



**LUNDS**  
UNIVERSITET

Lund University Master of Science in  
International Development and Management  
August, 2014

## **Environmental Education and the Cultivation of Student Agency in the Himalaya**

---

**A case study of Dhading Besi township, Nepal**



**Author:** Gavin Bryce

**Supervisor:** Elsa Coimbra

## Table of Contents

<b>Abstract.....</b>	<b>3</b>
<b>Acknowledgements.....</b>	<b>4</b>
<b>List of Acronyms .....</b>	<b>5</b>
<b>Introduction .....</b>	<b>6</b>
Research Focus.....	6
Research Question .....	6
Literature Review.....	8
Environmental education definitions.....	8
Formal Environmental Education.....	10
The emergence of Environmental Education.....	12
Types of Environmental Education .....	13
Ecological Tour .....	13
Environmental Education Best Practice.....	14
Agency .....	15
<b>The Context .....</b>	<b>17</b>
<b>Methodology .....</b>	<b>21</b>
<b>Findings + Analysis .....</b>	<b>28</b>
<b>Conclusion .....</b>	<b>36</b>
Future Considerations.....	37
<b>References.....</b>	<b>38</b>
<b>Appendix I – Maps .....</b>	<b>44</b>
<b>Appendix II – Dhading Besi Images .....</b>	<b>47</b>
<b>Appendix III – Dr. Nand Kishor Interview .....</b>	<b>50</b>
<b>Appendix IV – Dr. Erling Holmgren Interview .....</b>	<b>55</b>
<b>Appendix V – Dhading Desi High School .....</b>	<b>62</b>
<b>Appendix VI – Dr. Rupesh Raj Interview .....</b>	<b>66</b>

## Abstract

This study investigates the quality and availability of environmental education (EE) in Dhading Besi, Nepal. Focus is placed on the cultivation of students' agency and their participation in environmental action. Interviews are conducted jointly at two local high schools with students/teachers, climate science researchers and local environmental NGOs. The study finds that current environmental education, though limited, is having both a positive and significant impact on students' environmental literacy and agency through active participation in environmental action. Interview findings highlight the need for a nationally coordinated EE framework and an updated EE curriculum. This would likely result in improved environmental sustainability, climate change resilience and socio-economic development in Nepal.

## Acknowledgements

Massive thanks to my family and friends, you have helped keep my outlook positive over the past year, without your support I would not have been able to complete this work. Supervisor supreme, Elsa Coimbra, your many pointers and ideas have been pivotal in shaping this thesis, thank you for pushing me.

Thank you to my partner Cécilia for helping me to navigate the pathway of writing a thesis. Your laughter and encouragement over the past year has been vital.

The late night group supervision meetings (thanks to my location in New Zealand, almost the exact antipode of Sweden), provided support and clarity through listening to obstacles that other 'LUMIDers' were working on. This platform for sharing ideas and concerns helped me to untangle the knots I managed to get myself in.

The challenging aspects of my thesis included selecting the study location, the writing duration and long-distance study. I assumed it would be a relatively straightforward process to select the location for an appropriate case study. This was not the case, as it involved a two-month long inquiry to discover Dhading Besi in central Nepal. Sustaining the motivation to write day-in day-out over several months was tricky at times. My daily walk to and from my writing niche at Victoria University of Wellington Library – through Wellington's central nature reserve - reminded me daily of our ecological dependence, the necessity of sound environmental management and the many contributions of environmental education.

Thank you to the UNESCO office in Kathmandu for the opportunity to undertake a three-month internship in the Education Unit. It was a period of intense learning and I thoroughly enjoyed the experience. The Education Unit's support has been invaluable to the development of this thesis.

Lastly, thank you to the multitude of people - previous and current – working to improve human beings relationship with the natural environment and environmental sustainability. I hope that this thesis contributes positively to the reformation of social-ecological relationships.

## List of Acronyms

CapEFA	- Capacity Building for Education For All
CLC	- Community Learning Centres
CFP	- Community Forestry Project
CFUG	- Community Forest User Groups
EE	- Environmental Education
ESD	- Education for Sustainable Development
HKH	- Hindu Kush Himalayan region
ICIMOD	- International Centre for Integrated Mountain Development
NFE	- Non-formal Education
NFEC	- Non-formal Education Centre
TEK	- Traditional Environmental Knowledge
UNESCO	- United Nations Education, Science and Cultural Organisation
UNDP	- United Nations Development Programme
UNICEF	- United Nations International Children's Emergency Fund

## Introduction

This research focus emerged during an internship for the UNESCO office in Kathmandu in autumn 2013. I was tasked with writing concept notes for a project as part of Education for Sustainable Development in Mountainous Communities. This area of education interested me greatly and so started my enquiry in to EE.

This study investigated the available environmental education (EE) for year-12 students' and the cultivation of students' agency in Dhading Besi District, Nepal. Emphasis is placed on students understanding of their local eco-system and environmental problems that their district faces.

The objective of the study is to contribute towards the formulation of a national EE framework to enhance students' ecological awareness and cultivate students' environmental agency, which in turn can promote student participation in positive environmental action.

### *Research Focus*

The research focus is on the availability and quality of environmental education and the development of students' agency in Dhading Besi, Nepal.

### *Research Question*

- To what extent is environmental education developing students' environmental literacy and agency in Dhading Besi, Nepal?

### *Sub-question*

- What are the current limitations to environmental education in Nepal and what possible improvements could be implemented?
- How can environmental education contribute further to Nepal's environmental development?

While priority is given to EE in public schools, the study also recognizes that EE can be received through family, community based organisations, and NGOs.

This research may be of assistance to the district education boards (particularly Dhading district), EE educators and community organisations working diligently on environmental issues in Nepal. It is my aim that this research will contribute to the development of a comprehensive national assessment on the quality and availability of high-school EE in Nepal. A nationwide assessment of EE could then be utilised to provide a shared resource for educators, district education boards and national education planners. This resource could assist in developing an improved EE national framework, subsequent EE curriculum, provide successful EE learning outcomes/activities, and in time highlight EE best practice. It is essential that Nepal develop a comprehensive EE framework to develop the next generations' ecological awareness, to assist in solving the numerous environmental problems that Nepal faces.

Research on high-school EE curricula and its effective implementation is lacking in Nepal. Limited understanding of EE and the importance of environmental literacy, coupled with low EE funding, has resulted in out-dated EE curricula. School and community educators in Dhading and throughout Nepal are active and working hard on environmental issues. However, existing high-school curricula in Nepal is inadequate in terms of duration, scope and has low levels of integration with other subject areas with limited practical learning activities. Education boards, education planners, school management and community organisations have limited resources and tools to cultivate students' understanding of environmental problems, establish environmental solutions or methods to increase student participation in environmentally focused action.

Nepal is a climate change hotspot with changing monsoon patterns with droughts, flooding and changing crop diseases predicted to increase in future decades. (IPCC, 2013). Climate change is a priority issue for Nepal with adverse risks predicted to increase combined with decreased agricultural yields. Current environmental problems in Nepal include: deforestation (primarily the overuse of wood for fuel) and land degradation; water pollution (human and animal waste, agricultural runoff, and industrial effluent); indoor air pollution from the burning of wood for fuel; external air pollution due to transportation and industrial emissions particularly in urban areas; wildlife conservation; and weather extremes causing increased natural disasters

(Ministry of Science, Technology and Environment, 2013). Nepal's environmental issues are discussed in depth in the 'The Context' section.

The scope and nature of environmental education in general and specifically in Nepal is discussed in the following section.

### ***Literature Review***

The climate on planet Earth is destabilising with the time frame of opportunity to avert further change decreasing rapidly (IPCC, 2013). Interestingly, technology and scientific knowledge are not the limiting factors in responding to this crisis. Rather, humans' ability to change the political and economic systems, and make choices and lifestyle change, will determine if the response will occur in time. People at all levels need to adapt their behaviour, from individual voters and elected officials to consumers and corporate CEOs. The critical contribution of environmental education in protecting and progressing to higher levels of environmental sustainability is recognized internationally (UNESCO, 2013; UNEP; 2004; World Bank Group, 2012)

### ***Environmental education definitions***

There are diverse definitions employed by environmental educators, environmental education institutions, environmental organisations and environmental education researchers. Common elements that thread through the majority of definitions for EE include:

- The influence of environmental education on values, attitudes and behaviour relating to the environment.
- The multi-disciplinary, trans-disciplinary and inter-disciplinary nature of environmental education with a significant focus on the linkages and intersections between the biophysical environment, social, economic and political.
- The contribution of environmental education to protect and manage the environment.
- The scope of learning activities encompassed by environmental education, which includes the formal, non-formal and informal education.



The two UN agencies tasked with education mandates (UNEP and UNESCO) define EE as the aspects of education, communication and training contributing towards sustainable development (UNEP, 2004). Locating specific EE definitions in agency websites and publications is difficult. Rather, definitions are buried deep within conference reports and have often remained unchanged since the 1970's and 80's. International education organisations and EE organisations in particular would benefit from updating or repositioning their EE definitions, to increase the exposure and understanding of EE within the global community. In contrast, definitions of education for sustainable development (ESD) are more accessible and have prominence in UN agency websites and publications. This is to be expected, as the UN has emphasised ESD in the past decade with the UNESCO Decade of Education for Sustainable Development 2004 - 2014. Increased exposure of ESD is positive for EE, however, there is a risk of ESD focusing less on *environmental* components due to a boarder educational focus, with additional focus on other areas of development, including education on poverty reduction. Of course, education on poverty reduction is positive, although not when at the expense of EE (Kopnina, 2012).

The definition of environmental education adopted by this thesis (adapted to gender neutral pronouns).

“Environmental education is a process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the interrelatedness among [people], [their culture] and [their] biophysical surroundings. Environmental education also entails practice in decision-making and self-formulating of a code of behaviours about issues concerning environmental quality” Martin, 1975:21).

This definition of EE was selected due its comprehensive and inclusive structure. This definition has high relevancy in the Nepali context as formal EE is relatively recent. Over technical and/or specific EE definitions would be at risk of over-complicating or excluding certain types of EE in Nepal.

EE is a normative study with a defining purpose to develop conceptual and behavioural change. A central tenet of EE is a holistic (systems theory) understanding of the environment, with students developing their conceptual understanding of myriad relationships between people and the environment. These relationships can be categorised into distinct yet overlapping groups; human-eco-system, eco-system-flora/fauna, human activity-eco-system resources and eco-system services.

#### *Formal Environmental Education*

Formal EE in secondary school is commonly designed as a form of science education, with EE embedded in the science curriculum. Nepal's education system follows this structure with EE taught in a population and environment module over a period of four weeks. EE is compulsory in years 8, 9 and 10, whereas EE is optional in years 11 and 12. In tertiary education EE is interdisciplinary with courses open to all university students. Tribhuvan University located in Kathmandu offers an EE component in the Bachelor of Education degree; a Masters specialisation in EE; and a Bachelor of Science in EE with papers on ecology, environmental management, climate change and sustainable development. There are 500 students per year level studying science teaching (which includes the EE component) compared with 1000 teacher trainees in total at Tribhuvan University. Of the 500 science teacher trainees, approximately 350 students enrol annually in EE (Appendix II).

A key concept in formulating the research design and the data analysis stage is *socio-ecological systems*. The concept of socio-ecological systems encapsulates the integrated concept of humans embedded (emphasizes the humans-in-the-environment perspective) in nature and stresses that the delineation between social systems and ecological systems is both artificial and arbitrary (Berkes, Colding & Folke, 2001). There are no social systems without nature, correspondingly there are no natural systems on earth that are independent of people. Social and ecological systems are interdependent with constant co-evolution. Earths ecosystems, from the global biosphere to local eco-systems, provide the biophysical base and ecosystem services for life to develop (Stockholm Resilience Centre, 2013).

Humans and human activities are embedded within the environment. However, In order to discuss EE with interview participants, on occasion the conventional concept of humans (as separate from the environment) was utilised to facilitate interviews.

By observing the impact of human decisions on ecosystems we can see the nature of socio-ecological relationships. Human actions alter the capacity of ecosystems to sustain social development. There is a pressing need for EE to introduce the conceptual understanding of socio-ecological systems, for people to perceive and situate the social world within the ecological.

A key theory for framing EE in this thesis is the concept of *social ecology*. Social ecology is a critical social theory founded by Murray Bookchin. It adopts a reconstructive, ecological, and ethical approach to society through advocating a transformative outlook on social and environmental issues, and promotes directly democratic politics (Bookchin, 2005). Social ecology also aims to situate human communities within the natural world. The theory posits that part of the root problem of current ecological and social problems is linked to dominating hierarchical modes of social organization. Social ecologists promote ethical thinking and collective activity grounded in a radically democratic framework.

Critical social theory is particularly relevant to the Nepalese context due to the country's current political climate. Marxist theory in the form of Maoism has dominated the political landscape in recent decades culminating in a destructive civil war. The Nepalese Civil War (named the People's War by the Maoist party) between government forces and Maoist fighters ravaged the country for 10 years. The conflict was initiated by the Communist Party of Nepal (Maoist) in 1996 with the intention of overthrowing the Nepalese monarchy and establishing a Peoples Republic. The Nepal Ministry of Peace estimates overall that 17,800 people died (4,500 Government of Nepal casualties and 8,200 Maoists casualties) with an estimated 120,000 to 150,000 people internally displaced. The civil war ended with the Comprehensive Peace Accord in 2006 with most Maoist demands conceded.

Correspondingly, concepts central to social ecology including 'dominance' and 'exploitation' have currency in Nepal. Herein lies the relevancy of social ecology theory as numerous individuals and groups have high political literacy surrounding issues of participation, hierarchy and inclusion. Social ecology theory is highly applicable to the Nepal context and hence beneficial in defining the EE discourse.

*The emergence of Environmental Education*

EE is an emerging field, which in its current form has a history of over 40 years (Gough, 2013). In *Emile: or, On Education*, (1762) Jean-Jacques Rousseau stressed the importance of an education that focuses on the environment. Several decades later, Louis Agassiz encouraged students to “Study nature, not books”. Educational movements including the Nature Study Movement (ca.1900), Outdoor Education Movement (ca.1920), and Conservation Education Movement (ca.1930) preceded EE and provided suitable conditions for it to emerge in the late 1960s. Moreover, the popularization of Ecology Education in the 1950s and Education for Sustainable Development in the 1990s assisted the development of EE (Stevenson et al. 2014).

In 1972, EE gained international recognition at the United Nations Conference on the Human Environment in Stockholm, Sweden. In 1975, EE was addressed specifically at the International Environmental Workshop in Belgrade, Yugoslavia. Participants at the United Nations Educational, Scientific, and Cultural Organization (UNESCO) workshop, proposed a global framework for environmental education, referred to as the Belgrade Charter. Professionals in the field have generally accepted the Charter’s goal statement for environmental education. The Charter states:

“Environmental education, properly understood, should constitute a comprehensive lifelong education, one responsive to changes in a rapidly changing world. It should prepare the individual for life through an understanding of the major problems of the contemporary world, and the provision of skills and attributes needed to play a productive role towards improving life and protecting the environment with due regard given to ethical values. To develop a world population that is aware of, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations and commitment to work individually and collectively toward solutions of current problems and prevention of new ones.” –

Belgrade Charter, UNESCO.

A notable addition of the Belgrade Charter compared with earlier conceptions of EE was an emphasis on human agency and taking action.

In recent years EE has received considerably more attention. With the concepts of *environment* and *sustainability* becoming more commonly understood and more widely discussed there has been an increase in media exposure and greater political debate and legislation. In addition, there is also a greater understanding and acceptance of the systemic linkages between environment, health, climate, poverty, development, and education (Stevenson et al. 2014). EE is an interdisciplinary study with links to numerous other green political movements, of which socialist ecology and eco-libertarianism have movements in Nepal, again due to popular political engagement with socialist and libertarian thought.

This thesis conceptualises EE primarily from the vantage point of student's ecological consciousness and student's agency.

### *Types of Environmental Education*

The International Handbook of Research on Environmental Education (2013) defines EE as having five characteristics:

1. Environmental issues are fundamentally normative. Therefore, EE is a normative study.
2. Relationships between people-society-environment are interdisciplinary therefore EE is interdisciplinary. 'Triple Bottom Line' discourse.
3. EE develops students' knowledge, understanding, attitudes, values and their agency in taking action on environmental and sustainability issues.
4. EE takes place within both formal institutional settings and informal public domain settings.
5. EE has both a local and global focus as environmental issues range from local to global.

### *Ecological Tour*

An ecological tour is an extended period of time in the natural environment whereby students are immersed in the wilderness (i.e. an outdoor excursion/camp consisting of more than two days). It provides the setting for students to experience the natural world and to develop a connection with it. This is particularly beneficial for students that have had little or no extended time in the natural environment. Taking students out of their own cultural and environmental context often allows them to see problems

that they did not recognize in their home environment. Year 12 students' at both Dhading Besi high-schools participate on a day excursion to a community forestry project coordinated by Dhading Desi community NGO's. Students' plant trees and learn about local community forestry projects, and the positive effect on local flora and fauna, the reduced flooding and landslide risks and improved environmental conservation. This is students' primary excursion with an EE focus.

An ecological tour integrated into an environmental education course or program offers students experiential and applied learning opportunities that often strongly influence or transform their perceptions of and feelings about the natural world (Niesenbaum and Gorke, 2001). Experiential and applied learning are effective, if not essential, in environmental education (Rome & Romero, 1998). Moreover, it is clear that major life experiences in nature are important in developing a life-long concern for the environment (Chawla, 1999).

#### *Environmental Education Best Practice*

It is important for EE to communicate to students that environmental problems are not beyond intelligent solutions and that the demands of growing populations can be balanced with environmental concerns. A first step would be for students to recognize that environmental education is not solely about protecting plants and animals, it is also a people issue.<sup>1</sup> The most successful EE projects are bio-cultural<sup>1</sup> in nature and incorporate humans in the conception of 'nature' (Janzen, 1997; Primack, 1995).

Recognizing and solving environmental problems requires interdisciplinary thinking. According to Toyne and Ali Khan (1998), interdisciplinary environmental education must move beyond mere exposure to relevant disciplines and make integrated use of them in developing problem recognition and problem-solving skills.

Opportunities for students to learn from local environmental experts - i.e. indigenous community elders with traditional environmental knowledge (TEK) - provide

---

<sup>1</sup> Homo Sapiens are mammals and therefore 'in' nature. However, in this context a naive conception of humans as separate from animals is used.

knowledge of the flora and fauna and specific environmental problems in a traditional framework.

### *Agency*

The problem of structure and agency is the central issue of modern social theory. (Archer, 1996). There is a continuous and ever enriching academic debate within sociology, over the primacy of structure or agency in shaping human behaviour. Structure or social structure, is the recurrent patterned arrangements that influence or limit the choices and opportunities available to people. Whereas agency is the capacity or ability of individuals to act independently and to make their own free choices (Barker, 2003). The structure versus agency debate can be understood as socialization versus autonomy in assessing whether an individual acts as a free agent or is dictated by social structure.

The centrality of the structure versus agency problem although rightly situated, need not exclude the parallel problem of culture and agency. The structural and cultural domains are substantively different from one another and are relatively autonomous from each other (Archer, 1996; Hays, 1994).

The concept of agency is complex with multiple definitions in various academic fields. Additionally, the term *agency* is elusive with a lack of systematic analysis. Agency is associated with many different terms: motivation, intentionality, initiative, freedom and creativity. This coupled with the movement to demonstrate the interpenetration of agency and structure, has resulted in many theorists failing to differentiate agency as an analytical category in and of itself (Emirbayer & Mische, 1998).

The following excerpt is dense, though provides a concise definition of the three aspects of agency.

“Human agency [is] a temporally embedded process of social engagement, informed by the past... but also oriented toward the future (as a capacity to imagine alternative possibilities) and... [in] the

present (as a capacity to contextualise past habits and future projects)...” (Emirbayer & Mische, 1998, p.963).

Due to the cross-cultural nature of this research, it is paramount that the concept of agency is critically assessed from both a Western individualistic perspective and a more collectivist Asian perspective. Firstly, a brief introduction to the *fundamental attribution error* (FAE). There is a pervasive bias in western cultures to attribute observed actions to properties of the individual. Social psychology literature labels this the FAE. In other words, people tend to overestimate the influence an individual has and underestimate the influence of situations on observed behaviour (Kennedy, 2010). This is a crucial point, as an individual's behaviour can be extrapolated to the level of a social event or change. Attributing social events or change squarely with the traits of one or more individuals, fails to consider the wider social, economic and political conditions that also contribute to social behaviour and hence social action. This bias was earlier described as a universal human tendency (Gilbert & Malone, 1995). However, cross-cultural studies have questioned the assumption that social perceivers of all cultures place the causes of social behaviour to a greater extent on an individual's personality. Interestingly, Asian cultures have a markedly reduced FAE (Miller, 1984). This reduced emphasis on the individual's primacy in social action is useful in understanding the conceptualisation of agency in an Asian context. Agency from a Western perspective is primarily centred on the individual. In contrast, agency from an Asian perspective is centred to a greater extent on the collective i.e. the group and the conditions in which the collective operates. In operationalizing the concept of agency, this research selected a midpoint between the individual and the collective, and attributed behaviour on both the individual (student) and the setting (learning environment).



## The Context

The case study is the small town of Dhading Besi, the district headquarters of Dhading District, Nepal. The district is located in central Nepal (there are 75 districts in Nepal) (See appendix I for maps). Dhading Besi (*besi* meaning lowland in Nepali) is the sole lowland plain in the Dhading district. People settled in Dhading Besi due to the flat land and fertile soil. Rice, potato and millet are cultivated throughout the district. Dhading Besi has a population of 336,067 (2011), a decrease from 338,658 in 2001 (Nepal Bureau of Statistics, 2011). The township is located along the banks of two rivers, Arung and Thopal khola, the sources for both rivers are within 10 kilometres of the township. Dhading Besi is located at an elevation of 1,367 metres. Dhading District does not have a conservation area, however, numerous Community Forestry Projects are located throughout the district. Neighbouring districts, Gorkha and Rasuwa, have considerable conservation areas, Manaslu Conservation Area and Langtang National Park (See appendix I).

The population ethnicity is primarily Tamang and Gurung in the north, with Newari in much of central Dhading District.

Nepal is a low-income country defined as having low levels of human development (World Bank, 2013). The Human Development Index places Nepal 145<sup>th</sup> globally with an index of 0.537, one of the lowest HDI's in Asia. Factoring in Nepal's inequality highlights a clearer representation of the country's human development, with the inequality adjusted HDI considerably lower at 0.384 (UNDP, 2013).

Dhading Besi is the district hub with the only available financial, agricultural, education and health services in the district. Local farmers transport their produce (via bus, tractor, foot or donkey) to the Dhading Besi food markets. Local government offices are located in Dhading Besi as it is the district headquarters.

As a whole, Nepal has one of the most diverse topographies in the world with an altitude range of over 8,000 metres. The mountainous north of Nepal has eight of the world's ten tallest mountains, including the highest point on Earth, Mount Everest,

called *Sagarmatha* in Nepali. Moreover, it contains more than 240 peaks over 6,096 metres.

The Terai region in the south is relatively flat with an altitude of between 67 and 300 meters. On the northern border of the Terai, the first Himalayan mountains reach approximately 1,000 metres, called the Sivalik Hills or Sub-Himalayan Range. Further north the Mahabharat Range or Lower Himalayan reach 2,000 – 3,000 metres. Dhading district is located in the Mahabharat and Upper Himalayan ranges. Nepal's diverse geology makes it extremely vulnerable to natural disasters (Paudel et al., 2003).

Flooding and landslides are the major natural hazards facing Nepal (United Nations University for Environment and Human Security, 2013). Drought and famine, depending on the timing, intensity and duration of the summer monsoon can have major impacts, particularly on rural mountainous communities (Pradhan, 2012). The annual monsoon season can bring massive rain events, with maximum precipitation levels reaching 550 mm in 24 hours (Neupane, Gautam & Shrestha 2010), this can cause flood pulses downstream through mountainous terrain causing flash flooding and landslides in the hilly regions of Nepal. Flooding also causes significant soil erosion. When flooding reaches the Terai region, inundation of rivers causes recurrent and severe flooding in Southern Nepal and neighbouring India (Dixit, 2003).

Vulnerability to natural disasters is further exacerbated due to population increase, low building regulation, ad-hoc economic development and environmental degradation. Nepal is also highly prone to earthquakes with low earthquake preparedness.

EE is essential for developing students' understanding of current environmental problems, natural hazards and environmental problems that are likely to occur in the near future. While all countries have natural disaster risks, Nepal has significant natural disaster risks with a 5.53% likelihood of a citizen becoming a victim of a natural disaster (United Nations University for Environment and Human Security, 2013). It is therefore critical that Nepal incorporates EE to a greater extent in the education system to prepare and reduce the nation's high exposure and vulnerability to

natural disasters.

Education is fundamental for improving human capital to ensure sustainable social, economic and environmental development. Although infrastructure is a major factor in mitigating climate change, other practices can reduce the need for solutions requiring infrastructure i.e. the stabilisation of hillsides through the planting of trees reduces water run off, lowering the probability of flash floods occurring. This investment and numerous others, are relatively low cost and effective at both increasing agricultural resilience and decreasing natural disaster risks. Natural disasters have a negative impact on rural livelihoods with people living in poverty disproportionately affected (70% of Nepal's population rely on subsistence farming) (World Bank, 2013). EE is an important factor in developing the social capital required to maintain ecosystem services and increase the resilience of Nepal's agriculture sector and natural resources.

The National Planning Commission and The Ministry of Federal Affairs and Local Government are collaborating with the UNDP and the UNEP to implement a nationwide Poverty-Environment Initiative (PEI). The focus of the initiative is to improve sustainable development planning and implementation undertaken at national and local levels contributing to: addressing climate change impacts; conservation; sustainable use of natural resources; poverty reduction; and a commitment to ensuring development follows a low emission pathway. The PEI impact would significantly improve through the implementation of an effective national EE curriculum.

Environmental policy was first initiated in the country with Nepal's enforcement of the Convention on Wetlands of International Importance (Ramsar Convention) in 1988. Nepal has signed numerous environmental conventions in recent years, including the Convention for Biodiversity in 1992; the Convention for the Protection of the Ozone Layer (Vienna Convention) in 1994; and the Kyoto protocol in 2005.

Community forestry projects (CFPs) are a branch of forestry whereby the local community plays a significant role in forest management and land use decision-making (Acharya, 2002). This forestry management system is a central

component of Nepal's forest management strategy. Since its initiation in 1978, CFPs have contributed to restoring Nepal's forest resources. Forest accounts for nearly 40 percent of Nepal's total land area. Forested land was decreasing at an annual rate of 1.9 percent during the 1990s, this decline was reversed in part through community forest, resulting in an annual increase of 1.35 percent between 2000 to 2005 (Kanel, Paudyal and Baral, 2005). CFP are organized and managed by Community Forest User Groups (CFUGs) while the government provides support and facilitation. Since 1980, approximately 14,000 CFUGs have been formed (Ibid). One-quarter of Nepal's national forest is now managed by more than 35 percent of the total population (Ibid). Community forestry is currently the second largest forest management programme after government-managed forests. There are over 600 CFPs located throughout Dhading District (Ministry of Forests and Soil Conservation, 2010). There is huge potential for EE to be situated with CFUGs with local leaders and managers facilitating student learning with CFP as the learning theme.

Green Clubs are school wide environmental groups with membership and management consisting entirely of students. A green club at each school could participate in designing EE learning activities for their school. This would enable students to assist teachers in designing locally specific EE with the added benefit of including students' perspectives and interests within learning outcomes.

## Methodology

### *Interpretive framework*

I subscribe to the interpretive framework of social constructivism. A person's description of their reality is a mental construction that is socially conditioned. My intention as a researcher is to understand and describe the multitude of realities associated with a particular issue and to highlight relevant patterns and associations.

Prior to commencing this thesis I was aware of my own conceptions, values and perspectives of the environment, environmental education and what I consider effective methods in environmental education to cultivate agency in students. An important step in my research methodology was to bracket - as much as possible – my own social and historical conceptions and values, to better understand the position of study participants. For an accurate understanding of another person's reality, a high level of communication is required. Correspondingly, a shared understanding between the researcher and study participants, of concepts being discussed is an important component of communication. Interviewees were encouraged to share their perspectives (constructions) of certain concepts that would be used in the interview i.e. nature, eco-system, sustainability.

To operate through the lens of my values while interacting with study participants could lead me to measure participant's knowledge, perspectives and values against my own (Sultana, 2007). For example, a perspective I hold, preserving the eco-system in which one inhabits is important because an individual or communities health is dependent on the health of the environment. Although this perspective is true to me, if I perceive this as the only accurate understanding of the relationship/s between environmental and human health, this could have hindered the research and limited my ability as a researcher to better understand participant's worldview.

### *Research Methodology*

I utilized a single instrumental case study approach to fieldwork with Dhading Besi as the case study location (Creswell, 2012). I deemed the case study approach most appropriate for my research question as focusing on environmental education and its

effect on eco-system resilience is a clearly identifiable case with clear boundaries. Moreover, I aimed to provide an in depth understanding of the issue. Dhading Besi was identified as an appropriate single case to research due to the village's conservation of native flora and fauna, successful community forestry programme, and location in the hill country (a heavily populated land type with low eco-system resilience in Nepal). Critical case purposeful sampling was used as my sampling method, to yield the most information and provide a diverse body of knowledge (Patton, 2001). Interview participants included: two local high schools (two year 12 classes from each school), high school teachers, academics, environmental NGO's, parents of students, and education administrators. Data collection aimed to be extensive with multiple sources of information, including direct observations, participant observations, interviews, documents and audio/visual recordings. I will conduct a holistic analysis of the Dhading Besi case, including an analysis of themes (environmental concerns, challenges, possibilities etc). In the interpretative stage of the research process the lessons learned from the instrumental case will be reported on.

### *Interviews*

I aimed for clarity in conducting interviews by using easy to understand language and by staying clear of technical jargon (Silverman, 2013). However, when specific concepts were required I attempted to explain them as simply as possible without losing or distorting the meaning of the concept. Questions were asked clearly and slowly, allowing the translator time to formulate the questions in Nepali. All interviews had a competent translator that appeared to accurately translate certain words or sentences that the interviewees were unable to communicate.

I protected interviewee's identity through codifying names from responses in order to enhance trust (Creswell, 2009).

### *Representations*

I considered Ragin (2010), in how I was representing the research location (Dhading

Besi) and the interviewees. The district experienced significant conflict during the decade long civil war which disrupted the economic livelihoods of the Nepalese, particularly in Dhading District, as the district aligned with Marxist-Maoist political ideas, and subsequently supported or engaged in conflict with the Nepalese Government. The civil war broke down infrastructure throughout Nepal and further delayed human development. Additionally, the civil war impacted on the availability and quality of education in the district. Correspondingly, human development in the district has remained low with a high rate of illiteracy and poverty. My aim is to represent the district accurately without producing an image of the population as apathetic or disengaged as foreign development workers and tourists can propagate these views at times. I observed the local population – particularly the youth – engaged with environmental issues and I aim to advance this perspective. I have endeavored to generate a comprehensive picture of Dhading Besi educators, students and environmental NGO's and their relationship to the local eco-system by listening to their stories, perspectives and ideas on how to further generate students engagement with environmental issues and activities.

The interviewee's ability to speak basic English was also an advantage as this will likely assist in forming clearer representations of the interviewees.

In representing study participants I endeavored to write 'with' them rather than about them (Sultana, 2007). Aiming for a balanced amount of reflection throughout my fieldwork, I addressed differences in representation, without over analyzing, which may have lead to paralysis due to over concern of misrepresentation or inauthenticity. Reflection was undertaken through internal reflection on participant's response/ideas and in dialogue with NGO leaders and Nepalese academics. I cultivated the perspective that ethical fieldwork can be both productive and a source of liberation, granted I critique my positionality and engage in research that is politically conscious. This perspective translates into fieldwork through remaining conscious of my limitations as a researcher, how my postionality inevitably influences the data that is produced, and being conscious of ethical guidelines in the form of Lund Univeristy's Ethical Guidelines and my personal ethical framework.

I reflected on how differences can be bridged and how to produce mutually defined

research. One of the most affirming interactions during my fieldwork occurred while discussing environmental education with high school students (aged 17) in Dhading Besi, Nepal. In the classroom students displayed an understanding of environmental issues - and their causes - that the district faces. Students discussed how to tackle the environmental issues and ways to improve environmental education in the village. In an effort to mutually define this research I first encouraged students to share their conceptions and values associated with environmental terms, including *nature*, *environment* and *sustainability*. This group activity outlined the ‘multiple realities’ of the school students and assisted the future direction of the fieldwork as it informed me of students values, perspectives and constructions of the local eco-system, particularly the importance the local eco-system has to them.

A guiding principle of my fieldwork was the partial nature of knowledge and how power relations influence knowledge production.

“Knowledge is always partial and representations of knowledges produced through field research embody power relations that the researcher must be aware of in undertaking ethical research”. (Sultana, 2007, p.382)

I reflected on how others constructed my identity and how this assisted or hindered my fieldwork. This process facilitated in developing my reflexivity that made for a more meaningful research process. I aimed to conduct research that minimized the distance or objective separateness between myself and interviewees (Cresswell, 2012).

### *Positionality*

My foreign nationality was an advantage as most interviewees had a positive view of New Zealand and New Zealanders. The interviewees were very interested in my research focus and forthcoming in answering questions. Management positions in Nepal are predominately held by men with women unfortunately having lower levels of participation in public life. Due to this situation, my gender may have resulted in less resistance in conducting the interviews/focus groups as management were



accustomed to interacting with men and also men working individually. My previous studies in human geography and education provided me with relevant tools and perspectives to analyze human relations, actions, value structures and environmental education.

### *Power relations*

The research methodology worked to emphasize non-hierarchical interaction with study participants, mutual learning/respect, and attention to unequal power relations between the researcher and researched (Sultana, 2007). Hierarchy was more present in interviews than others. Although hierarchy is a common phenomenon in social interaction, efforts were made in the research methodology to lessen hierarchy in interactions with study participants.

It was not possible to blend in while conducting fieldwork at Dhading Besi due my conspicuous appearance (mainly my nationality and height), particularly in Dhading district as there are low numbers of foreign tourists or expatriates in the district. Although, my presence was clearly noticed, I took measures to present and conduct myself with participants in a way that was non-hierarchical. This included: dressing smart-casual, not displaying expensive equipment, communicating in clear and simple language; being aware of my body position/posture i.e. where possible when seated I would sit at the same level as study participants. By focusing on mutual respect and understanding in interactions with study participants a greater level of transparency is likely to have occurred and although the stories and ideas that were shared were interpretive and only partial, they were relevant and of high quality. I aimed for clarity when interacting with study participants to minimize power imbalances and to optimize interviewees understanding interview questions (Silverman, 2013).

When interacting with academics I was often viewed as a novice, this was likely due my age and/or my limited experience as a researcher. Correspondingly, power resided more with the academics than myself, a dynamic could develop whereby I had less influence on the direction of the interview compared with interviews with Dhading Besi study participants.

Due to the limited duration of the fieldwork and my positionality - nationality, gender, ethnicity, appearance - I was not able to become an 'insider' in my interactions with Dhading Besi study participants. I was conscious of my differences throughout my fieldwork and the resulting power differences that at times I think were accentuated as I was conducting research in a foreign country. This 'otherness' influenced interactions, resulting in only partial access to peoples' values and perspectives on the environment and environmental education. On the positive side, I was treated as an important guest in Dhading Besi with all study participants making time to answer questions and assist me greatly.

Power relations were fascinating although at times limited the research process. Interestingly, power dynamics in Nepal were based on criteria that I had previously considered unimportant when interacting with individuals and organisations. This changing of criteria was possibly due to interacting with individuals and organisations of a culture different from my own, therefore, aspects of my positionality that I previously viewed as having little relevance, now took on greater value i.e. my nationality and language. Power dynamics would often be flexible or non-existent at the start of the interview. However, as the interview progressed a hierarchy would become evident through the display of language, experience, timing, posture etc. It is possible that a clearly defined hierarchy developed throughout the interview as I was often perceived as 'the other', I was an outsider from a foreign country with a different culture, language and appearance. Time allowed for the interviewer and interviewee to construct a relationship of values on how the other person compares to himself or herself.

I found inverse power relations limited the quality of interviews more than power relations where the interviewees considered themselves to have less power. I realized that once a power relation is established it has inertia and is difficult to address or alter. Reverse power relations were evident through unreturned emails and phone calls, meeting request rejections and reluctant responses. Interviews with Nepalese NGO's and Dhading Besi high schools (teachers and students) mostly placed me in a superior position, possibly due to my foreign nationality or enrollment in post-graduate studies at a European university. I worked to deconstruct this power dynamic, however, this was easier said than done.

*Ethical considerations*

I anticipated and prepared for ethical issues and was critical about issues of positionality and power relations (Creswell, 2012). I aimed to conduct fieldwork with minimal power imbalances (discussed previously).

I reflected throughout my fieldwork on self, representation and process, and examined the power relations in the research process, and the issue of accountability in both data collection and interpretation (Jones et al. 1997).

Research in Dhading district was influenced by the politics of Nepal and the politics of development, which I recognized and respected. This was evident in the form of opaque management structures and accountability in certain organizations, which created difficulty in understanding the roles and responsibilities of individuals and organisations. To briefly summarise: Nepal experienced a 10-year civil war that ended in 2006. The years following the peace treaty were marked by political confusion with low levels of governance and political accountability. This resulted in a low amount of development policy being formulated or enacted.

## Findings and Analysis

Data analysis consisted of cyclical coding stages and categorization leading to the development of themes, concepts and theory.

The first stage of data analysis involved descriptive and values coding whereby words, statements or sentences from study participant interviews encoded with appropriate codes. This stage of the coding process was performed cyclically both during and after data collection. Therefore, recoding and recategorizing occurred repeatedly, with codes often refined during each coding cycle. Multiple descriptive and value codes were defined and assigned to the data, with the characteristics of the codes assisting in the next stage of analysis. The next stage involved recognizing patterns and categorizing the codes. Patterns were characterized on similarity, difference, frequency, sequence, correspondence, and causation. Codes were categorized with each category having several subcategories, and each subcategory having several codes.

Coding was considered the transitional process between data collection and more extensive data analysis.

The next stage of analysis involved comparing the different categories and subcategories to develop themes. From themes, concepts were generated to develop higher-level and more abstract constructs. The final stage of data analysis was to demonstrate how these themes and concepts systematically interrelate (Corbin & Strauss, 2008:55).

This section of the findings is from two classroom discussions with year-12 students from two Dhading Besi high-schools. Note: 'High school interview 1' contained minimal data, due to low levels of student participation and translation error. Therefore, this section pertains primarily to 'high school interview 2'.

The discussion commenced with introductions about my research on the natural environment in Dhading and I explained the reasons for researching students' EE,

their ideas and opinions on how to improve EE, and their perspectives of the local environment.

Students' conception of the *environment* was comprehensive with student's clearly placing humans within the *environment*. I asked one year-12 class to discuss what the environment is. The two following responses were representative of the class discussion.

*"The environment is the place where all the living creatures live, it is where the ecosystem, living things as well as non-living things co-relate."* – Rupesh.

*"In my view, the environment is something in which all biological, cultural, physical, aspects come [together] directly and indirectly."* – Roshni.

The student responses were conceptualizing humans as part of nature i.e socio-ecological relationships

Students' showed disappointment when asked about the health of the natural environment surrounding Dhading Besi. The environmental issue of water pollution was discussed primarily, with forest loss and flooding also mentioned.

*"Throwing rubbish should be stopped and [The surrounding environment] should be improved and it should be pollution free!"* – Sajita.

I asked students how the local environment could be improved and encouraged students to share possible solutions. Increased forestry projects, city recycling and compost projects were put forward.

*"Different awareness programmes should be done, forestry projects to plant new trees, ... training provided to the local people."* – Roshini.

To assess the value students placed on the local environment I encouraged students to share their views on the environment. Students reacted strongly to my suggestion that

they might consider the environment to be ‘boring’ or ‘uninteresting’. The majority of students stated that the environment was their home and was very interesting to them.

*“It is very important because we can fulfil all our basic needs from the environment”*

– Krishna.

I asked students how important EE is and how interesting environment and population studies are at their high-school. Students found environmental education to be interesting because they learned about relationships in the natural world and humans relationship with the natural world.

*“Everything is from the environment, we get everything from the environment, food, cloth[s], everything.”* – Rupesh.

Students talked about the effects the population and environment classes had on them. Their understanding developed, specifically their awareness of the impact that human activities have on the natural environment and the importance of a functioning ecosystem. Two students said they participated to a greater extent in environmental groups.

*“ ...it has increased my participation in environmental groups, so its made me very interested and active about conservation.”* – Roshni.

*“[I try to produce] less pollution and ... we know how to conserve the environment.”*

– Sunita.

Roshni is discussing his increased agency through greater participation in environmental groups. A total of 7 students in both classroom interviews discussed their interest and participation in environmental actions. Although this is a positive outcome, EE at the two high schools did not appear to be outwardly promoting students’ agency. However, assessing agency across different cultures is problematic due to differences in how agency is conceptualised and therefore enacted.

I asked students if they were positive about the future status of the environment in Dhading. The class was evenly split, with half the class thinking optimistically about the local environments future and the other half having a negative outlook.

*“If we leave it as it is, then it will deteriorate. If we create awareness in our societies then of course it will get better.” - Sajita*

*“I think the environment will degrade, because in my lifetime the population will increase, and if the population increases then pollution also increases. So the environment will degrade.” – Krishna*

Students voiced that EE could be improved by increasing practical learning activities.

*“Theoretical is done, but practical is not. I think we should do more practical exercises.” – Sunita.*

Students discussed a day excursion to plant trees at a local CFP. The excursion can be categorized as a mini ecological tour as it involves a short period of time in the natural environment. The excursion involved all students at the high-school planting trees to support the CFP. Students expressed a lack of ownership and low group cohesion possibly due to the large number of students participating. Students were not divided into smaller groups for the excursion. During the class discussion, students voiced that it would have been beneficial to be in a smaller group i.e. one classroom per group, to have a group name, and for different groups to have a designated area of the forest project or other CFP to plant. This could have increased student’s participation, ownership of the project, students’ sense of belonging, and highlighted the group’s impact.

This next section of the findings is from two separate interviews with Dr. Nand Kishor and Dr. Erling Holmgren of the International Centre for Integrated Mountain Development (ICIMOD) where they coordinate the Himalayan Climate Change Adaptation Programme (HICAP). HICAP aims to contribute to enhancing the resilience of mountain communities, through improved understanding of

vulnerabilities, opportunities and potentials for adaptation. The project is generating knowledge on the impact of climate change on natural resources, ecosystem services and the communities depending on them. ICIMOD is a regional intergovernmental agency serving the eight regional member countries of the Hindu Kush Himalayas (HKH) – Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal and Pakistan – and the global mountain community. Founded in 1983, ICIMOD is based in Kathmandu, Nepal, and provides a partnership for regional member countries, partner institutions, and donors with a commitment for development action to secure a better future for the people and environment of the extended Himalayan region (ICIMOD, 2013).

Dr. Kishor discussed the need for a national climate change adaptation education centre as climate change adaptations are only occurring sporadically at the local level.

*“There are some organisations which are implementing some climate change adaptations and are still learning about water conservation approaches etc, and using water more efficiently, so those kinds of things are being introduced, but very very sporadic. Very thinly. On a very localised scale.”* – Dr. Kishor.

The implementation of climate change adaptation in Nepal would also benefit from a national environmental education framework. Indeed as climate change education is a crucial component of EE.

Dr. Kishor discussed Nepal’s profile on Yale University’s Environmental Performance Index. Nepal received a sustainability score of 92/100 for agriculture and scores above 60/100 for the nations forests, biodiversity and habitat (Hsu et al. 2014). This is impressive considering Nepal’s geographic size, population and status as a low income country. Dr. Kishor discussed the combination of factors that have contributed to Nepal’s strength in these three sectors.

*“Community forestry, is a big example. Its not just sporadic here and there, it is throughout the country. Until a few years ago community forestry was the darling of all the donors, so at that time, it was really being highlighted, Nepal is a best-case example. That’s definitely a big contribution to [the Yale] index. Then of course low levels of economic development, that is definitely the case. And the third and probably*



*more inherent is the mountainous communities, the people in these mountains with low development, their affinity with their resources, their thinking about their livelihoods revolves sustainable resource management. So because of this factor, in other mountain areas in this part, South Asia, you will find that the environmental performance is good, there is a culture, or a high level of sensitivity, amongst the indigenous to really live with the nature rather than destroy the nature.” – Dr. Kishor.*

Dr. Kishor’s statement is a reminder that there is comprehensive traditional environmental knowledge (TEK) in Nepal that has been generated over tens of thousands of years. There are numerous opportunities for school students to learn directly from indigenous Nepalese, about the environmental solutions that the indigenous cultures in the Hindu Kush Himalaya region have designed and implemented. Moreover, there is huge potential for increased community engagement with formal EE. Dr. Kishor spoke of the low environmental resilience in Nepal, particularly in the mountainous communities.

*“Oh yes. The impact of climate change in Nepal is much higher and more importantly because of the political and low economic levels, their ability to cope is very low in the mountainous communities.” – Dr. Kishor.*

I asked Dr. Kishor to discuss the livelihood challenges that Nepalese are likely to face due to climate change in the future.

*“[A] general reduction in [the] productivity of crops, that is very clear in our research. On top of that, if you have extreme events, [transportation] is broken and what ever you have produced cannot be sent to the market. So you cannot really separate it, it is all interlinked... Agriculture is becoming more challenging and less attractive for people. So with that factor, if agriculture is less attractive for people they will produce less and this means they will depend more on imported food, and this will mean increased costs.” – Dr. Kishor.*

We discussed possible solutions to the livelihood challenges the rural Nepalese face including reduction in agricultural yields and education on crop and seed selection to mitigate climate change.

*“Certainly there can be several ideas. We are not really at this time promoting any particular ideas, except for generic things, like first of all, training local extension officers about the issue of climate change and crop specific knowledge i.e. the introduction of crop varieties that are less resistant to temperature. The issue of water resource management, this also has to be a higher priority.”* – Dr. Kishor.

ICIMOD is conducting extensive research into climate change science and possible adaptations in the HKH region. However, this knowledge is siloed and is not communicated adequately to relevant regional education organisations e.g. UNEP, UNESCO, Ministry of Education etc. Partnerships between ICIMOD and UNESCO have occurred in the past through Education for Sustainable Development in Mountainous Communities projects. However, there is scope for an immensely beneficial partnership between UNESCO, UNEP, ICIMOD and the Ministry of Education to assist in the development of an EE framework for high-school education in Nepal. ICIMOD and UNESCO representatives have been supportive of this possible partnership and perceive the value in connecting with fellow organisations working to improve the environment and environmental education in Nepal.

Dr. Holmgren and I discussed the Government of Nepal’s focus on climate change and the shortcomings around unprepared government.

*“All the countries in this region [Hindu Kush Himalayan region], many countries I think, climate change is a busy topic because there are so many players, it’s very important, so there’s money around”.* – Dr. Holmgren.

Climate change management is often placed within the development agenda of the national development plan. The problem with climate change is that it involves numerous agencies. Environment ministries often house the climate change focus, which can be problematic, as these ministries are not equipped to deal with climate change aspects beyond issues of natural resource management (i.e. forestry). Other

sectors including education, social development, public health etc are all linked with climate change though not within the standard sphere of environment ministries management. This is common in countries throughout South-Asia and South-East-Asia (Appendix IV). Dr. Holmgren discussed that progress can be slow for governments to plan strategically for climate change adaptation.

*“I’ve seen how time consuming it is and how frustrating it can be [for governments] to know that there is a lot to do but its not easy to tackle.” – Dr. Holmgren*

The ministry of environment often has lower relevancy in the governmental hierarchy and therefore receives less funding and primacy compared with rural development ministries, ministries of finance etc.

*“If the climate change people aren’t sitting [in development meetings], then its not going to happen. So putting together a vehicle which moves this agenda forward has been very difficult, it still is.” – Dr. Holmgren.*

A problematic component for governments to operationalize climate change policy is the implementation arrangement. Moreover, the difficulty in designing and implementing climate change policy, parallels the difficulties found in developing and implementing EE in Nepal. Nepal has numerous hurdles to overcome in implementing climate change policy and EE. Both problems require inter-disciplinary strategic planning and cross-organisational management. A positive factor is the international development community’s presence in Nepal and the various partnerships that are assisting Nepal to formulate and implement effective EE.

## Conclusion

Current school environmental education in Dhading Besi develops student's environmental literacy to an adequate level to understand local and national environmental issues. However, it is inadequate at developing students' agency and therefore ineffective at enabling students to take actual action in addressing environmental problems - i.e. through initiating and/or participating in environmental actions. Students with strong agency have educated themselves on environmental interventions and the importance of these measures. The role of community is pivotal in promoting students engagement with environmental interventions. Continuous involvement of the community is a crucial factor for school environmental education to maximise effectiveness.

Current limitations to EE in Dhading Besi include low funding, ineffective EE curriculum and limited practical learning activities.

Improved EE in terms of scope and duration is required in Nepal to reduce the impact of human activity on the natural environment. Although EE is available at high-schools throughout Nepal, current EE is sporadic with low levels of integration in other learning areas. A national EE body could highlight innovative local initiatives in EE and model best practice.

There is sizeable potential in Nepal for EE to partner with outdoor education. This would enable students to experience learning about the environment, while in environment. Moreover, Nepal's diverse geography is particularly suited for outdoor education.

Increased EE funding in Nepal, coupled with an EE framework to coordinate EE learning activities could greatly enhance EE. Establishing a nationwide framework for educators to share teaching experiences and knowledge, particularly in the form of teaching methods, would identify gaps and areas for improvement in current activities and combine financial and educational resources. This would in turn assist in formulating clear priorities and improve EE learning outcomes.

*Future Considerations*

Future environmental education would benefit greatly from an increased focus on practical learning activities and hence students' active learning.

Further studies on EE in Nepal would greatly assist curriculum developers, teachers, and local education boards to better plan and support students' learning about the environment and environmental issues, which are essential for humanity's existence.

The global implications of these findings are that EE requires concerted efforts to reposition and redesign the existing educational curriculum in the HKH region.

## References

- Archer, M. S., 1996. *Culture and agency: The place of culture in social theory*. Cambridge University Press.
- Barker, C., 2003. *Cultural studies: Theory and practice*. Sage: London
- Berkes, F., Colding, J., and Folke, C., 2001. *Linking Social-Ecological Systems*. Cambridge: Cambridge University Press.
- Bookchin, M. 2005. *The Ecology of Freedom: The Emergence and Dissolution of Hierarchy*. Oakland: AK Press.
- Chawla, L., 1999. Life paths into effective environmental action. *The Journal of Environmental Education*, 31(1), pp.15-26.
- Corbin, J. and Strauss, A., 1994. Grounded theory methodology. In D. Norman and Y. Lincoln (Eds.), *Handbook of qualitative research*, London: SAGE Publications, pp.273-285.
- Creswell, J. 2012. *Qualitative Inquiry & Research Design, Choosing Among Five Approaches*. Thousand Oaks: Sage.
- Dixit, A. 2003. Floods and vulnerability: need to rethink flood management. *Natural Hazards* 28(1), pp.155-179. Available at <<http://dx.doi.org/10.1023/A:1021134218121>> [Accessed on 8 May 2014].
- Emirbayer, M. and Mische, A. 1998. What is agency? *American journal of sociology* 103(4), pp.962-1023.
- Folke, C., Carpenter, S., Walker, B., Scheffer, M., Elmqvist, T., Gunderson, L. and Holling, C. 2004. Regime Shifts, Resilience, and Biodiversity in Ecosystem Management. *Annual Review of Ecology, Evolution, and Systematics*, 35: 557–581.

- Gilbert, D. T. and Malone, P. S., 1995. The Correspondence Bias. *Psychological bulletin*, 117(1), pp.21.
- Gough, N., 2013. Thinking Globally in Environmental Education. In: *International Handbook of Research on Environmental Education*. New York: Routledge Publishers. Section 1, Chapter 4.
- Hays, S., 1994. Structure and agency and the sticky problem of culture. *Sociological Theory*, 12, pp.57-57.
- Hsu, A., Emerson, J., Levy, M., Sherbinin, A., Johnson, L., Malik, O., Schwartz, J. and Jaiteh, M., 2014. The 2014 Environmental Performance Index. New Haven, CT: Yale Center for Environmental Law and Policy. Available at <<http://www.epi.yale.edu>> [Accessed on August 2 2014].
- ICIMOD, 2014. HICAP: Himalayan Climate Change Adaptation Programme. Available at <<http://www.icimod.org/?q=10140>> [Accessed on June 4 2014].
- IPCC, 2013. Working Group I: Contribution to the IPCC Fifth Assessment Report. Climate Change 2013: The Physical Science Basis. Available at <[http://www.climatechange2013.org/images/report/WG1AR5\\_ALL\\_FINAL.pdf](http://www.climatechange2013.org/images/report/WG1AR5_ALL_FINAL.pdf)> [Accessed on 10 June 2014].
- Janzen, D. H., 1997. How to grow a wildland: the gardenification of nature. *International Journal of Tropical Insect Science*, 17(3-4), pp. 269-276.
- Jones, J., Nast, H., and Roberts, S. 1997. *Thresholds in Feminist Geography: Difference, Methodology, Representation*. New York: Rowman and Littlefield.
- Kanel, R., Paudyal, S., and Baral, A., 2005. Nepal Community Forestry 2005. Government of Nepal: Kathmandu.

Kennedy, M. M., 2010. Attribution Error and the Quest for Teacher Quality. *Educational Researcher*, 39(8), pp.591-598.

Kopnina, H., 2012. Education for sustainable development (ESD): the turn away from 'environment' in environmental education? *Environmental Education Research*, 18(5), pp, 699-717.

Martin, G. C., 1975. A review of objectives for environmental education. In G. Martin & K. Wheeler (Eds.), *Insights into environmental education*, Edinburgh, UK: Oliver & Boyd.

Menon, T., Morris, M. W., Chiu, C., and Hong, Y., 1999. Culture and the construal of agency: Attribution to individual versus group dispositions. *Journal of Personality and Social Psychology*, 76(5), May 1999, 701-717.

Miller, J. G., 1984. Culture and the development of everyday social explanation. *Journal of personality and social psychology*, 46(5), pp. 961.

Ministry of Forests and Soil Conservation 2010. *The Future of Nepal's Forests: Outlook for 2010*. Government of Nepal: Kathmandu.

Ministry of Science, Technology and Environment, 2013. *Status of Climate Change in Nepal*. Available at <<http://doenv.gov.np/category/download-center/>> [Accessed on 10 July 2014].

Neupane, R., Gautam, S. and Shrestha, S. D., 2010. Impact of climate change on discharge characteristics of the Narayani River, Nepal. 27(41).

Niesenbaum, R. and Gorke, B., 2001. Community-Based Eco-Education: Sound Ecology and Effective Education. *The Journal of Environmental Education*, 33(1), pp.12-16.

Patton, M. 2001. *Qualitative Research & Evaluation Methods*. Thousand Oaks, CA: Sage Publications.



- Paudel, P.P., Omura, H., Kubota, T. and Morita, K. 2003. Landslide damage and disaster management system in Nepal, *Disaster Prevention and Management*, 12(5). pp. 413-419.
- Pradhan, N. S., 2012. Role of Policy and Institutions in Local Adaptation to Climate Change : Case studies on responses to too much and too little water in the Hindu Kush Himalayas. ICIMOD: Kathmandu.
- Primack, R. B., 1995. *A primer of conservation biology*. Sunderland: Sinauer Associates.
- Ragin, C. C., and Amoroso, L. M., 2010. *Constructing Social Research, The Unity and Diversity of Method*. Thousand Oaks: Pine Forge Press.
- Rome, A. and Romero, B., 1998. Enhancing conservation education opportunities in nature reserves in tropical countries: a case study in Belize. *The Journal of Environmental Education*, 30(1), pp.34-37.
- Samir, K. C., 2013. Community vulnerability to floods and landslides in Nepal. *Ecology and Society*, 18(1), 8. Available at <<http://dx.doi.org/10.5751/ES-05095-180108>> [Accessed on 7 May 2014].
- Shiwaku, K., Shaw, R., Kandel, R. C., Shrestha, S. N. and Dixit, A. M. 2007. Future perspective of school disaster education in Nepal, *Disaster Prevention and Management*, Vol. 16 Iss: 4, pp. 576 – 587.
- Silverman, D. 2013. *Doing Qualitative Research: A practical handbook* (3rd). LA: Sage.
- Smith, J., 1975. A source of information. In: W. Jones, ed. 2000. *One hundred and one ways to find information about health*. Oxford: Oxford University Press. Ch.2.
- Sultana, F. 2007. Reflexivity, positionality and participatory ethics: Negotiating

fieldwork dilemmas in international research. *ACME: An International E-Journal for Critical Geographies*, 6.3: pp. 374- 385.

Stevenson, R. B., Wals, A., Dillion, J. and Brody, M., 2014. Introduction: An Orientation to Environmental Education and the Handbook. In R. Stevenson, A. Wals, J. Dillion and M. Brody (Eds.), *International Handbook of Research on Environmental Education*, UK: Routledge

Stockholm Resilience Centre, 2013. *What is Resilience?* Stockholm University. Available at <<http://www.stockholmresilience.org/21/research/what-is-resilience.html>> [Accessed on July 23 2014].

Toyne, P., and Ali-Khan, S., 1998. A common agenda? Health and the greening of higher education. *Copenhagen, WHO Regional Office for Europe*.

UNDP, 2013. Rise of the south: Human progress in a diverse world. Nepal. Available at <<http://hdr.undp.org/sites/default/files/Country-Profiles/NPL.pdf>> [Accessed on May 12 2014].

UNEP, 2004. Programmes and Resources for Environmental Education and Training. Available at: <<http://www.unep.org/training/publications/index.asp>> [Accessed on May 12 2014].

UNESCO, 2012. Education for Sustainable Development Lens: A Policy and Practice Review Tool. Available at <<http://unesdoc.unesco.org/images/0019/001908/190898e.pdf>> [Accessed on June 27 2014].

United Nations University for Environment and Human Security, 2013. World Risk Report (WRR 2013), Alliance Development Works/Bündnis Entwicklung Hilft (BEH).

World Bank, 2013. *Nepal country profile*. World Bank DataBank. Available at:  
<[databank.worldbank.org](http://databank.worldbank.org)> [Accessed on December 20, 2013].

World Bank Group, 2012. Development Education Programme: Environment.  
Available at  
<<http://www.worldbank.org/depweb/english/modules/environm/index.html>>  
[Accessed on 10 July, 2014].

# Appendix I – Maps



Figure 1: Map of Asia



Figure 2: District Map of Nepal



Figure 3: Map of Dhading District, Nepal

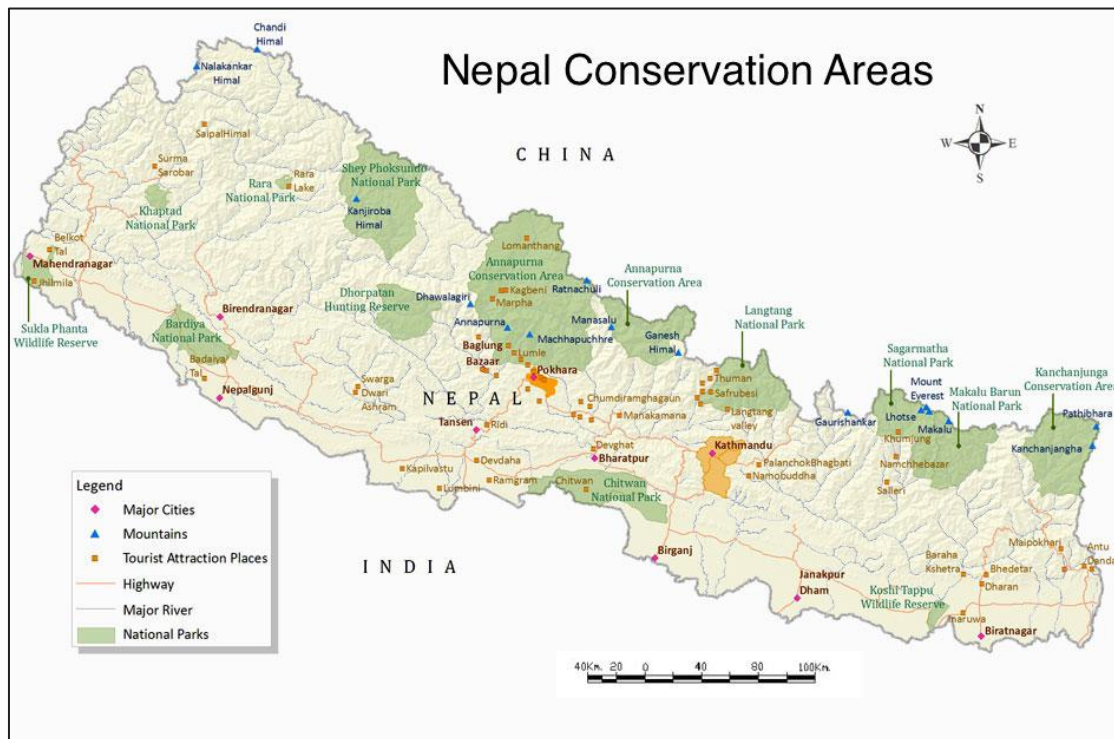


Figure 4: Map of Conservation Areas in Nepal



Figure 5: Map of Hindu Kush Himalayan region and major rivers/water basins



## Appendix II – Dhading Besi Images



Figure 6: Student interviewees at high school 2



Figure 7: School 1 with Dhading Besi hills in the background

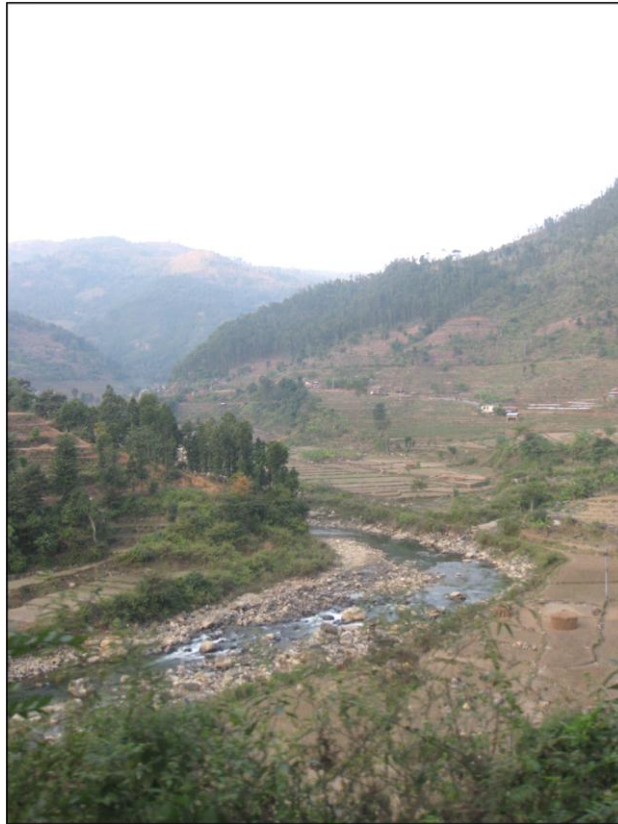


**Figure 8: Dhading Besi town centre**



**Figure 9: Dhading District agricultural (rice paddy) with Nepalese women in foreground**





**Figure 2: Looking North up Dhading Valley towards Dhading Besi**

## Appendix III – Dr. Nand Kishor Interview

Dr. Nand Kishor  
HICAP Coordinator  
ICIMOD, Kathmandu

Interview location: ICIMOD Kathmandu Office, Khumaltar, Lalitpur, Kathmandu, Nepal  
Interview time: 2:04pm (duration 44 minutes). November 23, 2013

Gavin Bryce: UNESCO is more into, say culture, say than climate change, so how come they something some internships on climate change. Yeh, they have got four units, one of which is the culture unit, which is the most well known... mmm... areas of UNESCO's practice. They have the world heritage sites, tangible and intangible cultural heritage, theres the education unit, which has a... ahhh... big focus on literacy in Nepal and education for all, particularly at primary school, but now that's been almost completely achieved, they're now focusing more on quality of primary school education. Mmm, and then theres the scientific focuse, which is supporting science education and science projects. Theres not a representation for that unit at the Nepal office. And theres... mmm... transparency in journalism and freedom of speech, freedom of press, which has... mmm... also a strong focus at UNESO Nepal. But, within the UN, UNESCO is as the decade of sustainable education, which is 2004-2014, so they have a focus together with the United Nations Environment Programmes (UNEP), so they're looking at climate change education for sustainable development

Nand Kishor Agrawal: Oh, ok I understand

Gavin: Mmm, there is, I would like to have seen more focus of UNESCO on climate change education. Mmm, I imagine because over the last ten years, literacy has been the big focus, so it has been a lot of the attention of UNESO. But there are some amazing organisations – including ICIMOD – that are working towards this focus.

Nand: We know we were all in one UNESCO workshop and recently there was a meeting in Paris.

Gavin: Yes, OK.

Nand: The past week only.

Gavin: Yeh, that was the general assembly

Nand: Yes, one of my colleagues was there

Gavin: The, mmm, head of UNESCO Kathmandu, was in Paris for the week or two weeks. Interesting. I just saw the director of ICIMOD. I recognized him from a short video from the Rio Summit.

Nand: Ah huh, ok.

Gavin: A couple of years ago. So, with climate change adaptation strategies.

Nand: Just one more question.

Gavin: Ok ofcourse.

Nand: How did you come to know about ICIMOD and this programme, me and my coordinating.

Gavin: Great, so I was in the UNESCO library and I was looking at the climate change section and a lot of the books were 5, 10, 15 years old. Dusting them off. But there were three publications from ICIMOD. That were just like, wow, this is really top quality publications.

Mmm, and as I picked up one of the booklets, a friend of mine who works there said, "I'm organising an exhibition climate+change, so I've had a little to do with ICIMOD, I could give you a contact there", but she didn't respond, mmm, I've contacted.

Nand: Anja?

Gavin: Yes, I think it was Anja, she's been very busy. I imagine. I looked up the website and I was very happy to come across the organisation. ICIMOD and ASEAN, is it SAARC or ASEAN? The other IGO

Nand: SAARC is there, an IGO. But we have not directly linked to SAARC. We have a different setup, this is also a IGO but it is different setup and different outputs. But anyway now you can go ahead now.

Gavin: Fantastic, if we have any other questions, that's fine.

Nand: That's OK, I will come back. But just now you can go ahead with what you want to.

Gavin: Thankyou.

Gavin: With your project, could you tell me some more about how active Nepal is with your project, climate change adaptation, are there certain areas that are of focus with the project?

Nand: Yes, certainly, I can give you a little flyer. See this ICIMOD, is doing another couple of similar projects. So it's called HICAP and climate change adaptation project. This is implemented in say four countries. Pakistan, Nepal in the kochi basin, India, Tibet in China, eastern India and also southern Mekong in China. And in Nepal we are focusing on this kochi river basin area. What we are doing is, this is a very integrated, and it tries to cover everything under climate change adaptation. So first we basically do science in climate change, so everybody knows the global temperature will change by 1 or 2 degrees, minister for the environment says 4 degrees. But nobody really talks about what it means to a district in Nepal, to a district in, not everywhere is going to uniformly change.

Gavin: Absolutely

Nand: So what we are doing is, we are downscaling this global scenarios to the local areas, using different climate change models. Actually using 3 or 4 climate change models so that we come to a more comprehensive numbers, so that is what we are doing under this science part of it. And also looking at the hydrology, how is the hydrology going to be affected, the water. So this is one very scientific, technical research. Then the next part where we are doing is how the forests will change, the grasses going to change, how the agriculture is going to change. So this will be another bunch of, we see what is the direct impact of these things on the say ecosystems that we have or the agriculture that we have, how it impacts the productivity etc. And the third important component that we do, how the community the people how, here in this part you are talking about. Already the change, and what is that they are already doing without this knowledge, the community already taking some action, very clear, whenever we go to the site we see. So this we are doing a very extensive survey, very good quantitative research, we base this on villages, spending time with them for weeks and months. To really gather, what, how they are facing it and what changes are taking place. That is another part, very social and community orientated. So these three are the main research areas that it is covering, and of course we have a big component on communicating that, once we have all these results we communicate it, in a simple way, so everyone can understand. So that will be a more education part of it.

Gavin: Great

Nand: So that's what we are doing. In Nepal, as I mentioned we are working in the Kochi basin and the focus is on, of course this science focus is there, assessment of how the forests are changing, this we are doing particularly in the foot hills, and a lot of work on how the communities have already changed.

Great, thank you for explaining, that is very clear. So, it seems that once of the primary focus with the scientific research is on the hydrological cycle, with the water, I read just before I arrived, that there was extensive flooding in western Nepal, how, what changes have been seen within the hydrological cycle in western Nepal. Is it increasing, decreasing rainfall.

Nand: Ok

Gavin: More sporadic.

Nand: **Increased rainfall**, decrease that comes from this part, we see the model in the past how the rainfall has been there, and according to new models how has it predicted. So we have basin wide, now we are in the process of collecting basin wide details. That OK, in the Kochi basin, what is our prediction for rainfall. **Hydrological, how the river flow is changing, that is something to do with rainfall, but not necessarily everything to do with rainfall.** That is a slightly different part. So when it comes to results, the results are still going on, it just started last year. So we hope to come up with some results by the middle of next year, which will make it public. The idea is to make all this details public on our websites and also with other sources. So by the middle of next year we will be able to. We are not focusing much on disasters, for example, these big floods that came in India and Nepal. So we are not, ICIMOD as a whole is, there is a different division that gets into that. But I mean in this program we are not getting into why this disaster happened, why the flood happened.

Gavin: This is more of, ultimately, a livelihoods focus?

Nand: Ultimately, yes.

Gavin: And so, the basin within Nepal that this project is focusing on... I'm just thinking what section to ask this question on... I'll ask a couple more questions about this area, because I'm still learning about the specific vulnerabilities that the Nepal landscape has towards climate change. So I'm thinking that with decrease in rainfall or concentrations in rainfall, is there a focus on, I see there's an area on vegetation, so is that to do with decreasing surface water runoff? If you have a field that has no vegetation there will be a lot of erosion occurring and instead of the water being absorbed into the earth it'll go off in to the rivers, so you can have higher flood events, loss of top soil, so you're soil fertility will be decreased. With the section here, what types of activities have been observed within the local population?

Nand: OK that is basically comes here, because the results from our side are not yet ready, but **people are already feeling the changes, they see that rainfall is less or more in some places, the temperature is changing. What changes they are doing is, they are already making some changes in their crops. That is the first change.** That is clearly visible from our site-specific research and our surveys. That farmers are already changing some of the crops. Suppose they were growing potato, so maybe they are growing potato anymore, **but the people at a little higher altitude are growing potato. So, but, another thing, that doesn't get determined, only by climate factors. Sometimes that gets determined by the market.** So it is a combination ok. To give an example, if a farmer is growing a rice paddy and his products are, let's say, 10 metric tonnes per year, and now because of the temperature, he is going down to eight, so what this farmer is doing to see that wither he continues with rice or introduces potato, because of the changes, **so changes they are doing without any external influence, except say the climate influence and maybe sometimes the market influence.** So those changes are already happening.

Are there districts or villages within Nepal that are known for having improved environmental sustainability or have shown certain practices that have, are there innovative areas within Nepal that are.

There are – which is not part of the project – I am aware and have heard of this big community forestry practices. So maybe some colleague in UNESCO will be able to tell you about, someone who has been here for sometime. **Nepal is known for its community forestry practices, say the last 15 years or 20 years they have been conserving their forests, elected**

communities and that has changed a lot of degraded areas into rich forests. That is a very very constructive and very pro, a very supportive activity. So that is definitely there. And there are some organisations that – we are a research organisation so we don't work with that part – there are some organisations which are implementing some climate and still learning, more water conservation approaches, and using water more efficiently, so those kinds of things are being introduced, but very very sporadic. Very thinly, its not as if a massive.

Gavin: Its on a very localised scale.

Nand: A very very localised scale, yes.

Gavin: Its interesting to hear about the forest projects, its good to hear.

Nand: If you google, I'm sure you will find a lot of material on that.

Gavin: Thank you for notifying me of that. Your project is in multiple countries. How do you think Nepal, because I've been looking at Nepal's environmental performance, there's an environmental performance index that yale releases every two years and Nepal is rated quite highly, I think its ranked 31<sup>st</sup> out of 150 countries, that they've surveyed. For you, how much do you think that environmental performance is because of Nepal's lower levels of development, or is that because of peoples inbuilt environmental awareness, do you think? From my perspective, Nepal's performance is because they have very low amounts of industry of mechanisation, its mostly done by hand, so it would be a reduced impact on the environment. But I think with Nepal's development that that could be in real danger of being changed. Because obviously there's a lot of poverty here, so there's a lot of aspiration to improve economically.

Nand: Okay, I think it's a combination; I wouldn't really undermine the work that is done in Nepal. Because community forestry, as I said, is a big example. Its not just sporadic here and there, it is throughout the country. Where they have this community forestry approach. Until a few years ago community forestry was the darling of all the donors, so that time, it was really being highlighted, Nepal is a best-case example. That's definitely a big contributed to this index. Then of course low level of development, that is definitely the case. And the third and probably more inherent is the mountain, the people in these kind of mountains, with low development, there affinity to their resources, their thinking about their livelihoods revolves around it. So because of this factor, in other mountain areas in this part, South Asia, you will find that the environmental performance is good, there is a culture, or a high level of sensitivity, amongst the indigenous to really live with the nature rather than destroy the nature.

Gavin: It's very promising to hear you say that. I had a little bit of time in the Annapurna range and from being in that environment, it was very apparent that if they didn't take care of their environment, they could loose their entire crop for the year of rice. So theres a real necessity to be conscious of those interactions. I would imagine the Nepal has unique challenges towards climate change? What do you see are some of the main challenges that Nepal faces with climate change?

Nand: Oh yes. Nepal for example the impact of climate change is much higher. Now first of all the research shows that the temperature increase in the higher altitude is greater than the temperature increase at the lower altitudes. So that itself is a big big challenge and this whole glacier melting. We collect a lot of data on glaciers. So although there is still diverse views coming in, there is more or less agreement that yes glaciers are melting, maybe not at the same faster pace presented before, but they are melting and that leads to a lot of floods etc, climate induced disasters in various parts of Nepal. And more importantly and because of the say political and low economic levels, the ability to cope is very low in the communities.

Gavin: There is not much of a buffer.

Nand: Yes, if any flood happens, lots of life lost, and those that are left behind can suffer even more. So that is really really the case with low income levels that can hardly afford to... But at

the same time, the plus point is, there a lot of people from Nepal that work outside the country and that money is not sensitive to climate, so that is a plus point. But otherwise, the whole economy is very much centric to water resources which they are having.

Gavin: Thank you, with the livelihoods focus, bringing it down to not so much extreme events, what would be some of the livelihood challenges that you could foresee that aren't so much related to extreme events?

Nand: General reduction in productivity of crops, that is very clear in our research also. That the productivity of crops is going down. And on top of that, if you have extreme events, the road is broken and what ever you have produced can not be sent to the market. So you can not really separate it, it is all interlinked. If something is broken there, then it's gone. The cost of sending things from the local area to the market also much higher than in the lanes (?) so from that perspective I think agriculture is becoming more challenging and less attractive for people. So with that factor, if agriculture is less attractive for people they will produce less and this means they will depend more on imported food, and this will mean increased costs, they will have to spend more getting those foods. So that is getting a cycle.

Gavin: It's a negative feedback isn't it?

Nand: So that is the problem.

Gavin: What are some ideas that ICIMOD has to lessen that cycle? Or do you know if the government has floated the idea of an incentive scheme?

Nand: Certainly there can be several ideas. We are not really at this time promoting any particular ideas, except for generic things, like first of all, training local extension officers about the issue of climate change. For example, if a large number of farmers change from paddy (rice) to potato and the local extension officer knows only about paddy and not potato, then it is the government's job to put a person there who knows more about potatoes. So those kind of small things that can make big differences are very very important. And then the whole issue of water resource management, this has to be on a higher priority. Introducing varieties that are less (sic) resistant to temperature.

[Recorder ran out of power at 25 minutes 55 seconds].

[END OF INTERVIEW]



## Appendix IV – Dr. Erling Holmgren Interview

Dr. Erling Holmgren  
HICAP coordinator  
ICIMOD, Kathmandu

Interview location: ICIMOD Kathmandu Office, Khumaltar, Lalitpur, Kathmandu, Nepal  
Interview time: 1:04pm (duration 53 minutes). November 27, 2013

Erling Valdemar Holmgren: I was brought up in Kenya, I got my imprint there, wildlife savannahs, and I guess that's it, stayed with me all my life, I studied biology, ecology, and physical geography. I put in human geography as an aspect for the teachers degree.

Gavin Bryce: I like how you say imprint from the environment I grew up, thankfully, my parents spent a lot of time sailing or skiing. My mum loved hiking and camping, my dad, not so much camping. I spent my last year of high school at an outdoor education school/academy, so we would spend the weekends out in the mountains, hiking, rock climbing. Yeh, so once those experiences come in, it's a good thing to focus on preserving it.

You said before that the climate change focus is abit of a mess. I imagine that's also to do with the growing influence of the corporate world. And its not... well old, industry doesn't really profit economically from caring for the environment. Nepal's been through a lot of strife in the previous decade. What areas do you see are promising or are a sign of strength within climate change adaptation or the climate change focus in Nepal?

Erling: Well firstly really, at ICIMOD, we try to avoid too much attention on Nepal, so that we're politically equally spread, ofcourse obviously we pick up more that happens here, to some extent, but I would say that all the countries in this region, many countries I think, climate change is a busy topic, because there are so many players, its very important, so there's money around. The governments aren't ready. So normally, change is put within the development agenda and that can be put in by presidential decree or an official inclusion in the national development plan, that's often the starting point and that's good because it needs to be held somewhere, the problem is that there's so many agencies involved then, no ones really the boss, because climate change affects so many different aspects of life. Its often housed within an administrative environment which is not often placed because as its such a cross-cutting theme the ministry of environment is not really equipped to deal with all the aspects beyond issues of forestry, water, pollution i.e. natural resource management. But you have all the other stuff that involves construction, education, social issues, health for example. So getting countries to organise themselves to tackle climate change often takes a long time before they know how to do it. And that's typical both in where we are now in South-Asia and in South-East-Asia, where I've worked before. So I've seen how time consuming it is and how frustrating it can be to know that there is a lot to do but its not easy to tackle it. Now the ministry of environment is often one of the weakest ones compared to places like, the ministry of rural development, or ofcourse, the ministry of finance, construction, ministry of interior and all these, sort of, national development ministries have a bigger say, but if the climate change people aren't sitting there, then its not going to happen. So putting together a vehicle which moves this agenda forward has been very difficult, it still is.

Gavin: Yes, it comes as you say, from the heads of state, or ministers, and then percolates into a ministry, or becomes administrated, but then, yeh, theres the next step of that being operationalized. I see that process at UNESCO, reading documents, its very inspiring, and the UNESCO decade of education for sustainable development 2004-2014, and that overarching theme is robust and UNESCO Nepal has picked it up, but, they've done nothing with it from what I've read. I'm doing an assignment for my course where I'm doing a project evaluation, and I chose to do it on DESD, but I had to zoom out, as there was nothing about it and changed it to education for sustainable development, which includes a number of different programmes, but then it was still difficult to find the nuts and bolts of what's actually taking place, so, I changed it to literacy capacity education.

Erling: Well you see that's because, the implementation arrangement is not properly fixed. So you say with climate change as well as what you'll be talking about with education for environment, because you need to have a mandate for that agency to go ahead and implement, which means they then have to have a budget for it, which means people are gonna be payed, to do that sort of work as their priority. And for example in the climate change agenda, even if there are staff assigned to address climate change, climate change adaptation and mitigation strategy, or action plan, that means they have a lot of daily work which means, interaction with other ministries, it also means they have to deal with the projects, which have come from the donors / the development sector, to assist, to help operationalize this climate change agenda, but they don't really have time to work on the projects, so projects are staffed by experts who come as part of the package even though they are supposed to deal with government and do capacity building with the government staff while this project is being implemented. But the government staffs main work is what they have been assigned by their own sort of program of work, so they're not involved in the climate change assistance projects.

Gavin: They're involved in the administration of it. And also the UNESCO staff, unless its actually in your job description, (you're here to do capacity building) then you need support staff to do the other work, so it eats up the time. And what you say from another angle aswell, theres just not the priority within UNESCO education Nepal, which is one of the main agencies tasked with education, climate change is right down the bottom. Its understandable because, of the focus on, much lower rate of literacy and much lower access to education. But it's a difficult thing where the climate change education thing needs to ideally embed all aspects of development, but if its put down the bottom and looked at as a subject in and of itself, then it does take wings.

Erling: No, the thing is also that, government agencies compeat in different ways, they compete to spend their budget so that they get replinshed. And they have certain turfs where don't really want to interact with others. Its very typical within forest and natural resource management; or forest and land management; or forest and environment, sometimes it's the same sometimes its separate, umm, not to forget water issues. So, you know, there's this sort of famous framework of water shed management, really is this sort of similar, it involves different agencies, which need to agree on how to work together on the ground. But if they don't have equal budgets they don't have equal incentive to do the work or actually have equal demands to do that work, if the rural department and local governments has the budget then they have to spend it, so they have to do that work, that's all fine, but the point is for them to have budgets allocated. And this is what we're finding in climate change is that its very difficult. Because they don't really have that. And its not easy for them to grapple with climate change adaptation, because its not really clear what they have to do. So part of our work here at ICIMOD is to try to help with this big question. And to me and many other colleagues here, we see this to boiling down really to institutional focus. Capacity building is actually more important to institutional level at local government perspective than in the national.

Gavin: Yes, because its much more removed in the national say than the local?

Erling: Now, many programs get their funding from donors at national level, so the Ministry of Environment will have a budget for climate change, now lets say that education was a big part of the need – which I believe it is – the point is they don't really have the expertise within the Ministry of Environment to handle the educational aspects, but the Ministry of Education doesn't have the budget to do it. So you're only going to get them working together, when one invites the other. So they come and sit at meetings and workshops, conferences and then they go away again. Ahh, its not really a practical work program to make sure you have some sort of common goal defined, so that they work towards the same output. If that would work you would need the section of the ministry of environment to have an equal budget say with the Ministry of Education, where there task is to work towards climate change education. It all depends on the institutions, about how its setup, whos actually tasked with what, and what the programs are, if its written in their work program that they must work together then that's ok, the point is how to get that done.



(Does this link in with our current emphasis on deductive thinking (rather than holistic or systems thinking)?

Gavin: Yes. Can you have Ministry of Environment and then you have another ministry that's the ministry of climate change. What could be possible for Nepal to aid collaboration between the ministries?

Erling: Well, it's the same again in many countries. So, it's not really gonna work with a Ministry of Climate Change – although many times we have thought it would – because the work program entails so many cross cutting areas, multidisciplinary work areas, if you're going to do climate change adaptation in a certain district where let's say there is now a lack of winter rain now. It's really hitting them hard, because they don't get that little crop which feeds them until the monsoon comes, so that they're OK in that period. Without the winter rains now, they have to dig in to either savings or have a sell-off asset just to feed themselves. The last few years there's been very big disruptions for communities when they've lost the crop. This is a good example where the climate change issue and its an adaptation issue, we need to have water management expertise, we need to have crop production expertise, that's the minimum because we're looking at helping them get through this winter drought. But there might be other things involved as in, crop type, what kinds of crops is it necessary. What's happening... The problem is also for the farmers – if we continue thinking of them – is sometimes too much rain in one go, so you need storage / spouting so you can't handle that, so they don't get washed away. There's also issues of temperature change now, crops are suffering and fruiting is suffering, there's disruption in the fruiting cycles. Plants are flowering too early, fruit doesn't develop as well on the stalk, the produce isn't as good as it used to be. You need these institutional setups so local government groups will work together, and I go back to saying they need the technical expertise, they need to have money to be able to do that, their budgets. And I think the farmers will know a lot about what they could do, but then there's this sort of interaction between the two or three agencies – and this is again where environmental education comes in again – so with that I would like to bring up the issues of terminology, language issues, marrying technical talk with practical terminology and local household language is very important because you can't have the same communication setup on this topic in different parts of Nepal which have different languages and they may have different traditions. This is one thing that I think the climate change agenda suffers from everywhere, the communication aspect, because scientists don't talk easily with farmers and they certainly don't talk easily with government technical staff or government bureaucrats. Decision maker is often a bureaucrat, so the scientist may be able to talk well with the technical staff, but then how to get the message across to the decision maker.

And the second point is language, its different terminologies, often people don't know what people are talking about. Oh yes there's a problem, now, we have green house gases, and they'll wonder what's that, they don't know what a green house gas is. They don't know why it's important now, there's a lot of so called important narratives, which go way over the heads of people. And the last important point is the gender aspect, women talk differently, so we have women's farmers groups, they'll have different priorities and understanding of what they need or perhaps the men will have and it's a very important part as women are suffering more in the mountains of Nepal. It's not just the fact that they have another family burden as it were, because with kids, it is more women dealing with them. There's also collecting of resources, water, fire wood, it's the farming practices. And, in the hills the mountains here there's a lot of migration away from homes, to get better cash, so there's a lot of young men leaving here. Very big numbers. Which means additional issues for the women. So it's important in environmental education to think almost at the top of the priority list is to make sure you have relevant messages, best form of communication, bearing in mind men and women, and elders and youngsters way of speaking. Because you spoke about traditional knowledge before and I think that is extremely important as part of the adaptation that has been going on for hundreds of years. It's been lost a little bit because kids aren't very interested to live here anymore, so that don't really want to know about that. I don't think that we would be able to envision having environmental education rely on traditional knowledge, but it should definitely be an important part.

Gavin: Embedded

Erling: Where going to have to look towards stepping into the modern age of communications technology, what we talk about as using mobile IT reach is far better than it was 10 years ago in Nepal. But, its still not good enough. So mountain communities are disconnected in many ways, or at least less connected.

Gavin: As well as transportation links, market access.

Erling: So they miss out on all these things. But that could be one way to help something like environmental education or to boost the both the way the EE is transferred, but also in access. So I think whats happening is systematic, Nepal has not kept up with the times, it is way behind than some other countires, where they put priority on making sure that there are mobile phone connectivity and that there are internet nodes as far as you can go out into the rural areas. China has gone further than many parts of South Asia. India has gone further than Nepal. Still mountain communities in India are still suffering like mountain communities in Nepal are doing. They're not as well connected and they miss out more.

Gavin: Its really good to hear your ideas on this. Moving off just as a side point. How do you think Nepal will look in ten years time, if you were to just make a wild guess, in terms of environmental impact. I've only spent 3 months here so my guess isn't informed, but I try to stay optimistic for Nepal from an environmental perspective, but, being in Kathmandu, and seeing the toll on the environment, there's so much poverty that theres so much need to increase income, yeh, I suppose looking at the terai region or the cities, I wouldn't hold much hope for, but in the mountain communities, if they're able to... but its such a meagre, its subsistence living. And they're so vunerable to any change, its seems very previous.

Erling: Yeh, it does. I think the Terai has an advantage in one way, its location, it does have big neighbours that could help quite a lot. The problem is theres lots of gender strings that come attached to that. But Nepal, needn't lag behind so much if it had the write community feeling in the country. This election shows, as usual, that when people cant agree on a common agenda they spilt. And they losse. And that's also a little bit of the dilemma that the emphasis is still on a few important families, we have the caste system to deal with, and no really seems to be wanting to tackle that head on. And so there are going to be disparaties for a long time to come until that's checked. And we know there are certain parts of Nepal, Western Nepal is behind in many indicators. But in some ways that might be better of just left to the vices of managing themselves as they've got quite a lot of natural resources. But if you think about hydro power possibilities here, there is no reason why Nepal should have this desperate situation with electricity, it's a very practical thing, why hasn't it happened, why cant they agree to get it done. And so this is systematic of how development works in Nepal. Its not a very good picture coming up, no matter whos in charge. I mean Nepal should be total slef sufficient with hydro power since a long time ago.

Gavin: Its mindboggling that there hasn't been a success in that area. I wonder how much of that is to do with outside influence, from India and China? It seems to be there is a very fatalistic mindset here in terms of what can we do or what can I do. I wonder if that comes about through living in an environment that is very chaotic very difficult to get things done, it takes time, so maybe an apathetic mindset is a result of that.

Erling: I think to some extent Nepal has been fortunate in a way to have had a good enough situation to muddle through and survive pretty well. Going back 3 or 400 years, once all the small kingdoms settled down in kinda of worked, but it wasn't very good, there is a lack of – my private opinion – acknowledgement of a need to work hard here to catch up, so, in China they can talk a lot, also, its been an eye opener, that you can talk a lot in China, different oppinions on what to do, but everyone agrees you should do something and if it doesn't work you go back and fix it. Here they just keep on deciding next time, and theres other things they should do and then they cant. And then they the families compete with each other. So theres this apathy, theres this kind of stagnation and that's not good when you're a mountain community, when you could be self sufficient, and selling electricity expensively to both China

and India. So I don't think it's gonna happen very quickly. I don't think there's enough urgency. I mean they love there 90 days of celebration. At least in Patan, they have 90 days of celebration every year. Countries I've worked in, like Vietnam and Thailand, this doesn't exist.

Gavin: There's a real hunger there, thinking of Bangkok, there is such an inspiring urgency, a yearning to succeed, and you see that in East Asia as well. There seems to be a big focus on finding contentment regardless of your circumstances, peace of mind, equanimity, regardless of your experience. It's a great way to live, but then to reengage back with the work is essential. It's really interesting to talk about that. Have you seen a decline in agricultural products here, in terms of what you can access in the supermarkets?

Erling: I don't think so, I think it's still pretty seasonal, there are seasons where certain produce is going to be there for sometime and then it goes. Over the last few years, when I was last here in 2008 and now I've come back in 2012, I think there's more outlets for organic grown vegetables, that's a good sign. Although they may only be in our part of town where there are foreigners happy to pay for them. I think probably there might be more available now, in KTM at least, because things get flown in. I think compared to when I first came here in 1994, there is a big difference.

Gavin: With adaptive capacities, how do different areas of Nepal compare with other areas in the Himalayas?

Erling: Looking at household surveys they're not really ready yet. In general, there are certain trends, the begin to think might be common throughout the mountains. One of which is, a new change of cropping system, fruit is often being dropped in many places. And you change to something else, say grain. There's a change in the production of potato, which is quite interesting, in some places it's better to grow potato now, especially around the KTM valley. There is a change in the number of livestock that the households have. One point is that households maybe have less people to work, less livestock per household, less free grazing. One point is a restriction of grazing on forests. But also, children are prioritized to go to school. If men are away from the household, it means there are quite a lot less labour to take the livestock out. These are some of the main things from the agriculturally based households that we have. Pakistan it seems that moving is the best way to adapt, as in some places the water has dried up completely. There is a shift in the amount of rainfall but also in the way perhaps that the water is distributed. In some villages now have moved completely because they just couldn't stay. The whole population.

Erling: Successful community forestry projects, and that's been interesting to many other parts of the world, now there is a debate on what to do with the type of management, it's a bit worrying to believe that there's voices saying that perhaps these communities are misusing that mandate, there's self gain and so on. But I think that they have shown to be a pretty good deal. We're using it now in our programs to bring people to show community forestry. This is EE at the highest level when you bring in technicians from government and academics to learn from that.

Gavin: I think community forestry will be an area I'll be focusing on. I see a possibility of linking to environmental education. I just didn't foresee that it would be as difficult as it's been to find out the information.

Erling: Yes, that is pretty typical for this region and also for countries where you kind of have an old system of government, I mean Nepal's Government is an old system. Information collection is not easy. I see that UNESCO could do in this area of EE is to brake into the climate change agenda and offer something to the big stake holders. What is it that we could do as pilot projects, with a national interest at hand better start somewhere though and perhaps different places throughout Nepal. Doing something with a mix of agencies at ground level, 10 year plan.

Gavin: Yeh, that's one thing I've been turning around in my mind, is the ministries and their capacity to follow through and get stuff done, isn't that high, so im wondering why there hasn't

been a shift in focus towards the NGO's and local government. But it just hasn't really come through.

Erling: There are entry points now, because, I think its good now to remember a link here between national adaptation plan on climate change, now there's local adaptation plans of action (LAPA), these are supposed to be implemented throughout the country. Because there is an idea of institutional setup for that already in place here. And so to move in there and say, OK, we want to use this setup, our idea is to trail A, B, C, in certain places (forest focus, agroforestry focus). Agroforestry is a big big thing, and I believe in that a lot. To combine the different types of agricultural practice. Then that slips quite easily into what we call climate smart agriculture. This is a thing that has come out quite strongly in the last couple of years and throughout CAP19. If you search for climate smart agriculture. There's even, we're looking at climate smart villages, so you work with different community agencies at a very local, and that should connect back to the LAPA.

Gavin: Which links in with the UNFCCC as well

Erling: Yeh, Because it goes back up stream to the national umbrella of NAPA and this project that they have here in Nepal, I forget the acronym, National Climate Change... This I think would be an interesting entry point that UNESO could easily tap into and support the LAPA. There's education needs everywhere. Even if it was me trying it out in a one year program within a couple of schools, throughout the country.

Gavin: The climate smart communities, are there people in Nepal pushing ahead with this?

Erling: It's a global idea, which is a recent one from.

Gavin: What is climate smart agriculture?

Erling: It means you have to be looking at how to help farmers, you know as an extension of support from the government. What are they facing?

Gavin: With a future focus?

Erling: Well a lot of this would mean they are using technology that is already available. There not supposed to invent anything new. It's a landscape approach, agriculture, climate resilience and practical technology.

Gavin: With the climate smart communities, who is focusing on this?

Erling: It isn't strong here yet, you can look up CCAFS.

Gavin: Well I don't want to take up to much more of your time Valdemar.

Erling: Rest assured that it is beyond discussion that climate change education is a tool that should be employed by many different agencies for many different purposes. One is in general, as part of the curriculum of science, but it is also, very easy to link that to livelihoods in rural communities. They've already been doing a lot of it, but the thing is to really institutionalise it. That is the other key point, that there are often many institutions and groups (agriculture, technology) involved in CC education. EE is part of basic news... not basic news but a way to equip people with basic skills to handle new challenges. So I think, a problem with something like UNESCO, is there a little bit too much of the advisor, a bit like ICIMOD in a way. They make nice publications, but you've got to find the connection to the population, but this has to go through the institutions that are mandated to do that.

Gavin: Its very well said, it makes me think of universities, with academics, where the knowledge is just circulating in the sphere, and only occasionally it comes out to the wider public. That's why I like the idea of researching, yet also bridging that knowledge, sharing that knowledge. A lot of people don't have access to it, because they cant understand the jargon or know how to access scientific articles. So, yeh, and, I don't know that much about ICIMOD,

but im surprised that they don't have a stronger outreach, I know it's a research institution. ICIMOD has linked with UNESCO, though its more of just extending a hand shake, and be associated with ICIMOD.

Erling: Yes, ICIMOD is changing, part of this new 5 year program that we started this year, is to look more at outreach, this conference on 'addressing poverty and vulnerability' , this is a new area we're trying to support. Before we looked at ice and what is happening, then we looked at hydrology, then ecosystems, down through the river valleys and the communities and their livelihoods downstream. All of these blue areas (points to map of Himalaya water catchment area) are areas that we are tasked with reaching out to.

Gavin: The knowledge and expertise that ICIMOD has is phenomenal.

Erling: EE fits the support for food production and healthy eco-systems for livelihoods. Climate change adaptation in general. In practical things mountain communications, roads, how they're made, too many roads being cut in Nepal today, some of them may fall down with the heavy rains.

The entry points are there, if UNESCO could, we could have an EE program with theses Himalayan countries, it could be a nice UNESCO/ICIMOD partnership, because we don't have enough education outreach from our side.

Gavin: It sounds great, if you go higher even and link it with UNDP.

Erling: For sure, as UNDP has offices in each country, I worked a lot with UNDP, so I can see it doesn't take that much of a big planning deal to put that in place.

Gavin: You have an education background so I imagine it would be an area of interest for you.

Erling: Yip.

Gavin: That's great, thanks Valdemar.

Erling: You're welcome, we'll have to see if something comes along in two three...

[END OF INTERVIEW].

## Appendix V – Dhading Besi High School 2

Twenty year 12 students from Dhading Besi School 2  
 Interview location: School 2. Dhading Besi, Dhading District, Nepal  
 Interview time: 11:05am (duration 43 minutes). December 15, 2013

Gavin: How many students are there at this school?

Students: More than a 1000.

Gavin: Sometime please tell me, what do you think of the environment in Dhading? The environment can be the mountains the rivers, the forests, the animals, birdlife, what do you think of the environment in Dhading?

Rupesh: The environment is the place where all the living creatures live, it is where the ecosystem, living things as well as non-living things co-relate.

Gavin: Does someone else want to share, what do they think the environment is, the natural world is? These are very simple, very basic questions, but I'm interested in your answers.

Roshni: In my view, the environment is something in which all biological, cultural, physical, aspects come directly and indirectly.

Gavin: One more description please...

Gavin: Okay, lets try this, you have two minutes to discuss (with the people sitting beside you) what the environment means to you.

Gavin: Okay, our we ready. What is the environment to you?

Gavin: Remember you can speak in Nepali if you want to and we have a brilliant translator.

Student 1: The environment is a composition between the village and the natural resources, animals and that is it, it can be exist.

Gavin: I've listened to some of your ideas on what the environment is. I want to know what does it mean for you. What type of meaning does the environment have for you? For me I love to go to into the natural world, to go walking, to go hiking, also going skiing/snowboarding, I also do a lot of rock climbing/mountaineering, so I spend a lot of time in the natural world, camping, hiking/trekking, That is one really important aspect, one really important thing of the environment/the natural world. And so I spend a lot of time outdoors I want to protect the environment and I want to make sure that humans we work in balance with the environment / with the natural world, because if we do too many activities we can cause environmental destruction, we can cause it to degrade, become not as healthy, so that's what the environment means for me, I like being outside, in the natural world, so I want to protect. Also I studied biology so I'm very interested in the plant life.

Gavin: Who would like to share what the environment means to you?

Gavin: What do you think of it? Do you think it's boring? Nothing happens? What type of meaning does the environment have for you?

Student 2: Wonderful.

Gavin: Do you think Dhading is a beautiful natural landscape? What do you think of Dhading? I think Dhading is a very beautiful landscape, because it has lots of mountains, forests and also hills, and it has two big rivers that flow through it.

Gavin: Please, please share your ideas.

Gavin: Is it important? Why is it important?

Krishna: Yes, because we can fulfil all our basic needs from the environment.

Gavin: What else do we think?

Student 1: For the survival of living things.

Student 4: We can carry out every human activity in the environment.

Gavin: Is the school part of the environment? Part of the natural world? Yes, no, kind of. Are humans part of the natural world?

Students: Yes.

Gavin: It can be difficult to talk about the human world we humans (some people think) are apart of it.

Gavin: At school, what kinds of things do you learn about the environment? Do you learn about it in English? Do you learn about it in history in Nepali?

Students: In our books.

Gavin: What books do you learn that in? Do you have one book for all of your classes?

Students: No, separate book for separate subjects.

Gavin: What subject looks at the environment?

Students: Science and environment. Population and environment.

Gavin: What do you think of that subject, do you find it an interesting subject.

Students: Yes.

Gavin: Why do you find it interesting?

Rupesh: Everything is from the environment, we get everything from the environment, food, cloth, everything.

Student 6: It is interesting, we can learn everything.

Gavin: So, environment and population, is the subject where you learn about the natural world also biology, a very important subject. Some schools have an integrated curriculum, so the divisions between the different subjects are less.

Gavin: So, I now know what some of you think about the environment, where you learn about it. How does that effect your thinking, or how does that effect your actions? Does it change anything about how the way you see the world, or what you do? For example, we I learnt about pollution, whenever, I go into the natural world I take all my rubbish back out with me. So that is one effect that learning about the environment has had.

Roshni: So it has increased my participation in environmental groups, so its made me very interested and active about conservation.

Gavin: Is there a Green Club at this school?

Student 4: Less pollution and we will know how to conserve the environment.

Gavin: Do any of you see your mum or dad, brother or sister, doing something, and you might stop them and say maybe we should do things differently. Does that happen sometimes? Maybe, maybe not?

Gavin: Two last questions, what do you think of the environment in Dhading? Do you think its healthy, do you think its polluted, or do you think it needs improvement or is it ok as it is? What do you think about the local environment in Dhading?

**Sajita: It should be improved and it should be pollution free!**

Gavin: What do you think needs to be done in Dhading? What can be done to improve it?

**Roshni: Different awareness programes should be done, forestry projects to plant new trees, different training provided to the local people.**

**Sajita: Throwing rubbish should be stopped.**

Gavin: Good how can we stop throwing rubbish?

Gavin: No rubbish in the rivers. Maybe you could give them a fine?

**Sunita: Start compost project.**

Gavin: If there was a recycling service in Dhading, would you recycle some of your rubbish?

Students: Yes.

Gavin: Lastly, when you look at Dhading Desi, are you positive about what will happen to the environment in your time? Do you feel optimistic that the environment will get better?

**Sajita: If we leave it as it is, then it will deteriate. If we create awareness in our societies then of course it will get better.**

**Krishna: I think the environment will be degrading, because in my lifetime, the population will increase, and if the population increases then pollution also increases. So the environment will degrade.**

**Student 7: It might be better in the future. Different awareness programs might be launched, all people might be aware of the problems.**

Gavin: What is the biggest environmental problem in Dhading? And what is the biggest advantage?

**Students: Water pollution mainly, it is the biggest problem.**

**Student 8: Educated men, uneducated actions.**

Group was decreased to 6 students:

Gavin: Can you tell me about the groups your involved with about the environment? What do they do?

Gavin: You are 16 years old, you have one more year of high school.

Gavin: If there were public rubbish bins in Dhading, people would begin to use them or would people continue to put rubbish wherever?

**People throw their rubbish in the rivers and on the roadside.**

Gavin: Do you think it will be able to change in your lifetime?



Student 5: In the context of Dhading, educated people are doing such things, we can make them aware. However, the educated people are aware but they still throw their rubbish here and there. Limit the paper.

Gavin: Do you think it has more to do with people who have low literacy or no education? So they don't have the awareness.

Gavin: Is there community forestry in Dhading?

Students: Yes, about 600.

Gavin: Do you help plant trees when you were younger?

Student 7: Yes, when I was younger I went in the jungle with my school and we planted a tree.

Gavin: Did you enjoy that experience?

Students: Yes.

Gavin: You, not so much?

Gavin: Do you think environmental education that you receive at this school is enough? Do you think it does a good job, or do you think it needs to be done differently?

Sunita: Theoretical is done, but practical is not. I think we should do some practical exercises. So that it will be good for us.

Student 8: Students are divided into many groups, it is necessary to give them names. The groups should be sent to different forest areas or villages, for the knowledge.

Students: This will create a smaller group (one class) so you can see the effects as a group.

Gavin: Are you saying because it's the whole school, its too big, maybe need smaller groups.

Students nod heads in agreement.

Gavin: Thank you for your ideas.

[END OF INTERVIEW].

## Appendix VI – Dr. Rupesh Raj Interview

Professor Rupesh Raj  
Head of Science Education  
Trubhuvan University, Kathmandu

Interview location: UNESCO Office in Kathmandu, Nepal.  
Interview time: 3:02pm (duration 48 minutes). December 16, 2013.

I visited Banares... Varanasi.

You visited Varanasi?

Yeh, I was there three years ago. I had maybe three or four days in Varanasi. A very interesting city.

A nice city.

But there were, I caught the train from, mmm, I caught the train from the Taj Mahal.

You visit Taj Mahal?

Yes, to Varanasi, but there were a lot of people getting off the train to go to Lucknow. And then we caught the train to Varanasi.

Varanasi is here...

My topic is environmental education for climate change resilience so how.

Effect of climate change and livelihoods.

I'm interested in the environmental education offered at Tribuvan University, can you get a degree in environmental education?

There is just I'll review, up to Year, 8, 9 and Year 10, environmental education is compulsory, they need 100 marks. Year 11, 12 it is optional. In bachelor level, environmental organisation courses reach interdisciplinary, every student can take it.

The title of that, is that an EE class or course?

EE is a course, 100 marks, within this it has a sub-unit, pollution, eco-system and EIA (Environmental Management System), different types of pollution, climate change, weather change, cultural heritage, sustainable development, man made degradation of the environment and the effect on human beings. Sustainability course is there I think.

And so the environmental education course is undergraduate.

Undergraduate and graduate.

So, it's interdisciplinary?

Yes, but it is actually 100 marks for the teachers, for those who teach the secondary level and primary level students. Bachelor in Education, they took 100 marks education, interdisciplinary course on EE.

How many marks do they need in total for the degree in teaching?

It is 150. 50 marks is for a practical course, 100 marks for theoretical course.  
So, teachers can major in environmental studies, that's a big component of their...

Yes, I'll tell you, there is a bachelor and a masters level for environmental education. But, technically in the pure science. After passing a masters degree in environmental education they can go in any discipline: environmental sector, government sector or administrative sector or technical sector. But in bachelor level in education, they go only on the teaching line, they are teacher. There is differences. Our students are teacher, after passing graduation they go to schools and they teach students, their profession is teaching. But, a masters in pure science, their major is environment, they can go to policy, anywhere, research centre or anywhere. But, my discipline is for teacher.

How many students are there each year to study EE?

In science discipline, science in education there are 500 students. That's for science education. But there are 1000 students for all teachers.

How many of the science students will take EE? Mmm, 80%, very popular, high demand, they can get a job easily.

So 80% of the 500 students, so maybe 400 students will specialise in EE, and the graduates of the science education. Are they going to primary or secondary schools?

They go to secondary schools or in the remote places of the Nepal, everywhere. They get a job easily, they are in high demand.

Tribhuvan is the top.

Not only university, they will get the job in high school level easily.

Because the environment is becoming a high priority.

Environmental education is a high priority and recently launch[ed] in Nepal, just 5 or 10 years ago.

Interesting, very interesting, is it equal gender?

60% girls, 40% boys.

So teaching is more girls.

From your perspective as a scientist, what are the areas of the environment that have the biggest challenge or the biggest threat?

There is more danger, especially in ecology. Our fauna and flora is going extinct. So, it should be preserved first and then ecological disturbances means our animals die, or migrate, our plant species extinct, this is the major problem in Nepal. Then air pollution, particularly in Kathmandu. It is more polluted in KTM, air pollution, then you may so water pollution also.

I was very surprised to learn about the source of the Bagmati river. It is very close, only approx., 10 kilometres away.

Yes, I did a Phd on analysing the chemical make up of the Bagmati river, from four distinct levels.

What were the findings?

There is no arsenic.

That's good.

There are high levels of ammonia, iron. Some zinc.

Is the majority of the pollution flowing into the Bagmati river, is that from sewage.

And the Bagmati, does it flow into the Ganges? The river is 27 kilometres until the border.

Are there projects to clean the Bagmati river?

Yes, there is one plantation, in the Bagmati river, Gauri Ghat, near by Pahupatinath, that is purifying the water.

It is a purification system.

Looking to the future for the next 5 or 10 years within the KTM valley. Are you hopeful about the possibly the improvement with the environment?

Yes, improvement, the government is implementing many various projects for the air and water pollution, up to 5 years, it will change very quickly, I hope. The population will be increase here. Our organisation is growing day by day. But I feel it improves.

It is good to hear a positive outlook.

The students that I spoke to in Dhading, they said that almost all their EE or population and environment programme. Was classwork, was the theoretical. They were looking for more practical experiences. Universities are generally more theoretical. Are there any practical activities that the EE students do, to participate in the KTM valley.

In the lab they will test bio-chemical, COD, chemical oxygen demand, and BOD, biological oxygen demand. They will test in the lab, ammonia, nitrates, carbon dioxide, sulphites etc. They will test the Bagmati or the Bishumati.

Does the Bishnumati have higher levels of pollution than the Bagmati?

Yes, the Bishumati is more polluted than the Bagmati. A much smaller volume of water compared with the Bagmati.

What is the focus of the education department with the science and EE unit, for the next 5 years? Are they looking to enhance.

Student will increase, our numbers will increase, we enhance, we prepare big lab, environmental pollution etc.

Talk about KEEP.

The students I interviewed talked about a 'Green Club'. There was a green club at their school. So, the high school students would get involved in E projects and link in around that.

Climate change, is there much of a climate change focus in the environmental education at Tribhuvan?

There is a small project on CC. It launched recently within the last 10 years. Just two years ago, the government introduced the project on CC.

It is interesting how UNESCO, the years 2004 -2014, it is the decade for education for sustainable development. There is climate change education, but the main focus in Nepal has been literacy and also education for everyone / Access. So not as much focus on climate change or EE. Which is understandable.

The students at Tribhuvan, where are they from?

This a metropolitan city, people come from out of the valley, originally they are from outside, now they stay here.

So there is quite a lot of urban migration, are there scholarships for some students to study education at Tribhuvan.

No, expenses are their own finance.

The costs for studying at Tribhuvan, to train to become a teacher. How much is it for a yearly tuition fee?

50,000 Rupees for two years.

How many lecturers are there for the science department and the environmental education department. Just seven teachers.

Does one specialise on EE?

Yes.

It is impressive, 400 environmental education teachers per year, is a good amount.

**Ecology is being impacted by deforestation.**

Is there also a project to improve the sanitation?

No not yet.

[END OF INTERVIEW].