

## **Interfacing Indigenous Knowledge and Climate Change Education**

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### **Abstract**

This paper is part of my PhD thesis. In this study, using the narrative inquiry methodology, lived experiences of schoolteachers who have been teaching the topics of climate change were collected mainly through interviews in Lamjung District. This paper reflects how teachers have been teaching climate change education and how they have been balancing indigenous knowledge to deal with climate change concerns. Generally teachers have been following implemented and experienced school curricula and accumulating the factual knowledge of climate change science, which has often been linked with the empirical interest of Habermas, especially, with his theory of knowledge and human interest in education. However, the stories of six schoolteachers were not limited to what they have been teaching but also how they have been teaching, how they have been linking environmental concerns with the indigenous knowledge and cultural practices that have been contributing to sustainable management of the natural resources and climate change resilience. Thus the stories of the teachers were also analysed through Habermas's practical and emancipatory interests and indigenous worldviews by reflecting on my own stories while working on the theme of climate change and indigenous peoples at community, national and global levels since 2009.

**Keywords:** Climate Change; Climate Change Education; Indigenous Knowledge and Cultural Practices; School Curriculum

### **Emerging Climate Change Concerns**

Climate Change has become a major concern worldwide due to rapid changes in average temperatures, and their impacts on livelihoods of people resulting from melting of ice and snow cover, glacial lake outburst floods, landslides, sea level rise and frequent changes in rainfall patterns (Blobe, Meyer-Ohlendorf, & Steel, 2006). One of the major focuses and objectives of the Article 6 of the United Nations Framework Convention on Climate Change (UNFCCC) has been the action for climate empowerment through education, training, public awareness, public access to information, public participation (United Nations Educational, Scientific and Cultural Organization [UNESCO] & UNFCCC, 2016) to deal with

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climate change impacts. Nepal, as a member state to the UNFCCC has already developed climate change policy (Ministry of Environment [MoE], 2011) and worked in the area of education by revising the topic of climate change in the school curriculum and school textbooks accordingly. Considering the importance of climate change education to young generations at school and my own experiences in the area of climate change and indigenous peoples both at national and global levels, I could relate the lived experiences of 6 schoolteachers, how they have been teaching the topic of climate change indifferent schools in Lamjung and how they have been relating climate change concerns with the indigenous knowledge and day to day lives at the communities.

Fourth Assessment Report (AR 4) has indicated that during the 21st century, the global surface temperature would rise a further 1.1 to 2.9°C for the lowest emission scenario and 2.4 to 6.4°C for the highest (Intergovernmental Panel on Climate Change [IPCC], 2007) and encouraged to reduce the global level of emission. The Paris Agreement aims to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degree Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even to 1.5 degree Celsius (United Nations, 2015). The Climate Change Policy of Nepal, 2011 mentioned that despite having only 0.4% of the total global population and being responsible for only 0.025 percent of total global GHG emissions (MoE, 2011), the average annual rise of temperatures in Nepal is 0.06 °C and is much higher than the global rise in temperature which is only 0.025° C (Shrestha, 2008), thus Nepal has taken a stand to limit the rise of future temperatures to below 1.5°C because of higher impacts of climate change on mountains and mountain communities in Nepal.

The topic of climate change concerns is important for both developed and developing countries, however its impacts are more sever in the developing countries like Nepal, which is already ranked as 4<sup>th</sup> amongst 170 vulnerable countries to the impacts of climate change (Maplecroft, 2011). In order to address the possible hazardous impacts of climate change in Nepal, the Climate Change Policy has set a target of distributing 80% of the available climate change funding to grassroots-level initiatives. These initiatives identify and document climate-friendly, traditional techniques, indigenous skills, knowledge and their applications, and make necessary improvements to traditional techniques to promote their practical uses. However, the revision of school curriculum and textbooks are more focused on the technical aspect of climate change education rather balancing to indigenous knowledge and day to day cultural practices, how communities have been contributing to climate change resilience and how they have been adapting to changing temperature and rainfall patterns at their communities.

Nepal is a mountainous country with three ecological zones; mountains, hills and plains. It has a rich cultural diversity that comprises 125 castes/ethnic groups (Central Bureau of Statistics, 2011), out of which the Government of Nepal has already recognized 59

indigenous nationalities with unique languages, tradition and cultural practices (National Foundation for Development of Indigenous Nationalities, 2001), it is very crucial that our future generations are aware of the richness of cultural diversity of the country as well as how indigenous knowledge has been contributing to sustainable management of the resources, biodiversity and ecosystem. Thus knowledge is very crucial to be transferred into future generations to deal with the climate change concerns and be proud of their own culture and social values. However, it does not mean that indigenous knowledge would be enough to deal with the climate change impacts but balancing it with technical knowledge on climate change education would provide children with the holistic education and could link to their day to day lives and meeting the Nationally Determined Contributions (NDC) that has been voluntarily committed by Nepal during the Paris Agreement (United Nations, 2015) and deal with global climate change concerns.

### **Indigenous Knowledge**

Indigenous peoples have a symbiotic relationship with the nature. I have been working with the indigenous peoples and climate change concerns since 2009, I could see that natural resources for them are not only the sources of their livelihoods but they are socially, culturally and spiritually attached as well. Thus the interconnectedness between indigenous knowledge and natural resources need to be understood well. Indigenous traditional knowledge and cultural practices play a very important role in preserving and promoting the environmental sustainability. Indigenous knowledge has been playing an important role for conservation and management of forest ecosystems in Nepal (Karki & Adhikari, 2015). In a sense, to preserve and promote these knowledge and practices is to preserve and promote more sustainable environment, livelihoods and development. In this regard, Troster and Parrotta (2012) write,

Traditional forest-related knowledge, innovations, and practices can contribute to sustainable development in several ways. Most indigenous and local communities live in areas containing the vast majority of the world's forest (and agricultural) genetic resources, including most of the world's terrestrial so-called biodiversity hotspots. The traditional knowledge and techniques used to sustainably manage and use these genetic resources and ecosystems can provide useful insights and models for biodiversity conservation practices and policies. (p. 4)

Troster and Parrotta show the symbiotic relation of indigenous peoples to the natural resources, biodiversity and how they have been contributing to preserving and promoting the sustainable management of those resources and ecosystem. Since one of the main causes of climate change impacts is due to over consumption and exploitation of the nature, it is important that the initiatives to protect the nature by indigenous peoples is necessary to understand. Although indigenous and local people are vital and active parts of many ecosystems and may help to enhance the resilience of these ecosystems, they are rarely

considered in academic, policy and public discourse on climate change (Salick & Ross, 2009). Perhaps this has been one of the bitter facts that has been reflected on the policy making process of climate change and while revising the topics of climate change in the new school curriculum in Nepal. Although climate change policy has indicated the study on traditional knowledge, it has not explicitly mentioned about the values of indigenous knowledge for climate change adaptation and mitigation initiatives. Similarly, in the revised topics on climate change of the implemented school curricula, there hardly occurs a balance in the science and indigenous knowledge while teaching and learning climate change education at schools.

Subjects like science, social studies, health, population and environment at schools mainly covered the topics of climate change education. In the science subject, under the topic of nature and environment, the general information on nature, environment and weather are covered in grade nine. Whereas, the management of environmental pollution, the protection and management of water and forest are covered in grade ten (CDC, 2015). Considering the lack of access to information on weather and environmental changes by the vulnerable communities in Nepal (Colom & Pradhan, 2013), the efforts of the school curriculum on the topics of climate change to cover the management of the natural resources to deal with climate change is necessary, however to adapt climate change impacts into their lives, it is necessary to understand how their ancestors and parents have been living? How they have been managing their natural resources and contributing to sustainable livelihoods?

### **Stories of School Teachers**

Stories of 6 schoolteachers (pseudonyms are used in this paper) were similar, as they were following the implemented and experienced school curricula and textbooks while they were teaching the topics related to climate change. Since they have been following school curriculum and textbooks, mainly the science teachers have been teaching the technical parts of climate change, the causes and impacts of climate change and efforts at national and global levels to deal with climate change. This has fulfilled the empirical interest but still meeting the emancipatory interest in education of Habermas in his theory of knowledge and human interest in Education (Habermas, 1971) still far away. Moreover, such education is more influenced by the western worldview than balancing indigenous worldviews that are shaped by their knowledge, skills, and cultural practices while interacting to the world around them. Although all teachers have been following the implemented curricula, the way of teaching of each teacher was different.

Shyam Ghale, Sani Gurung and Nirmala Lama, were from the same village where they have been teaching at a nearby schools, so they are quite familiar with their own values and knowledge systems; why for them the natural resources especially forest, water and land are important from the social and cultural aspects in their day to day lives. As they

are brought up in the communities, they are familiar to each festival, ritual, ceremony and they have been following the footsteps of their parents for its continuity. While teaching climate change topics at schools and following the textbooks, it was natural for them to link to their social and cultural values of indigenous peoples to the natural resources and how they have been contributing to its sustainable management and ultimately helping to climate change resilience. Although they have been following the same implemented curricula but the way of their teachings was influenced from the indigenous worldviews and helped them to balance the science aspects of climate change with indigenous knowledge. However, other teachers like Suman Pande, Deepak Ghimire and Lal Dura, who are not from the same village but came to teach in the school from another communities have different experience of teaching climate change topics at schools. They have been also following the same school curriculum and textbooks and also giving the general examples of the impacts of climate change and initiatives they need to follow. This has helped for children to understand the lessons, however if they have been using more examples from the same communities, linking to the stories of parents how their symbiotic relation to forest and other natural resources? What they have been doing to management of the natural resources and livelihoods? This would have been created more enthusiasm among the students to learn and value their indigenous knowledge and cultural practices and be more critical towards the lessons they have been learning on climate change at school.

Habermas (1971) does not talk about what is right and wrong but for the holistic education for the school children, the technical knowledge on climate change would not be enough unless we also develop the education from the practical and emancipatory interest for the desired transformation of the society and national in dealing with climate change. Although the teachers from another communities have been teaching climate change have been giving general examples of rising temperature by showing the early blooming rhododendron and melting ice on the mountains that children could see from their classrooms and trying to make the lesson as practical as possible but still to make them think and be critical, it is important for both teachers and students to understand what are their ground realities shaped by social and cultural values and what needs to be done further?

In comparison to the topic on climate change in science subject, the social science has covered more social and cultural aspects of people, however when they teach at classroom, how they have been balancing to indigenous knowledge and cultural practices also varies from teacher to teacher. Science teachers generally focus more on technical aspects of climate change but if the teacher is from the same village or have been in the village for many years and familiar to the rituals, festivals and roles and responsibilities of the customary institutions and governance process, he or she would automatically be linked to the values and knowledge systems, how they have been contributing for the sustainable solution to climate change impacts.

The stories of teachers who had been familiar to the concept of climate change in relation to indigenous peoples and have received trainings for teaching the local curriculum on climate change like Shyam Ghale, Sani Gurung and Nirmala Lama, were different from others. Although they were from the same communities where they had been teaching at schools and were familiar to their cultural and social ties to the forest and other natural resources, when they were aware about the role of their customary institutions and governance systems in managing the forest and natural resources, they become more critical while teaching the topic of climate change at schools and helped students to think about it on the need of continuing this knowledge and cultural values.

In general, the level of awareness on climate change among teachers is low, thus the efforts at both global and national levels are there to fill the gap and improve the level of awareness through education, training and public access to information are the objectives of Action for Climate Empowerment (ACE) of the UNFCCC (UNESCO & UNFCCC, 2016) as well as Climate Change Policy of Nepal (MoE, 2011) and the revision of school curriculum and textbooks (CDC, 2015) in Nepal. However, the process of awareness on climate change through education is developed from the technical interest rather than practical and emancipatory and influenced from the western worldview instead of balancing indigenous worldviews. To have the holistic education, it is important that the revision of the lesson on climate change needs to balance science and indigenous knowledge and develop from three interests of education. Not only this, orientation and prior trainings to teachers on climate change and indigenous knowledge would be helpful for teachers to meet the above mentioned three interests of climate change education and values the indigenous knowledge and cultural practices for climate change resilience in Nepal. From the stories of the teachers, it was clear that having prior knowledge on the role and contributions of the indigenous knowledge while teaching climate change would be helpful to create enthusiasm to learn more and to be more critical for the welfare of the communities.

### **Climate Change Education**

Considering the importance of climate change education at the global level, in 2002, during the 8<sup>th</sup> Conference of the Parties (COP) in New Delhi, the focus of the New Delhi Work Program was on the Article 6 of the Convention, "Education, Training and Public Awareness" to address the challenges of communicating, teaching and learning about climate change. The Decision 11/CP.8 of UNFCCC presents, "a five-year country-driven work program engaging all stakeholders in the implementation of the Article 6 commitments and recommending a list of the Article 6 related activities that could be undertaken at the national level" (UNFCCC, 2002).

Although the COP 8 decision invited parties for the implementation of Article 6 at the national level, its progress has been very slow. The first Dialogue on Article 6 of the

Convention was held during the 38th Session of the Subsidiary Body for Implementation in June 2013 with the representation from Parties, intergovernmental and non-governmental organizations. Different experiences, ideas, good practices and lessons learned were shared and exchanged on climate change education, trainings and other relevant international cooperation with recommendations (UNFCCC, 2013). The need of climate change education, public awareness, training, public participation and public access to information and international cooperation has been the focus of the first Dialogue on the Article 6 of the climate change conference in Bonn, Germany. This shows that the global dialogue has already started for developing a suitable package of climate change education. Later, the Article 6 of the convention is over refereed as Action for Climate Empowerment (ACE), so that it would be user-friendlier and easily understood term for referring to Article 6 (UNESCO & UNFCCC, 2016).

In line with the global initiatives to the climate change, Climate Change Policy of Nepal has prioritized climate change awareness programs for building capacity for climate change resilience and addresses the vulnerability to impacts of climate change. In line with the Policy, school curriculum has been revised and topics on climate change have been incorporated into Science, Social Studies, Health, Population and Environment (EPH) courses in secondary level school education of Nepal (CDC, 2015). As mentioned earlier, the topics on climate change cover only relatively general and technical information on elements and phenomena of nature and environment, such as greenhouse gases, water, carbon, weather, and environmental degradation and conservation. The stories of mainly science teachers, who have been teaching the topic of climate change at schools, emphasized the values of climate change education with more emphasis on science knowledge of climate change education. The way of teaching was more shaped by empirical interest in education than practical and emancipatory and balanced to indigenous knowledge. However, how they have been teaching the topics related to climate change education at school depends mainly where they are from and whether they have received the prior training on climate change or not.

Climate change education needs to be broad and extend far beyond the technical understanding of climate science alone and its goal should emphasize civic education and engagement, which means empowering, enabling, motivating, informing, and educating the public on not just the technical but also the political and social dimensions of climate change (Nisbet, 2010). The interest of developing climate change education from the technical, practical and emancipatory interest looks necessary to go beyond the limit of science knowledge of climate change education. As Nisbet here presents, balancing technical aspects with social dimensions of climate change would help provide a holistic picture of climate change education. Initiatives taken to integrate climate change concepts into the Grade 9 and 10 courses (MoSTE, 2012) by the Ministry of Science, Technology and Environment (MoSTE) and the Ministry of Education's Curriculum Development

Center (CDC) are reflected in the revised curriculums of the Science, Social Studies, Health, Population and Environment subjects; however, these courses have embraced only general and technical aspects of climate science, without incorporating its social and political dimensions, as argued Nisbet above.

### **Holistic Climate Change Education**

At the global level, under the Article 6 of the UNFCCC, there started discussions, exploration and exchanges of good practices of indigenous traditional knowledge and cultural practices that have been contributing to the conservation of natural resources, biodiversity and ecosystems as a means of climate change adaptation and mitigation. As mentioned in the Introduction of this paper the view of Troster and Parrotta (2012) that traditional forest-related knowledge have contributions for sustainable genetic resources and ecosystem and that holistic education on climate change is possible only if the social and cultural dimensions of climate change is included in climate change education.

The survival of indigenous peoples and the cultural diversity they represent are continuously under threat today, with more than 90% of the world languages are likely to extinct or threatened with extinction by the end of the century and only recently international scientists and policy communities have recognized the link between cultural diversity and biological diversity (Troster & Parrotta, 2012). Understanding the causes of climate change and its impacts is not enough to protect the cultural and biological diversity. It is necessary to strike a right balance in school courses between technical aspects of climate science and social and cultural dimensions of climate change, i.e. indigenous and local traditional knowledge and cultural practices, sustainable environment and development. The stories of the teachers above show that having prior trainings on climate change and indigenous knowledge, teachers have been more conscious of fulfilling all three interest mentioned by Habermas theory to meet the holistic education for the wellbeing of the communities. Teachers from the same cultural and social setting as students have been more open in sharing indigenous cultural practices and role of their customary institutions while teaching the topics of climate change. However, teachers from other communities do not have the same level of understanding, thus they often miss in balancing the indigenous knowledge while teaching climate change education. However, this gap would have been fulfilled if the school textbooks had balanced both science and indigenous knowledge under the topic of climate change in the subjects of science, social studies, health, population and environment in Nepal.

### **Indigenous Knowledge and Climate Change Education**

Education, without the component of cultural diversity for sustainable environment and development, is not possible as has already been indicated by Sub-goal 4.7 of the proposed Sustainable Goal 4 under the title of “Quality Education” (Rietig, 2014). As



indicated earlier, cultural diversity plays an important role in meeting the SDG 4 goal of quality education. Studies show that indigenous peoples are vital and active parts of many ecosystems, “they interpret and react to climate change impacts in creative ways, drawing on traditional knowledge as well as new technologies to find solutions” (Salick & Ross, 2009, p. 137). This shows that technical knowledge on climate change education is not enough to deal with climate change.

As the IPCC 4<sup>th</sup> assessment report stresses the crucial role played by indigenous knowledge, experiences and livelihoods in combating climate change, because of the symbiotic relationship indigenous peoples have with nature. The report also notes that indigenous knowledge is “an invaluable basis for developing natural resource management strategies in response to environmental and other forms of change” (IPCC, 2007). For indigenous peoples, the forest is not just a source of wood but a resource to which they are socially, culturally and spiritually connected. There has been growing recognition that indigenous knowledge enables resilience to climate change, and contributes to sustainable development. Thus, Nepal education system, with its priority on technical knowledge, simply develops an interest in control and cultural reproduction. There is no space for teachers and students to self-reflect, to think critically, and to become aware of false-consciousness and hegemony (Habermas, 1971; Luitel, 2017). Now, research recognizes the values of indigenous knowledge as a part of the climate change education. The ties between cultural diversity and biological diversity are there, but the survival of indigenous peoples and the cultural diversity they represent is continually being threatened (Troster & Parrotta, 2012). Understanding how science and indigenous knowledge can deal with climate change has been surfacing in the discourse, especially at the global level. This recognition is yet to be incorporated into Nepal’s education system.

The global climate change problem with the local solution has remained a consistent slogan in the climate change discourse. The local solution will be possible only if the local knowledge systems and cultural practices that have been followed for generations by indigenous peoples in the sustainable management of natural resources, biodiversity and ecosystems, are considered. School teaching learning should not be limited to only technical understanding of climate science, but should blend with it the social and cultural dimensions of climate change for children to be able to face the global problem in the long run.

Although the first Dialogue on the Article 6 of the UNFCCC has already opened the floor for incorporation of the best experiences of indigenous peoples and local communities in addressing climate change (UNFCCC, 2013) and for inclusion of their knowledge and cultural practices for sustainable management of forests, non-timber forest products, biodiversity and ecosystems for sustainable environment and development, yet they are not reflected at the national level while revising the topics of climate change in the new school curriculum. This has created a gap in balancing science and indigenous knowledge

while teaching climate change education. The stories of schoolteachers above showed that when the topics on climate change covered only from the technical interest, now it has been necessary to incorporate the indigenous knowledge, how it has contributed for climate change resilience for developing the feeling of ownership and respect own culture and communities.

### **Paradigm Shift in Education**

There is already growing appreciation of the value and importance of the traditional forest-related knowledge, innovation, cultural practices and traditional customary institutions as part of climate change education. The lived experiences of the school teachers mentioned earlier reveal a lot about the fact that teaching of climate change education becomes more interesting and more fruitful if the course covers both the technical and the social and cultural aspects as that would enable children to connect the knowledge from the coursebook to their daily life experiences. In relation to this, Parrotta and Agnoletti (2012) have presented the value of indigenous and local knowledge in sustainable natural resources management and state,

Traditional forest-related knowledge and associated management practices have environment, social and economic condition, long before the advent of formal forest science and 'scientific' forest management. Through long experience of inter annual and longer-term variability in climate, many such communities have developed significant bodies of knowledge, transmitted through the generations, on how to cope with local climatic shifts and impacts of extreme weather events and other natural disasters. This includes knowledge related to weather prediction, of wild plant and animal species and their management, and agricultural techniques for managing and conserving water and soil resources. (p. 492)

Traditional knowledge and cultural practices are often used amongst indigenous communities for weather forecasting and monitoring, and agricultural activity planning. The stories of local teachers already reveal that it is important that traditional knowledge be transferred to children while they are learning about climate change at school. The Government of Nepal ratified the Convention of Biological Diversity (CBD) on 23 November 1993, the Article 8 (J) of which is dedicated to "Traditional Knowledge, Innovations and Practices". The Article states,

Each contracting party shall, as far as possible and appropriate: subject to national legislation, respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biodiversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of the benefits arising from the utilization of such knowledge innovations and practices. (Government of Nepal, 1993)

With the ratification of CBD, the Government of Nepal has acknowledged the value of indigenous and local traditional knowledge in conservation of biodiversity, ecosystem and nature. Nepal has also ratified the International Labor Organization Convention No. 169 (Magar, 2011); voted in favour of the United Nations Declaration on the Rights of Indigenous Peoples in 2007 (United Nations, 2008); supported the promotion and protection of the traditional knowledge and cultural practices and endorsed the revival of the customary institutions that have been followed and practiced for generations. Thus the experiences of the schoolteachers like Shyam Ghale, Sani Gurung and Nirmala Lama need to be taken into account while observing the paradigm shift in teaching climate change education from the theoretical approach to the practical that looks beyond technical comprehension of the subject matters of climate change and treats the social and cultural dimensions with no less importance.

### **Closing Thoughts**

Climate Change Education has been a priority both at the global and the national levels to address the issue of climate change. The Climate Change Policy of Nepal has emphasised the need of climate change awareness programs and education for developing resilient coping strategies. The Curriculum Development Center has already started working on the revision of school curriculums and insertion of climate change topics into the Science, Social Studies, Health, Population and Environment courses at the secondary level of school education. However, the topic has focused on general and technical aspects of climate change, more science focused than balancing indigenous knowledge and its contributions for climate change resilience in Nepal.

As maintained by Trostler and Parrotta (2012), traditional knowledge and cultural practices of indigenous peoples and local communities play an important role in preserving forests and other natural resources, biodiversity and ecosystem, the indigenous knowledge system should not be ignored while seeking measures to address the climate change impacts. Moreover, the Intergovernmental Panel on Climate Change (IPCC, 2014) Assessment Report (AR5), on Impacts, Adaptation, and Vulnerability has acknowledged that indigenous knowledge systems and practices, including their holistic view of community and environment, are a major resource for adapting to climate change, and therefore it is necessary to include indigenous knowledge and cultural practices in school curriculums of climate change education. However, as mentioned by Salick and Ross (2009), indigenous peoples are rarely considered in academic, policy and public discourse in dealing with climate change concerns. While revising the school curriculum in Nepal and reworking the topics of climate change in Nepal, the values of indigenous knowledge is hardly reflected. This also reflects that the decision makers are not aware of the values of indigenous knowledge in relation to climate change concerns despite it has already started to be internalised by the intergovernmental panel on Climate Change. However, hearing the

experiences of schoolteachers, children become more curious to know about climate change if they are shared a few examples from their communities, how indigenous knowledge and their customary institutions have been governing for the sustainable management of the natural resources and contributing to climate change resilience. This helps children to understand the contribution they have been playing to deal with climate change and also be more critical for the wellbeing of the society.

### References

- Blobel, D, Meyer-Ohlendorf, N., & Steel, P. (Eds.). (2006). *United Nations framework convention on climate change: Handbook*. Bonn, Germany: UNFCCC.
- Central Bureau of Statistics. (2011). *National population and housing census*. Kathmandu, Nepal: Author.
- Colom, A., & Pradhan, S. (2013). *Nepal: How the people of Nepal live with climate change and what communication can do*. Kathmandu, Nepal: BBC Media Action. Retrieved from [http://downloads.bbc.co.uk/rmhttp/mediaaction/pdf/climateasia/reports/ClimateAsia\\_NepalReport.pdf](http://downloads.bbc.co.uk/rmhttp/mediaaction/pdf/climateasia/reports/ClimateAsia_NepalReport.pdf)
- Curriculum Development Center. (2015). *Secondary education curriculum (class 9 & 10)*. Bhaktapur, Nepal: Author.
- Government of Nepal. (1993). *Convention of biological diversity*. Kathmandu, Nepal: Author.
- Habermas, J. (1971). *Knowledge and human interests* (J. J. Shapiro, Trans.). London, England: Heinemann.
- Intergovernmental Panel on Climate Change. (2007). *Fourth assessment report, climate change: Synthesis report summary for policymakers*. Retrieved from [https://www.ipcc.ch/pdf/assessmentreport/ar4/syr/ar4\\_syr\\_spm.pdf](https://www.ipcc.ch/pdf/assessmentreport/ar4/syr/ar4_syr_spm.pdf)
- Intergovernmental Panel on Climate Change. (2014). *Summary for policymakers, in climate change: Impacts, adaptation, and vulnerability 26*. Retrieved from [https://www.ipcc.ch/pdf/assessment-report/ar5/wg3/WGIIIAR5\\_SPM\\_TS\\_Volume.pdf](https://www.ipcc.ch/pdf/assessment-report/ar5/wg3/WGIIIAR5_SPM_TS_Volume.pdf)
- Karki, M., & Adhikari, J. R. (2015). *Integrating indigenous, local and modern knowledge for sustainable conservation and management of forest ecosystems in Nepal*. Retrieved from <http://www.forestrynepal.org/publications/article/6307>
- Luitel, B.C. (2017). *The emancipatory interest* [Lecture note]. Kathmandu University School of Education, Hattiban, Lalitpur, Nepal.
- Maplecroft. (2011). *The new climate change vulnerability index*. Retrieved from <http://www.maplecroft.com/about/news/ccvi.html>
- Ministry of Environment. (2011). *Climate change policy, 2011*. Kathmandu, Nepal: Author.

- Ministry of Science, Technology and Environment. (2012). *Proceeding of workshop on integrating climate change concepts into the science curriculum for secondary level education*. Unpublished manuscript.
- National Foundation for Development of Indigenous Nationalities. (2001). *National foundation for development of indigenous nationalities act*. Kathmandu, Nepal: Ministry of Law, Justice and Parliamentary Affairs.
- Nisbet, M. C. (2010). *Civic education about climate change: Opinion-leaders, communication infrastructure, and participatory culture* (White paper). Washington, DC: American University.
- Parrotta, J. A., & Agnoletti, M. (2012). Traditional forest-related knowledge and climate change. In J. A. Parrotta & R. L. Trosper (Eds), *Traditional forest-related knowledge: Sustaining communities, ecosystems and biocultural diversity* (pp. 491-533). New York, NY: Springer.
- Rietig, K. (2014). 'Neutral' experts? How input of scientific expertise matters in international environmental negotiations. *Policy Sciences*, 47(2), 141-160.
- Salick, J., & Ross, N. (2009). Traditional peoples and climate change. *Global Environmental Change*, 19, 137-139.
- Shrestha, M. L. (Ed.). (2008). *Trends in daily climate, extremes of temperature & precipitation in Nepal*. Retrieved from <http://soham.org.np/wp-content/uploads/2008/03/v5-38-51.pdf>
- Trosper, R. L., & Parrotta, J. A. (2012). Introduction: The growing importance of traditional forest-related knowledge. In J. A. Parrotta & R. L. Trosper (Eds.), *Traditional forest-related knowledge: Sustaining communities, ecosystems and biocultural diversity* (pp. 1-36). New York, NY: Springer.
- United Nations Educational, Scientific and Cultural Organization & United Nations Framework Convention for Climate Change. (2016). *Action for climate empowerment: Guidelines for accelerating solutions through education, training and public awareness*. Paris, France: Authors.
- United Nations Framework Convention for Climate Change. (2002). *United Nations framework on climate change*. New Delhi, India: Author.
- United Nations Framework Convention for Climate Change. (2013). *Bonn climate change conference*. Retrieved from [http://unfccc.int/meetings/bonn\\_may\\_2017/meeting/10076.php](http://unfccc.int/meetings/bonn_may_2017/meeting/10076.php)
- United Nations. (2008). *United Nations declaration on the rights of indigenous peoples*. Retrieved from [www.un.org/esa/socdev/unpfii/documents/DRIPS\\_en.pdf](http://www.un.org/esa/socdev/unpfii/documents/DRIPS_en.pdf)
- United Nations. (2015). *The Paris agreement*. Retrieved from <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>