase 30% of the country’s land that is listed as Reserved Forest (RF) and to increase 10% of the land that is classified as Protected Areas (PAs). Climate change mitigation activities in the energy sector focus to increase the use of hydropower in the energy matrix, adopting renewable energy solutions for rural electrification, distributing improved cook stoves, and improving industrial energy efficiency. The renewable energy targets in Myanmar’s NDC mentioned the targets of 9.4 GW of total hydropower installed capacity by 2030, and 30% rural electrification through renewable energy applications [9]. Actions in the energy sector will also be aligned with Myanmar’s National Energy Policy, Long Term Energy Plan, National Electrification Master Plan, Comprehensive Village Development Plan, National Forestry Master Plan, Comprehensive Plan for Dry Zone Greening, and the National Energy Efficiency and Conservation Policy, Strategy and Roadmap.

INDC reflect the adaptations priorities listed in Myanmar’s NAPA. These actions are listed in a descending order of priority:

(i) agriculture and forestry sectors, and early warning systems (EWS);
(ii) health and water sectors;
(iii) coastal areas; and,
(iv) Energy and industry sectors and biodiversity.

National Adaptation Programs of Action (NAPAs) process was done to identify and communicate priority activities to address their urgent and immediate adaptation needs. The National Adaptation Program of Action (NAPA) was adopted by the government in 2013. The NAPA provided an overview of the main impacts of climate variability/climate change on socio-economic sectors and communities in Myanmar, and 32 Priority Adaptation Projects (with 4 projects in each of the 8 key sectors) were identified to address the immediate needs for building climate change resilience of vulnerable communities [10]. So far, an assessment was made on the NAPA process and the National Adaptation Plan (NAP) process is prepared to develop to support interventions that build on existing activities and institutions in Myanmar more effectively.

Both adaptation and mitigation measures contained in INDC have been prioritized not only based on their respective contributions to address climate change, but also take into consideration their potential to deliver additional development benefits (i.e. co-benefits). Implementing these measures will require international support in the form of financial, technological and capacity building assistance. As part of this support, Myanmar needs assistance to set up a measurement, reporting and verification (MRV) system to track progress on the implementation of the INDC and related policies.

5. International Cooperation

Myanmar and Ministry of Environment, Japan signed Memorandum of Cooperation (MoC) on environment to facilitate diffusion of low carbon technology, products, systems, services, and infrastructures and to contribute sustainable development of developing countries, and to meet UNFCCC’s ultimate object. Joint crediting mechanism (JCM) is implemented between countries.

6. Conclusions

Myanmar climate change combatting activities are being done steadily in the manner of “doing by learning’ and the requirements for capacity buildings finance, and technology transfer has to be filled up in accordance with the needs of governmental organizations. Second national communication and
intended national determined contribution is preparing to update and coordination and collaboration between institutions are also important for successful implementations of the climate related projects like ecosystem based adaptation, clean development mechanism to achieve the goals of sustainability.

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