

1.1 Genesis of water resources in climate change negotiation

Water resource occupies a critical position in the ongoing negotiations under the United Nations Framework Convention on Climate Change (UNFCCC). The World Development Report (2010) states that for nearly 1 million years before the industrial revolution, the carbon dioxide (CO₂) concentration in the atmosphere ranged between 200 and 300 parts per million (ppm). Levels are far above that range - 387 ppm over the past 150 years (WB, 2010). Earth has warmed up by 0.8°C on an average from pre-industrial levels. Models project that the global average temperature will increase from 2.5 to 7°C above pre-industrial levels by 2100. The World Bank report on 'Turn Down the Heat: Why a 4°C Warmer World Must be Avoided' informed the impacts and vulnerabilities from a 4°C rise in temperature and call for urgent action to safeguard the people and resources from the adverse impacts of climate change (WB, 2012). Climate change negotiations focus to keep the average rise in global temperature to below 2°C, compared to the pre-industrial levels but the science-based prediction is almost double, calling for urgent action. Even the temperature rise of 2°C will have tremendous effects on human life and life-supporting systems due to frequent and stronger weather events including additional stress on water, food security, health and biodiversity. This is a clear indication that predicted temperature rise will have tremendous impacts on human security, and resources on which human beings depend upon for 'survival'.

The fifth Assessment Report (AR5) of the Intergovernmental Panel on Climate Change (IPCC) has reaffirmed that 'warming of the climate system is unequivocal. The atmosphere and ocean has warmed, the amounts of snow and ice have diminished, glaciers have continued to shrink almost worldwide, sea level has risen, and the concentrations of GHGs have increased ...' (IPCC, 2013). The UNEP Emissions Gap Report 2013 points out a significant gap between the political ambition and practical reality. Full and effective implementation of current commitments and pledges by developed and developing countries might lead towards achieving 2°C target (UNEP, 2013). The report also focuses that technologies are available to reduce emission levels to a level consistent with the 2°C target but needs strong political actions supported by means of implementation (finance, technology, and capacity building).

In 1979, scientists discussed in the first World Climate Conference about the science and impacts of climate change, and realised the need for urgent actions to address the accelerated changes in the climate system. After years of continued deliberations by the scientific community and IPCC report this issue was taken up by the UN General Assembly which established the Inter-governmental Negotiating Committee (INC) open to all UN Member States in 1990 to draft the legally-binding instrument on climate change. Accordingly, the UNFCCC was drafted and its text was adopted in May 1992 in New York. In 1997, Parties to the Convention adopted the Kyoto Protocol in order to meet the objectives of the Convention.

The main objective of the Convention (Article 2) is "to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems **to adapt naturally to climate change, to ensure that food production** is not threatened and to enable economic development to proceed in a sustainable manner" (Climate Change Secretariat, 2006). To achieve this objective two prong strategies of adaptation and reduction of anthropogenic emissions by source and enhancing of anthropogenic removals by sinks of greenhouse gas emissions were adopted by the Parties right from the beginning of the implementations of this Convention.

On the front of stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system and carbon trading, including Clean Development Mechanism, between the developed and the developing countries under the Kyoto Protocol have been devised and brought into gear.

The principles of common but differentiated responsibility (CBDR) and respective capabilities, developed countries to take the lead, consideration to the vulnerable countries, restriction on unjustified trade and discrimination and precautionary measures etc enshrined in the UNFCCC have provided a sound basis for the climate change negotiation.

Article 4 paragraph 1(e) of the Convention states that all Parties, taking into account CBDR and their specific national and regional development priorities, objectives and circumstances, shall *cooperate in preparing for adaptation to the impacts of climate change; develop and elaborate appropriate and integrated plans for coastal zone management, **water resources** and agriculture, and for the protection and rehabilitation of areas, particularly in Africa, affected by drought and desertification, as well as floods.*

The Conference of the Parties (CoP) to the Convention and CoP serving as the Meeting of Parties (CMP) to the Kyoto Protocol meet annually, as of now, to make necessary decisions for the effective implementation of the Convention and the Protocol. Decisions on climate change adaptation have been taken during different sessions of the CoPs and CMP under the matters related to the LDCs, LDC Fund and other funds, Nairobi Work Programme and/ or Bali Action Plan, Cancun Agreement or the Durban Platform or Doha Gateway. Whatever may be the form, adaptation has increasingly received attention in UNFCCC negotiation process. Now, all LDCs have prepared their country-specific National Adaptation Programme of Action (NAPA) and most of the countries have started implementation of 1-3 projects to address their most urgent and immediate adaptation needs as per their NAPAs. Based on Cancun Adaptation Framework, developing countries in particular the LDCs have been engaged in National Adaptation Plan formulation process. Nepal's NAPA includes *empowering vulnerable communities through sustainable management of water resource and clean energy supply* (NAPA Profile 8) as a priority adaptation programme. Selected adaptation activities on water resources as included in NAPA are, *inter alia*: (i) conservation of lakes supplying water and ecological services to urban areas; (b) conservation of sources of water supply; (iii) piloting rainwater harvesting; (iv) promotion of clean and low carbon energy technologies; (v) establishment and improvement of micro-hydro projects; and (vi) implementation of local adaptation plans for efficient water and energy management (MoE, 2010).

During 19th Session of the CoP to the Convention, under the agenda Nairobi Work Programme on impacts, vulnerability and adaptation to climate change, CoP requested the Subsidiary Body for Scientific and Technological Advice (SBSTA) to consider, *inter alia*, the issues of **water resources** (Decision 17/CP.19). This opens multiple avenues to advance negotiation on water resources and benefit from the UNFCCC process.

The SBSTA at its 40th session (4-14 June 2014, Bonn) discussed agenda item related to NWP on impacts, vulnerability and adaptation to climate change. As per the practice, the SBSTA chair has proposed the draft conclusion which reiterates invitation made to the Parties and NWP partner organisations, including regional centres and networks, to include information on the following, as appropriate, in their submissions (SBSTA request in 39th meeting):

- a. Available and implemented tools and methods for adaptation planning processes addressing the four issues of ecosystem, human settlements, **water resources** and health;
- b. Good practices and lessons learned in relation to adaptation planning processes, including on monitoring and evaluation, addressing the four issues of ecosystem, human settlements, **water resources** and health; and

- c. Good practices and lessons learned related to processes and structures for linking national and local adaptation planning.

Based on the submission, the UNFCCC Secretariat will prepare a synthesis paper for consideration at SBSTA 41 (December 2014). In this context, Nepal may wish to make submissions to inform Parties and other partners on our concerns, views and ideas in implementing the NWP very effectively and efficiently.

1.2 Climate change scenario

IPCC (2001) reported an increase in mean surface temperature in the range of 0.3°C to 0.8°C over the past 100 years in tropical Asia including Nepal. On the basis of analysis of maximum temperature data from 49 stations in Nepal for the period of 1971 to 1994, Shrestha et al., (1999) reported warming trends across the country after 1977, ranging from 0.06°C to 0.12°C per year in most of the Middle Mountain and Himalayan regions, while the trends in the Siwalik and the plain areas of Terai were found to be less than 0.03°C per annum. A recent study shows that the average temperature trend in Nepal from 1975 to 2006 is 0.027°C per annum in comparison to the global trend of 0.017°C for the same period. This shows that the average temperature in Nepal is rising at a rate 1.6 times higher than the global average (Sharma, 2010). Glacier retreat is a clear indication of the higher rate of warming in the northern part of the country. The reduction in the snow and glacier cover from a small amount of climate change reduces the albedo effect and therefore increases the surface temperature, causing a positive warming feedback in the local environment (Meehl, 1994).

Different studies carried out on the climate change projection, mainly based on the climate models, have predicted the rise in temperature and changes in precipitation over entire country for different time periods. Based on Regional Climate Model (RegCM3) output for A2 scenario, Karmacharya et al., (2007) have predicted annual mean temperature rise with the range of 1.7°C in the south to 2.5°C in the north for the mid-century period of 2039-2069. This study indicated the decrease in monsoon precipitation in most part of the country for the same time period. Climate change impacts are multifaceted, affecting all sectors: agriculture, food security, water resources, energy generation, infrastructure, ecosystem services, and human health. Agrawal et al., (2003) has ranked the climate change impacts on water resources and hydropower significantly higher than other sectors.

1.3 Methodology

In the preparation of this Policy Brief, the following methodology was adopted:

1.3.1 Literature Review

For updating the knowledge on UNFCCC provisions, relevant decisions of the CoPs, submissions of the Government of Nepal on different agenda items, Climate Change Policy, NAPA, LAPAs, status of climate change in Nepal, and other relevant documents were reviewed.

1.3.2 Interaction and Consultation

Several rounds of internal discussions were held among the experts within JVS/GWP Nepal. Discussions and meetings were also held with the concerned officers of the Government including the Secretary of MoSTE. A half-day consultation program was organised on 20 February 2014 in Kathmandu. The Consultation Programme was attended by 52 participants including present and former secretaries of the Government of Nepal, water resources experts and climate change practitioners, including representatives of the government ministries and departments, non-governmental organisations, and academic institutions (GWP Nepal/JVS, 2014). Three presentations namely on impacts of climate change on water resources, Nepal's priority agenda for UNFCCC negotiation, and water resources and climate change were made and followed by discussions. Views and concerns of the paper presenters, commentators, and participants of the stakeholder consultation have been considered while drafting this policy brief.

1.3.3 Report Preparation

Based on the review, interactions and consultations, a draft report was prepared. The draft report was peer reviewed by the professionals of the water resources sector and those involved in climate change negotiation. The report was finalised taking into consideration the inputs received from reviewers and JVS members.

CLIMATE CHANGE AND ITS IMPACT ON WATER RESOURCES IN NEPAL

The recent study on economic assessment of climate change in key sectors informs that Nepal suffers high economic costs in agriculture, hydropower and water-induced disasters due to current climate variability and extremes. It has estimated direct cost of current climate variability and extreme events equivalent to 1.5 to 2 percent of current GDP/year (approximately USD 270-360 million/year in 2013 prices) and much higher in extreme years (MoSTE, IDS Nepal, PAC and GCAP, 2014). In case of hydropower, the model projected lower dry season flows and thus lower energy availability. The additional generation capacity needed to meet future demand under this scenario, due to climate change, was estimated at 2800 MW by 2050 with an increase in costs of USD 2.6 billion (present value) for the period through to 2050. This clearly indicates high economic cost Nepal should bear from climate change to which she is not responsible.

2.1 Water resources

Nepal's river system is divided into 4 major river basins namely Koshi, Gandaki, Karnali and Mahakali. Seventy four percent of the river basins lie within the country whereas, 22% lie in China and 4% in India. There are approximately 6,000 rivers and rivulets in Nepal draining 225 billion cubic meter of water annually (WECS, 2002). It is estimated that around 78% of the average flow in the country is available in the four major basins, 9% in the medium basins and 13 % in the numerous small southern rivers of the Terai.

The rivers in Nepal are broadly categorized as perennial and non-perennial rivers. The perennial rivers originate in the Himalaya and carry snow-fed flows with significant discharge thus, having tremendous potential as a source of irrigation and hydropower development. Large number of small rivers in the Terai which mostly originate in the Siwalik Range are non-perennial with little flow during the dry season.

The rivers in Nepal are characterized by wide, seasonal fluctuation of flow. The monthly flows generally reach their maximum in July-August and decline to their minimum in February-March. About 80% of the total flow occurs during five months (June - October) and the rest during the remaining months.

2.2 Water use and climate change impacts

2.2.1 Irrigation and Agriculture

Although Nepal is bestowed with abundant water resources its present use is very low. The Nepalese economy is largely based on agriculture which accounts for around one-third of GDP and provides employment to around two-third of active population (WECS, 2013). But, this farming is predominantly small scale due to inherent land fragmentation (due to land property sharing within families as well) and the majority of the farmers are small land holders cultivating less than 0.5 ha. Agriculture Sector is besieged by problems related to land management, marketing, proper institutional capacity, low productivity and above all dependent on all round irrigation services. Agriculture production is closely linked with the climate system, as about half of this farming in Nepal is rain-fed. So, with lower technological and capital stocks, the agriculture sector in Nepal is unlikely to withstand additional pressures imposed by climate change without a concerted investment response.

Analyzing current trends and scenarios based on projected temperature increase, an Asian Development Bank (ADB) study produced by the International Food Policy Research Institute entitled "Addressing Climate Change in the Asia and Pacific Region: Building Climate Resilience in the Agriculture Sector" warns that four countries in South Asia – Afghanistan, Bangladesh, India and Nepal" are being particularly vulnerable to falling crop yields caused by glacier retreat, floods, droughts, erratic rainfall and other climate change impacts (www.iwapublishing.com, 2011) The study warns that if current trend persists until 2050 (by this time Nepal's population is projected to be 80 million), the yields of irrigated crops in South Asia will decrease significantly – maize (-17%), wheat (-12%) and rice (-10%) because of climate change-induced heat and water stress. Change in temperature and rainfall pattern will change in cropping pattern. Temperature rise might favour for higher yield from some crops but extreme events will result to adverse effect on agricultural yield. The resulting food scarcity will lead to higher prices and reduced caloric intake across the region.

2.2.2 Hydro-Power Energy

The per capita energy (electric power) consumption in Nepal is 105.5 KWh¹. Energy is the driver of growth. There is a clear relationship between economic growth and energy consumption. If Nepal is to develop it must have to increase its energy consumption. At present the share of biomass such as forest, agriculture and animal residue etc. accounts of roughly 80% of the energy demand of the country. There is no fossil fuel reserve found so far and there is no coal reserve either. Hence, to increase the energy supply one of the major options available is hydro-power generation and renewable energies.

1. As of 2011: <http://data.worldbank.org/region/SAS>

Fortunately, Nepal is bestowed with abundant water flowing into its rivers through elevations ranging from 59m to 8848m from msl which provides abundantly suitable locations for hydro-power generation. A study done long past back in 1963 (Shrestha, 1966) estimated the theoretical hydropower potential to be about 83,000 MW of which technically and economically feasible potential is of about 42,000 MW. This potential if harnessed could fulfil the demand. However only about 700 MW² has so far been harnessed. As we go for up scaling the development of this potential, climate change phenomenon and its impact in the water resources of the character that we have is going to present a daunting challenge.

The water tower of the country is in the form of snow and glacial lakes in the mighty Himalaya. Due to the increase in the temperature and the resultant effect on the increased pace of glacier melt has caused a problem for a sustained flow of water in the rivers of the country. Studies show about 6% of the ice area lost in the period 1970 to 2000 and Valley Glaciers have shrunk by around 10 to 60 m/yr. In 2010, a total of 3,808 glaciers were identified with a total area of 3,902 km² and estimated ice reserves of 312 km³ (Bajracharya et al., 2014). The total area of glaciers has decreased by 24 percent between 1977 and 2010 and estimated ice reserves by 29 percent (129 km³). The number of glaciers has increased by 11 percent. Data showed glaciers recede on an average by 38 km² per year.

Variation in extreme events (temperature, precipitation) poses a great threat to the river flow presenting a scenario of too much, too little water. The study of the Department of Hydrology and Meteorology (DHM) showed an increase of 13% more flow on Karnali on a 4 degree temperature rise and 20% precipitation increase. The increasing trend in temperature make the hydropower generation more vulnerable. Increased rainfall intensity questions the safety of hydraulic structures.

2.2.3 Drinking water supply and Sanitation

In 2007, the water supply and sanitation coverage was approximately 80% and 43% respectively (MoPPW, 2011). The 2011 census data shows that the water supply and sanitation coverage in Nepal is 85% and 62% respectively. The MoPPW (2011) has cited that the access to improved drinking water and improved sanitation is higher among urban households, 94% and 78% respectively. According to a study conducted by Department of Water Supply and Sewerage (DWSS) in 2007/2008, 57% of total of 37,541 water supply schemes constructed in the country were in working conditions and remaining were not functioning. Climate extremes cause both physical and managerial stresses on water supply systems (IPCC, 2007). Climate change is expected to bring changes in seasonal patterns

2. NEA, A year in Review- Fiscal year 2012/2013 (NEA hydro production: 469.29 MW and IPP 230.59 MW)

and extreme events and hence the unevenly distributed renewable freshwater resources will be affected by the climatic variability. Climate change might have induced drying-up of water sources in the middle and high mountains. In the recent years, water scarcity in particular drinking water has induced migration of even a settlement such as in upper part of the Mustang district.

SPECIAL OPPORTUNITIES FOR NEPAL AND UNDERLYING ISSUES

As a LDC Party to the UNFCCC, Nepal could benefit from opportunities generated by the climate change phenomenon. Article 4.9 of the Convention states that 'the Parties shall take full account of the specific needs and special situations of the least developed countries in their actions with regard to funding and transfer of technology'. LDCs have to prepare themselves to adapt to the adverse effects and impacts of climate change. For this, Parties to the UNFCCC at its various sessions have made decisions to support for climate change adaptation, finance, carbon trade, technology development and transfer, and capacity enhancement.

3.1 Climate Change Adaptation

Adaptation is an adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. The ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damages, to take advantage of opportunities, or to cope with the consequences is considered an adaptive capacity of those affected which may be a natural system, a social system, an institution, a community or an individual. As climate change effects are widespread, any system or an individual either finds ways to adapt to, or migrate or disappears (survival of the fittest). It is natural that affected system or a community or an individual attempt to adapt to any shocks to the extent possible.

The CoP3 decided to undertake a process and determine actions necessary to meet the specific needs of the Developing Country Parties, specified under Article 4, Para 8 and 9, of the Convention. Parties decided at its 5th session to continue this process and recognized the need for capacity building on adaptation and developing guidelines on adaptation projects. In the process of enhancing the adaptation process the LDC Parties were encouraged to prepare country specific National Adaptation Programme of Action (NAPA) and at present all LDCs (except South Sudan) have prepared NAPA and started their implementation.

There are two processes to address climate change adaptation – NAPA and National Adaptation Plan (NAP). The Cancun Adaptation Framework in 2010 urged to formulate NAP to address medium- and long-term adaptation needs in the developing countries. The LDC Expert Group has prepared NAP Technical Guidelines to assist the LDCs in NAP formulation process in order to meet its two objectives of: (i) reducing vulnerability to the impacts

of climate change, by building adaptive capacity and resilience; and (ii) facilitating the integration of climate change adaptation, in a coherent manner, into relevant new and existing policies, programmes and activities, in particular development planning processes and strategies, within all relevant sectors and at different levels, as appropriate (decision 5/CP.17, paragraph 1). According, LDCs are now engaged in the NAP formulation process in addition to developing countries Parties to the UNFCCC.

Implementation of the NAPA prioritised activities are primarily funded through the pledge-based LDC Fund. LDCs may also use the LDCF for NAP formulation process. The Adaptation Fund (AF) and the Green Climate Fund (GCF) may also provide funding support. However, much work is needed to operationalise the GCF to support for climate change adaptation activities. LDCs have secured funding from the LDC Fund, bilateral and multilaterals to implement NAPA prioritised adaptation actions. The SCCF and AF have no or low support to LDCs to address the adverse effects of climate change through adaptation options.

Key Issues

Nepal has started implementation of NAPA prioritised adaptation activities. Experiences indicate a number of issues that could be raised and CoP may decide for the benefits of the most climate vulnerable peoples, communities and ecosystems of the LDCs. Some of the issues, Nepal could flag in the forth-coming meetings regarding adaptation are as follows:

1. Funding Gap

Based on the estimated budget included in the NAPAs of least developed country Parties to the UNFCCC, implementation of NAPA prioritised adaptation actions in LDCs require more than USD 2 billion whereas replenishment of funds within the Convention regime are extremely slow and low. Practically, GCF is empty; AF will shortly be empty as CDM market is almost collapsed; and LDCF does not meet the demands of the LDCs. The funding is basically a pledge from developed country Parties. Gap between pledging and disbursement of fund is also an issue. Nepal should advocate for bridging the funding gap, primarily on LDCF as it could be accessed only by the LDCs. For this, a mechanism could be developed so that developed country Parties to UNFCCC may wish to provide some percentage of their national GDP or funding through other actions that emit GHGs so as to ensure perennial source of funding in the LDCF. Alternatively, developed countries may wish to pledge and disburse significant amount on regular basis (annually) for the moment to support implementation of NAPA prioritised most urgent and immediate adaptation actions in the LDCs.

2. Co-financing

The GEF operated LDC Fund requires co-financing to access funds for climate change adaptation actions. If LDCs have national funding, they could themselves implement most urgent adaptation actions to adapt to the effects of, and build resilience to, climate change. As Article 4.9 of the Convention obliges the developed country Parties to provide technology and financial resources to the LDCs, without any pre-condition, LDCs may advocate for avoiding the provision for co-financing and support LDCs to meet their funding requirements.

3. Additionality

In order to access funding for adaptation activities, LDCs should prove additionality, i.e., impacts are due to climate change. Due to lack of scientific data and research studies in countries like Nepal, it would be difficult to prove 'additionality'. Hence, this provision should be exempted for LDCs while financing for climate change adaptation actions.

4. Direct Access

LDCs can't access financial resources from LDCF directly. Although, direct access provision exist for Adaptation Fund through the accredited National Implementing Entity (NIE), it has become extremely difficult to accredit NIE in the LDCs. The accreditation procedures for the LDCs should be simple and easy. In this context, Nepal should align with other countries or group of countries to advocate for direct access on LDCF so that Nepal's effort will also benefit other LDCs.

5. Complex Process

Accessing finance from the established funds under the Convention is complex and lengthy. Once, a Party approaches funds through the GEF Implementing Agency (IA) or the Multilateral Implementing Entity (MIE), significant time would be required to GEF IAs or MIEs to prepare and get endorsed the project and disburse the fund. LDCs need immediate response to cope with the existing and unforeseen impacts of weather events or climate change, and implement adaptation actions on the ground immediately. Hence, vulnerability of the LDCs should be understood and GEF IAs and MIEs should provide 'fast track' services. Similarly, GEF should speed-up approval and disbursement of funds to support the implementation of adaptation actions in the LDCs.

6. Lowering Service Charge

Experience indicates that service charge provided to the GEF IAs for the preparation of the document such as NAPA or TNA or NCs are appropriate. While service charge for investment projects might be very high in case of LDCs. In this context, GEF should revisit its 'service charge' provision and separate 'service charge' for the preparation of the project document, and implementation of the project (on the ground).

7. Support for NAP Implementation

As Technical Guidelines and funding decision for the NAP process are in place, LDCs may wish to start NAP formulation process to identify medium- and long-term adaptation needs and integrate climate change adaptation into sectoral development policies, programmes and projects and synergy with local planning. Non-governmental organisations are engaged in creating awareness and building capacity on NAP process in Nepal. Hence, Nepal should start raising issues for ensuring fund for the implementation of medium- and long-term adaptation projects as a part of the NAP process. The NAP process is expected to enhance north-south and south-south cooperation on climate change adaption.

3.2 Loss and Damage

Climate-induced disasters are increasing over the years damaging the physical properties and claiming the lives and property of the people in the LDCs. Due to uncertainties of climate change, disaster risk reduction may reduce vulnerability and build adaptive capacity of the climate vulnerable peoples and communities. Article 4.8 of the Convention and Article 3.14 of the Kyoto Protocol provides provisions on 'insurance' and 'response measures'. Issues related to 'liability' and 'compensation' are raised in the recent years. Much work is needed to make the 'polluters' liable' to loss and damage and develop a mechanism for 'compensation' under the UNFCCC.

The 1997 CoP3 decided to undertake a process to identify and determine actions necessary to meet the specific needs of the Developing Country Parties. The Bali Action Plan under its enhanced action on adaptation, urged Parties to consider 'disaster reduction strategies and means to address loss and damage associated with climate change impacts in developing countries that are particularly vulnerable to the adverse effects of climate change'. The CoP16 established the work programme to consider approaches to address loss and damage. The CoP17 in Durban identified three thematic areas: (i) assessing the risk of loss and damage and the current knowledge; (ii) a range of approaches to address loss and damage associated with the effects of climate change; and (iii) the role of the Convention in enhancing the implementation of approaches to address loss and damage associated with the adverse effects of climate change. The basic focus was to generate knowledge and information. In Doha (CoP 18), Parties agreed the need for a comprehensive, inclusive and strategic response measures and decided to establish in CoP19 international arrangements including functions and modalities to address loss and damage. The CoP19 established the Warsaw International Mechanism (WIM) for Loss and Damage associated with climate change impacts under the Cancun Adaptation Framework (Decision 2/CP.19). The WIM for loss and damage will (i) enhance knowledge and understanding of comprehensive risk management approaches; (ii) strengthen dialogue, coordination, coherence and synergies among relevant stakeholders; and (iii) enhance action and support including

finance, technology and capacity building to address loss and damage associated with the adverse effects of climate change. The CoP19 also established an executive committee of the mechanism and its initial meeting was held in March 2014 to develop initial workplan for the implementation of the functions of the WIM for loss and damage associated with the climate change impacts.

The initial meeting has identified themes such as non-economic losses, rehabilitation/recovery, social protection, migration/displacement, slow onset events, national adaptation plan, food security and health, risk assessment and management and so on. The workplan will be further discussed and adopted in CoP20 in Lima, Peru.

Key issues

There are methodological issues to calculate loss and damage associated with climate change impacts. As of now there is no clear funding arrangement under the Convention to deal with and address the effects of loss and damage. More evidence-based results would contribute to streamline the pertinent issues of loss and damage as this is a new area. It is equally important to share experiences and lesson learned in addressing loss and damage. Nepal should stress on methodological issues and studies in the mountainous countries to develop a mechanism that benefits the climate vulnerable poor people living in the mountains.

3.3 Clean Development Mechanism

The UNFCCC's main objective according to its Article 2 is to achieve stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.

The Kyoto Protocol was adopted to meet the objectives of the Convention. It established a regime which obligated the Developed Countries individually or jointly, to ensure that their aggregate anthropogenic carbon dioxide equivalent (CO₂-eq) emissions of the GHGs listed in Annex A of the Protocol do not exceed their assigned amounts, calculated pursuant to their quantified emission limitation and reduction commitments as inscribed in Annex B of the Protocol.

Further, the Protocol provided that the net changes in greenhouse gas emissions by sources and removals by sinks resulting from direct human-induced land-use change and forestry activities, limited to afforestation, reforestation and deforestation since 1990, measured as verifiable changes in carbon stocks in each commitment period, shall be used to meet the commitments.

Besides fixing the obligation of the Developed Countries Party the Protocol also allowed those Parties under Article 6 to transfer or acquire from any other such Party emission reduction units resulting from projects aimed at reducing anthropogenic emissions by sources or enhancing anthropogenic removals by sinks of greenhouse gases in any sector of the economy. Article 12 of the Protocol has defined the Clean Development Mechanism (CDM) and provides Parties not included in Annex I to benefit from the project activities resulting in certified emission reductions (CERs), and Parties included in Annex I to use CERs accruing from such project activities to contribute to compliance with part of their quantified emission limitation and reduction commitments under Article 3. It opened carbon trade between developed and developing Country Parties to the Protocol, and it worked well for the first commitment period (2008-2012). However, Annex I Parties has yet to commit on second commitment period of the Protocol. In order to bring all Parties in meeting the objectives of the Convention, Parties established an Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP) (Decision 1/CP.17) in 2011 to develop a protocol, another legal instrument or an agreed outcome with legal forces under the Convention applicable to all Parties. This instrument will be adopted by the Parties at CoP 21 in Paris in 2015.

Realizing that LDCs have not benefitted from CDM, Parties in 2010 in Cancun requested the CDM Executive Board to develop standardized baselines for CDM projects. The standardized baseline is a baseline established for a Party or a group of Parties to facilitate the calculation of emission reductions and removals and/or the determination of additionality for CDM project activities. This provision is expected to: (i) reduce transaction costs; (ii) enhance transparency, objectivity and predictability; (iii) facilitate access to the CDM; and (iv) identify the baseline and determine the baseline emission factor. The CDM Executive Board at its 62nd meeting requested the Secretariat to prepare a work programme to implement the Guidelines for the establishment of sector specific standardized baselines. The standardized baseline may cover fuel switch, switch of technology and energy source, methane destruction, and avoidance of GHGs formation.

Nepal has considerable potential of developing clean energy through various ways such as afforestation, hydro power, solar, biogas and other sources of alternative energy. All these have the potential of contributing to the net changes in greenhouse gas emissions by sources and removals by sinks resulting from direct human-induced activities relating to the development of clean energy.

As of April 2014, the Designated National Authority (Ministry of Science, Technology and Environment) has approved Project Design Document (PDD) of about 22 CDM Projects. In August and September 2011, the CDM-Executive Board has issued CER (certified emission

reduction) of Nepal's two biogas projects. Nepal's CDM projects on micro-hydro and improved stoves have been registered with the CDM Executive Board.

Key issues

Nepal has a large hydropower potential of approximately 83,000 MW. Presently, Nepal has developed approximately 700 MW run-of-river hydropower projects. Bulk of the hydropower generation has not yet been realized in the country. In the entire scenario of energy use of the country, only 1% of the total energy need is fulfilled by electricity. The bulk of the energy need is dominated by fuel wood (68%), agricultural waste (15%), animal dung (8%) and imported fossil fuel (8%).

Only about 40% of Nepal's population has access to electricity. With this scenario and given the fact that Nepal has significant hydropower potential, it will be necessary for Nepal to utilize this natural resource to provide electricity country-wide. This will also help the county alleviate its energy security concerns and climate change issues.

The Clean Development Mechanism (CDM) has accelerated hydro power development in various countries, including India. Nepal's hydro power plants still remain left out to avail the CDM benefits due to the fact that the Nepal electricity grid is predominantly fed by hydro power projects. Due to this, the grid emission factor in the baseline scenario becomes zero (for hydro) which does not provide the CO₂ reduction benefit to the project proponents who want to install new hydropower projects.

The current baseline emission factor based on Hydropower does not justify the real baseline emission factor for the end users who use grid electricity and other fuels such as kerosene, diesel and firewood, etc in the absence of grid availability. It may be noted that grid availability in Nepal is only about 8-10 hours and the official power cut are of the order of 14-16 hours a day. Hence, considering the fact that about 60% of Nepal's population still uses conventional fuels such as kerosene, firewood, and diesel, etc for their lighting and other needs there is a need to establish the baseline emission factor for the Nepalese end users which is a weighted average of the grid emission factor and the fossil fuels used by the end users in the absence of grid electricity.

Given this background, it is required to undertake a study, for establishing the good 'real' baseline emission factor for the end-users which would be a weighted average of grid electricity and the fossil fuels used in the absence of grid electricity. The new hydropower projects will be displacing the fossil fuel usage by the end-users which are burnt in the absence of grid supply. Taking into consideration the Cancun decision, Nepal should develop the standardized baseline that might provide options to bring the hydropower under the

carbon trade. The UNFCCC focal point may wish to initiate the process in collaboration with the technical agencies such as the WECS.

Nepal being the mountainous country and hydropower being the major source for clean energy may raise and advocate for preferential decision for the mountainous LDCs and/or mountainous developing countries having hydropower as the only source of clean energy to recognize the urgency of developing hydropower as the CDM project. Mountainous countries may align and make submissions on this issue for future negotiations. If so, this will provide additional benefits from carbon trade and Nepal's hydroelectricity projects that are constructed in difficult mountain terrain as a costly business could be made cost-effective.

For Nepal to get the carbon credit details need to be followed as prescribed in the form of prior information, meticulous review of the action and the compliance of the guidelines which require specific expertise and knowledge. Similarly, to acquire the carbon credit by the developed countries they also need to provide prior information on the details of the project from which such carbon credit is planned to be acquired as well as they continue to comply their obligation under the Convention and the Protocol. Thus the generator of clean energy and the one who is the buyer of the carbon credit both have to abide by the guidelines as specified under the Protocol.

As Nepal plans to export its hydro energy and the user is different than the supplier and hence care needs to be taken that the benefit should not be consumed by the user only. Perhaps modality needs to be developed whereby the carbon credit acquired by the Project constructed in Nepal is accounted for in its negotiation with the exporter. Modality for sharing such benefits should be developed. As Nepal is at the nascent stage in terms of the technical expertise in the trading it should try to negotiate and use the avenues available for enhancing its capability.

3.4 Technology Development and Transfer

Under the UNFCCC the Developed Country Parties has taken the commitment that they shall promote, facilitate and finance environmentally sound technologies to enable the Developing Country Parties to implement the provisions of the Convention (Article 4.5). They have committed that they shall finance the agreed full cost of the Developing Countries of fulfilling the commitments of providing periodic information on the situation of climate change under the Convention (Article 12). They are also to provide incremental cost of transfer of technology for meeting the obligation of the Developing Country Parties in the implementation of the Convention such as information dissemination, integration of sustainable development, adaptation policy formulation etc. (Article 4 paragraph 1 and 3).

Clearly, under the UNFCCC legal framework, transfer of technology does not refer merely to transactions involving the mere sale or mere lease of goods but requires the transfer of know-how and the right to use and further develop these technologies in support of the development and enhancement of endogenous capacities and technologies of developing countries. Thus a comprehensive definition of technology transfer involves not only the purchase and acquisition of equipment but also the transfer of skills and know-how to use, operate, maintain as well as to understand the technology hardware so that further independent innovation is possible by recipient firms. It also includes the ability to make the technology through “imitation” or reverse engineering; to adapt it to local conditions; and eventually to design and manufacture original products. The process of technology transfer involves progressively climbing through all these aspects.

Some milestones can be identified in the evolution of the issue of the development and transfer of environmentally sound technologies (ESTs) over time. The framework for meaningful and effective actions on technology transfer was adopted in Marrakesh (CoP7). The CoP13 established the Bali Action Plan which includes technology transfer. The CoP16 adopted the Cancun Agreements which established Technology Mechanism comprising a Technology Executive Committee (TEC) and a Climate Technology Centre and Network (CTCN). In Doha, UNEP was elected as the host of the CTCN.

The CoP18 invited Parties to nominate their national designated entities (NDEs) for the development and transfer of technologies in order to facilitate the operationalization of the CTCN. In the case of Nepal MoSTE has been designated as NDE.

Following to the implementation of this framework of commitment the LDCs as a block of countries have identified four primary needs they require from the UNFCCC in regard to the transfer of environmentally sound technologies: (i) obtaining adaptation technologies; (ii) engaging in capacity-building activities; (iii) a preference for bilateral donors, and donors' coordination; and (iv) acquiring adequate funding. However, very little has been in progress along that line. While there had been many discussions related to technology transfer, there remained significant lack of knowledge regarding the concrete mechanisms by which technology transfer may take place and the way to ward off the role that intellectual property right may play as a barrier. There is still a need for analytical frameworks for evaluating proposals as well as for making the discussion more concrete. To get something more concrete in this field there is a need to act in the following way which could be termed as issue of transfer of technology from the Developed countries to the Developing Countries, particularly in the LDCs with focus on affordable and easily accessible technologies for hydroelectricity generation:

Issues

There are several issues Nepal may flag to benefit from technology development and transfer.

1. Compilation and maintenance of updated information on intellectual property and restrictive business practices (e.g. refusal to deal, restrictive licensing practices etc) and promote measures/mechanisms to regulate/prevent restrictive practices in licensing agreements and anti-competitive uses of intellectual property through the development of norms/standards.
2. Promotion of R&D incentive models and funding mechanisms including under the UNFCCC to ensure that R&D outcomes including products/technologies emerging from R&D are not monopolized, but are available to others to engage in follow-on R&D and that such outcomes are affordable.
3. Establishment of technology pooling mechanism at the global level giving particular focus on the LDCs. This process should not only be easy and facilitative of transfer of technology but also be helpful in easing the barrier for such transfer.
4. R&D is critical in technology innovation. Sufficient funding will have to be made available to this aspect. Innovation of indigenous technologies is key particularly when it comes to adaptation. Encouragements for such activities must be a part of any development aid to the LDCs.
5. Furthermore, LDCs have conducted Technology Needs Assessment (TNA) and prepared Technology Action Plan (TAP) and developed countries should provide additional funding, in the spirit of the Article 4.9 for the effective implementation of the TAP in the LDCs.
6. Capacity development is another aspect of technology development and transfer. Transfer of technology can only happen when the receiver has the capacity to receive the technology and use it. This would require institutional mechanism and its strengthening, training and a continuation of research. These all are related to each other and in the absence of one other element would not be successful. Therefore, the development package must imbibe these aspects around UNFCCC negotiation process.

3.5 Capacity Building

Nepal has inadequate capacity to address the adverse impacts of climate change in general and in adaptation, impacts mitigation, and technology use in water resources sector in particular. Capacity building and/or enhancement is necessary to do the right things effectively and efficiently. There are several issues under the UNFCCC process requiring enhanced capacity to understand, inform, dialogue and influence decision-making. As water resource is a new area and recently introduced under the Nairobi Work Programme, Nepal needs to enhance its capacity on negotiation, adaptation options, GHGs emission reductions and emission factors, and technology use. Furthermore, Nepal should emphasise

on capacity building/enhancement as a part of the programme rather than for standalone capacity development package.

Nepal's climate change policy provides provision to channel at least 80 percent of the total climate finances to address climate change impacts faced by the climate vulnerable communities. For this, UNFCCC process has contributed a lot to prepare NAPA and LAPA and involve local communities in the climate change and related activities including in water resources sector. The climate change budget code will help in tracking budget allocation and public expenditure and hopefully empower the local communities in identifying, prioritising, implementing and monitoring climate change activities on the ground. Ultimately, it will enhance capacity and empower local communities. Hence, Nepal should focus on developing knowledge-based human resources to address multi-faceted climate change issues, particularly in reducing impact of climate change in water resources sector.

3.6 Special Focus on Himalaya and the opportunities in UNFCCC

Water is the key resource of Nepal. The potential of this resource for various uses like irrigation, energy, navigation, water supply, recreation etc holds the key for the development of other countries in the region as well. The Ganges River basin is the home of 410 million people of India, Nepal and Bangladesh. Nepal provides 45% of its annual flow, 75% of the dry season flow and 30% of flood peaks of this river water. India is already a high risk country so far as water availability is concerned. According to World Resources Institute it ranks 41 among the 181 countries of the world in regard to water availability (Times of India Dec. 14, 2013). On the other hand flood and submergence has been a regular annual feature in Bangladesh. All the three countries have been facing energy crisis crippling their economic advancement. Nepal's water resources hold the promise to ease the crisis of water and energy of the region and hence it is extremely critical that the water resources flowing from Nepal must be conserved and sustained for the life and economy of the people of the region.

Himalaya is the water-tower of Nepal and the region (South Asia). Unfortunately, this water-tower is being alarmingly affected by climate change. The warming of the earth has affected the snow peaks. Various studies have observed the behaviour of glaciers formation, expansion and retreat correlating with the increase in temperature. Out of the 2323 glaciers lakes inventoried, 330 lakes have expanded to area larger than 0.02 square kilometres and are further expanding in size due to glacier retreat (Bajracharya et al., 2007). It has also been highlighted that the minimum retreat of glaciers was not less than 400m and the maximum was 2340m during 1960-2001. The Climate Change Policy 2067 (2011) stated that Nepal is experiencing the increase in average maximum annual temperature by 0.06°C. This rate of increase is higher in the mountains than in other parts of the country.

Further, despite emitting only 0.027% of total GHG emissions in the world, Nepal has been affected disproportionately and became one of the most vulnerable countries for climate change effects. This concern is not only of Nepal but also of our neighbouring countries because their vital interest is also linked to this water-tower.

Various provisions of UNFCCC such as Articles 4.4., 4.8, 4.9 and 4.10 directly relate to the situation of Nepal as least developed, most vulnerable to climate change and mountainous country to ask for a special treatment under the Convention. The provisions of UNFCCC provides basis for the Developed Country Parties to meet the costs of adaptation insurance and transfer of technology, and implementation of response measures in the Himalaya and the mountains of Nepal.

In 2009, Nepal drew attention of the international community on the impacts of climate change in the Himalaya by organizing a meeting of the Council of Ministers on the high mountain, the Kalapatthar. The Prime Minister highlighted the impacts of climate change in the Mountains in Copenhagen Climate Change Summit in 2009, and urged the need for Mountain Initiative (MI). Accordingly, GoN decided to launch MI, conducted side-events in 2010 and 2011 during meetings of Subsidiary Bodies and CoPs and finally organized in April 2012 an International Conference of Mountain Countries on Climate Change. This Conference adopted Kathmandu Call for Action on Climate Change. This Call agrees, inter alia, to update sustainable mountain development agenda in the context of growing challenges and opportunities, resulting from climate change and globalisation, and urges to strengthen and consolidate the Mountain Initiative as a global platform for all mountainous countries (MoEST, 2012). It provides multiple opportunities to mountain countries to draw the attention of the international community to address the root cause of, and support mountainous countries to adapt to, climate change. Unfortunately, this initiative did not go very far. Nepal has still an opportunity to move them forward and work with the mountainous countries for this common cause. Nepal needs to internationalise impacts of climate change in the mountains with support from other mountainous countries. This Call for Action could be a basis to save the Himalaya and Nepal's fragile ecosystem. This will bring mountainous countries closer and promote coordination between governments and people, governments and donors and donors, to donors to respond climate change impacts in the mountains in a coordinated manner.

As Nepal is leading the LDC group as its Chairperson it is high time that it can muster whatever strength it has to draw attention of the international community on the situation of Mountain and could garner support for special programme for the Himalaya.

It has been more than two decades that UNFCCC came into existence. This Convention along with the Kyoto Protocol holds a good promise for addressing the impacts of climate change and reducing the GHGs emissions. Yet, the effective implementation of its principles and commitments has still been a far cry. Looking back the history of various CoPs and the meetings of the Subsidiary Bodies including Ad Hoc Working Group it seems that the objective of this important Convention is somewhat marred in the maze of procedures. Decision-taking process is too cumbersome and tedious and accommodation of diverse issues also makes the decisions difficult to implement or opens avenues for reinterpretation. Furthermore, there has not been sufficient replenishment of the committed resources for taking the programmes to their desired effects. However, there is no other way than to continue negotiation and exert sufficient pressure for its effective implementation.

Nepal being in the category of LDCs and a leader of this group has to leverage its position to attain more financial resources and technology to build its capabilities and programs to address the onslaught of climate change in its fragile ecosystem and economy. Raising the issue of environmental law based governance and re-emphasizing of CBDR to mainstream adaptation as well as reduction of anthropogenic emissions will be more relevant. The above issues under various heading can be taken as a policy guide to such a negotiation.

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